



**Transportation and Mobility Department**

**Memorandum No. 24-15**

**Date:** June 28, 2024

**To:** Susan Grant, Acting City Manager

**From:** Ben Rogers, Acting Assistant City Manager

**Re:** **REVISED** Emergency Purchase – Repairs to the City Hall Garage

On February 23, 2024, Lakdas/Yohalem Engineering (Lakdas), Inc. provided the City of Fort Lauderdale with a Structural Condition Survey report. The report was finalized and submitted to the City of Fort Lauderdale in April 2024. The report divided the conditions into four categories: 1) immediate repair 2) repair work within 6 months 3) repair work within 12 months and 4) maintenance (24 months). The report identified that no immediate repairs were necessary, however there were 6-month, 12-month, and 24-month repairs required.

After receiving the report, Lakdas started design efforts to define the repair requirements. The 100% design is scheduled to be completed by the end of June 2024. The 100% design is utilized to determine the line item and quantity needs which are required for the bidders to understand the size, scope, and magnitude of the project.

In addition to the April report, Lakdas provided the City with a letter on June 19, 2024, confirming that the six-month repairs **must be completed by October 23, 2024, in order to keep the City Hall parking garage in operation**. Given this, less than four months remain for the City to onboard a contractor and complete the work to prevent potential catastrophic damage to city property.

Due to the need to repair the parking structure on or before October 23, 2024, I request that a procurement emergency is declared pursuant to **Florida Statute §255.0525** Section 2-181(f)(4), Code of Ordinances of the City of Fort Lauderdale, Florida. This request is to **address the six-month repair needs** as the 12-month and 24-month repairs will be competitively bid. The six-month repairs include, but are not limited to, providing support to minimize cantilever slab extension beyond slab support beams, providing new steel brackets to support joist bearings at soffit beams, fill the planter boxes with a light in-filler and seal, and to provide connections to the deck for



deteriorated steel plate connections of the precast planter box connections at the top of each floor. The total estimated cost for the six-month repairs is \$1,600,000.

This declaration allows for emergency purchases authorized in the event of equipment failure, catastrophic damage to city property, or another similar unexpected event. Following this declaration, staff will coordinate with the Procurement Division and current City of Fort Lauderdale contractor(s) to expedite the needed immediate repairs of the parking structure. A full report of all purchases associated with his emergency request shall be made to the City Commission at the earliest available Commission Meeting.

If you have any questions, please contact Kristin Thompson, Transportation and Mobility Division Manager at (954) 828-3721 or [Krthompson@fortlauderdale.gov](mailto:Krthompson@fortlauderdale.gov).

Attachments:

Attachment One: Lakdas Final Report (April 11, 2024)

Attachment Two: Letter from Lakdas (June 19, 2024)

c: Anthony G. Fajardo, Assistant City Manager  
Laura Reece, Acting Assistant City Manager  
David R. Soloman, City Clerk  
Patrick Reilly, City Auditor  
Thomas J. Ansbro, City Attorney  
Rhonda Montoya Hasan, Senior Assistant City Attorney  
Linda Short, Finance Director  
Glenn Marcos, Chief Procurement Officer  
Milos Majstorovic, Transportation & Mobility Acting Director  
Kristin Thompson, Transportation & Mobility Division Manager  
Mitxi Sanchez, Transportation & Mobility Project Manager



# Final Submittal

04-11-2024

**RE: City of Fort Lauderdale City Hall Parking Garage  
Structural Condition Survey Report  
City Project # P12183  
LYE Project # 221203**

In accordance with our contract, dated August 10, 2023, an Engineering team from **Lakdas/Yohalem Engineering, Inc. (LYE)** reviewed existing construction documents (prepared in 1982) and conducted site visits at the **City of Fort Lauderdale City Hall Parking** from July 2023 to October 2023 to observe the current structural condition of the parking garage. The purpose of LYE's site visit was to document the existing structural condition of the parking facility and provide a detailed report. This report will serve as a guide in providing site findings (documented in tables and drawings), defect image cataloging, analysis, comments, and recommendations, as well as a probable cost of repair for the garage structure.

Our observations were limited to visible and accessible surfaces of the parking structure. They were intended to note visible damage to the various structural elements to gather information that would enable us to comment on the existing condition of the structural systems in place. Visual observation and sounding of concrete decks and ramps were the methods used to facilitate the survey processes. Neither our observations nor this report is intended to cover hidden defects or mechanical, electrical, plumbing, or architectural features of the building not specifically mentioned. Information was gathered from all four floors of the parking garage to include the following systems: Top and underside of slab columns beams, perimeter walls, rails, and ramps, as well as stairwells.

## **1. Purpose – Summary of Evaluation**

This report summarizes the defect findings obtained during the structural survey of the City Hall Parking Garage Facility (CHIPGF). Through visual observation and chain drag sounding of the deck slabs (top and undersides), LYE observed concrete deterioration at several structural components, including slab columns, beams, floor joists, and parapet walls. This included hairline and structural cracks at most structural elements; spalls and exposed steel reinforcement at most structural elements; exposed pre-tension cables at the end of each joist; delamination of concrete and deterioration of previous expansion joints and signs of moisture intrusion at key joist hangers; failing joint sealants; corrosion of metal components at perimeter wall and attachments. Other components observed included spalls, cracks, chipping, delamination in concrete surfaces, and





improperly sloped slabs causing drainage issues. An inventory of damages throughout the parking facility has been compiled and transcribed into the existing survey plans. The repair work is truncated into three categories, reflecting the time frame in which repair work is expected to occur.

Table 1.1 - Repair Categories & Costs		
I	Immediate Repair	No Work Required
II	Repair Work Within 6 Months	Refer to Section 5
III	Repair Work Within 12 Months	See the Attached Schedule for Each Floor
IV	Maintenance	See the Attached Schedule for Each Floor

## 2. PARKING STRUCTURE DESCRIPTION

The city parking garage is a 4-story concrete garage spread over approximately one city block. The garage accommodates approximately 1450 car spaces with a pedestrian bridge on the 4th Floor that connects to an east condominium structure and at the 3rd level on the south side connecting to the adjacent office. These bridge structures are not included in this project scope. The structure has three staircases, two on the south side at each corner and one on the north side that is located towards the middle of the structure. The elevator shaft is located on the southwest corner of the garage. The garage footprint is approximately 395'-0 x 284'-0. The referenced parking garage has multiple entrances and exits with two entry ramps and one exit ramp. One of the entry ramps is located on the structure's west side, which leads to just the second level. The second entry ramp on the structure's east side facilitates traffic from the First Floor to the 4th. The exit ramp located on the east side facilitates traffic from the 4th Floor down to the 1st Floor. The existing structural system is comprised of elevated slabs supported by a key joist system with a 4½" concrete slab that sits on prestressed 4½ soffit concrete beams with poured-in-place concrete columns on a pile foundation. Each structure floor's exterior infill perimeter precast concrete knee walls consist of precast reinforced concrete. A guardrail system composed of a concrete panel with cable rails is placed at approximately mid-height of the knee walls. The railing system is also found within the interior parking area at equal intervals. One true expansion joint and two control joints are found on floors 2, 3, and 4 of the structure that run in the north/south directions. The current use of the structure is mainly to provide parking for two-axle cars and SUVs not more than 50psf on the deck load.





### Structure Construction

- All three elevated decks are constructed with 24" deep Key Joists with a minimum of 4½" thick concrete slabs sloping up to 7" from the grid line in the north-south direction.
- Key joists span 60 feet between concrete soffit beams (hybrid prestress and poured-in-place concrete slab)
- Soffit beams span between 24" x 24" poured-in-place concrete columns.
- A single expansion joint runs in north and south directions approximately 150' from the east side with two construction joints.
- The structure has two ramps that are constructed with key joists and a concrete deck.
- Auger cast pile foundation to support columns and shear walls.
- Three concrete staircases with painted steel handrails open from Floor to Floor.
- Five entries to the first-floor level.
- Planter boxes are located along the structure's south and west sides.
- The construction of the 4th Floor to the original 3-story structure is marginally different from the 2nd and 3rd floors.

### 3. EVALUATION PROCESS

LYE proceeded by identifying the locations of the structural defects for each level. On-site LYE used chain dragging and hammer tapping (sounding) to identify spalls and delamination in concrete structural elements. A tape measure and other size gages helped size crack widths in linear feet of damaged concrete curb and exposed rebar. All other defects were noted through visual observations. After identifying each defect, a few pictures were taken along with marking the defect on the appropriate structural member and floor plan.

The referenced defects are quantified, given a significance level, through an acceptable time frame for repair work. Drawings were prepared to show deficiencies on each level for the deck systems' slabs, columns, underside, elevations, staircases, and elevator shafts. Picture files were created and organized by structural location defects and floor level of the defects.

Deficiencies were further reviewed and compared against original plans to state the appropriate recommendations. All measurements obtained during these inspections were transcribed onto survey plans for referencing and analysis. Each plan populates a schedule that gives a detailed description of the defects, a letter code that points to a provided repair detail, a repair urgency code or category (I, II, III) reflecting a time frame repair work is expected to occur – respectively: immediate, within six months, twelve months and routine maintenance with a reference number for the majority of the pictures of the defects.



A partial picture catalog has been developed (Appendix– Limited Picture Catalog of the Parking Garage Facility) to provide an understanding of the typical defects found throughout the facility.

Reference picture files can be retrieved from LYE or the City of Fort Lauderdale Transportation and Mobility Department.

#### 4. Summary of Defects Finding

##### 4<sup>th</sup> Floor:

The 4<sup>th</sup>-floor deck acts as rooftop parking and is exposed to exterior weather elements; this Floor, in particular, is used by the residents of the adjacent condo building structure to access the residential structure and their vehicles. The access to the condominium is provided with a steel bridge that connects the condominium to the east end of the 4<sup>th</sup> Floor of the parking garage. The reference bridge structure is not included in this scope of work. Since the fourth floor is exposed to outside elements, this parking deck was found to have more defects than floors one through three.

- Hairline crack: The majority of floor cracks observed were classified as hairline cracks, running in north-south directions on top of the key joist on the parking deck. Some of the cracks were observed around the top of the key joists bearing locations and beam locations. Hairline cracks were found around column bases and the columns themselves (some steel column structure extends above the deck to support the light pole).
- Structural crack: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab and running along the exterior beams supporting the slab on the north and south sides. Several cracks previously repaired are experiencing cracking at this time on the north and south sides. The key joist structure extends 5'-0" beyond the building frame structure and supports the south side parapet wall with the planter. The tension on top of the cantilever slabs has caused several cracks that can be visually observed running in the east and west direction along the top of the beam.
- Crack on parapet wall: Vertical cracks were found in various locations along the parapet walls, but most of the cracking was found near the control joint of the wall panels. Most crack lines appear on the inside face of the parapet wall and run in a vertical direction. Several crack lines were found on parapet walls and connections between the parapet wall and floor deck.
- Galvanized embedded plate connection: several locations with plate connections to the exterior parapet wall and concrete deck were found to be rusted, and as a result, the grout material at said locations is no longer in place and no longer secured to the deck.





- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed to the outside.
- Deck expansion joint defect: Deteriorated expansion joint materials were observed cracking and tearing, allowing water intrusion through the floors below.
- Joint sealant defect: Sealants along the joints between the beam and deck end were damaged and deteriorated, allowing water leakage down to lower levels.
- Drainage defect: Drain holes were damaged and clogged with debris at several drain locations. The clogging caused water to pool on top of the concrete deck and leak through expansion joints down to levels below.
- The parapet wall with the planter full of water is bearing heavily on rusted steel plates and the cantilever slab.
- It was observed that on the north and south sides of floors 2,3, and 4, cracks were running parallel to the beam supporting the deck because rebar was not placed through the beam to the other side of the deck.
- It was determined that there were a few design flaws observed during the Findings. These flaws are typical throughout the parking structure.

### **3<sup>rd</sup> Floor and Reflected Ceiling (Undersied of the 4<sup>th</sup> Floor Deck):**

- Hairline crack: The majority of floor cracks observed were classified as hairline cracks, running in line with the joist span directions on the parking deck. Some of the cracks were observed around the top of the key joists bearing locations and beam locations. Hairline cracks were found around column bases and the columns themselves.
- Structural crack: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab and running along the exterior beams supporting the slab in a north-south direction. Several cracks previously repaired are experiencing cracking at this time.
- Crack on parapet wall: Vertical cracks were found in various locations along the parapet walls, but most of the cracking was found near the control joint of the wall panels. Most crack lines appear on the inside face of the parapet wall and run in a vertical direction. Several crack lines were found on parapet walls and connections between the parapet wall and floor deck.
- Galvanized embedded plate connection: several locations with plate connections to the exterior parapet wall and concrete deck were found to be rusted, and as a result, the grout material at said locations is no longer in place and no longer secured to the deck.
- Spall with rebar exposed: There are many locations where rusted steel reinforcement can be observed and exposed to the outside.
- Deck expansion joint defect: Deteriorated expansion joint materials were observed cracking and tearing, allowing water intrusion through the floors below.



- Joint sealant defect: Sealants along the joints between the beam and deck end were found to be damaged and deteriorated, causing water leakage down to levels below.
- Drain steel pipes defects: The steel pipes observed on this level were rusted and loose. These conditions caused water to pool on the deck floor and leak into the deteriorated expansion joint and down to the levels below.
- Ceiling defects: Major defects were found on the ceiling, occurring on key joists' end bearings. The defects were found to be delaminated concrete with exposed rusted steel hangers (CASTALDI hangers).

### **2<sup>nd</sup> Floor and Reflected Ceiling (Underside of 3<sup>rd</sup> Floor):**

- Hairline cracks: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the parking deck. Some of the cracks were observed around the top of the key joists bearing locations and beam locations. Hairline cracks were found around column bases and the columns themselves.
- Structural crack: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab and running along the exterior beams supporting the slab in a north-south direction. Several cracks previously repaired are experiencing cracking at this time.
- Crack on parapet wall: Vertical cracks were found in various locations along the parapet walls, but most of the cracking was found near the control joint of the wall panels. Most crack lines appear on the inside face of the parapet wall and run in a vertical direction. Several crack lines were found on parapet walls and connections between the parapet wall and floor deck.
- Galvanized embedded plate connection: several locations with plate connections to the exterior parapet wall and concrete deck were found to be rusted, and as a result, the grout material at said locations is no longer in place and no longer secured to the deck.
- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed to the outside.
- Deck expansion joint defect: Deteriorated expansion joint materials were observed cracking and tearing, allowing water intrusion through the floors below.
- Joint sealant defect: Sealants along the joints between the beam and deck end were found to be damaged and deteriorated, causing water leak through down to below-level
- Drainage defect: Drain holes were damaged and clogged with debris at several drain locations. The clogging caused water to pool on top of the concrete deck and leak through the expansion joint down to levels below.
- Drain steel pipes defect: The steel pipes observed on this level were rusted and loose. These conditions caused water to pool on the deck floor and leak into the deteriorated expansion joint and down to the levels below.





- Ceiling defect: On this deck, major defects were found on the ceiling at the key joist end, which was damaged (concrete cracks and concrete) and spalled with exposed steel.

### Staircases:

There are three open staircases (nonfire rated) on the parking structure, one at the north elevation in the middle between the northeast and northwest corners and two at a south elevation at each corner on the east and west ends. They serve as the main walkway access to all floors of the garage. Vertical concrete walls from the ground structurally support staircases to the 4th level.

- Structural cracks on the walls: The cracking on the concrete wall and staircase is classified as severe/ defect of crack lines (< 1/4" thick) formed on the wall of the north staircase between the 3rd and 4th floors
- Concrete spall: several spall locations were found on stair steps and landing slabs from approximately 2sf to 5 sf area
- Steel handrail system defects: rusted handrails and base plate connection of handrails were found to be defective.
- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed to the outside

### Ramps:

- There are three ramp systems on the parking structure, one at the west elevation that terminates at the second level and two on the east side that connect all floors, levels 1 through 4. There are several floor deck cracks throughout each flight of ramps. The joist supporting beams have steel hangers, and the reference hangers are deteriorated with spalled concrete at each joint location.

### West Ramp:

- Hairline crack: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and the columns at several locations.
- Structural crack: Random crack line patterns (< 1/4" thick) were observed on the sidewalk between the flat portion and the inclined portion of the ramp.
- Cracks on barrier walls: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the interior face of the barrier walls.
- Spall with exposed steel: There were two locations where bollards were removed, but their base was left and exposed. These bases are rusting.
- Joint sealant defect: Sealant joints along the ramp between the sidewalk and the wall have defects.



**East Ramp Departure (2nd level to 1st level):**

- Hairline crack: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and on the columns at several locations.
- Structural crack: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab running along the exterior beams supporting the slab in a north-south direction. Several cracks, previously repaired, are experiencing cracking at this time.
- Crack on barrier wall: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the inside face of the parapet wall.
- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed to the exterior. This can be seen on the ceiling and beams above the ramp.
- Joint sealant defect: Sealants along the joints between the sidewalk and barrier wall were found to be damaged and deteriorated.
- Ceiling defect: On this deck, significant deficiencies were found on the ceiling at key joist ends (damaged concrete cracks and concrete spall with steel exposed). Some of the areas that had been previously repaired are now showing signs of cracking.

**East Ramp Entry (2<sup>nd</sup> level to 3<sup>rd</sup> level):**

- Hairline cracks: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and the columns themselves at several locations.
- Structural cracks: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab, running along the exterior beams supporting the slab in a north-south direction. Several cracks, previously repaired, are experiencing cracking at this time. There are also cracks on the sidewalk column locations.
- Cracks on barrier walls: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the inside face of the parapet wall.
- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed to the outside. This can be seen on the ceiling and beams above the ramp, especially at the ends where they intersect with the columns. The columns themselves have reinforcement exposed in several areas.
- Joint sealant defects: Sealants along the joints between the sidewalk and barrier wall were found to be damaged and deteriorated.





- Steel drainpipe defects: The steel pipes observed on this level were rusted and loose. These conditions caused water to pool on the deck floor and leak into the deteriorated expansion joint and down to the levels below.
- Ceiling defects: On this deck, significant deficiencies were found on the ceiling at the key joist end, which was damaged (concrete cracks and concrete) and spalled with exposed steel. Some areas had been previously repaired but now show signs of cracking.

**East Ramp Entry (3<sup>rd</sup> level to 4<sup>th</sup> level):**

- Hairline cracks: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and on the columns themselves at several locations.
- Structural cracks: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab, running along the exterior beams supporting the slab in a north-south direction.
- Several cracks, previously repaired, are experiencing cracking at this time. There are also cracks on the sidewalk where they meet the columns.
- Crack on barrier walls: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the inside face of the parapet wall.
- Spall with rebar exposed: There are many locations where steel reinforcement was seen rusting and exposed. This situation can be seen on the ceiling and beams above the ramp, especially at the ends where they intersect with the columns. The columns themselves have reinforcement exposed in several areas.
- Joint sealant defects: Sealants along the joints between the sidewalk and barrier wall were found to be damaged and deteriorated.
- Steel drainpipe defects: The steel pipes observed on this level were rusted and loose. These conditions caused water to pool on the deck floor and leak into the deteriorated expansion joint and down to the levels below.
- Ceiling defects: On this deck, significant deficiencies were found on the ceiling at key joist ends (damaged concrete cracks and concrete spall with exposed reinforcement). Some areas had been previously repaired but now show signs of cracking and delamination.

**East Ramp Departure (4<sup>th</sup> level to 3<sup>rd</sup> level):**

- Hairline cracks: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and the columns themselves at several locations. Barrier walls were also observed to have cracks throughout this level.



- Structural cracks: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab, running along the beams supporting the slab in a north-south direction. Several cracks were previously repaired, and they are currently experiencing cracking. There are also cracks on the sidewalk at column locations. The columns themselves have cracks running horizontally and vertically.
- Crack on barrier walls: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the inside face of the barrier wall.
- Spall with rebar exposed: There are several locations where steel reinforcement was seen rusting and exposed to the outside. This can be seen on the ceiling and beams above the ramp, especially at the ends where they intersect with the columns. The columns themselves have exposed reinforcement in several visible areas.
- Joint sealant defects: Sealants along the joints between the sidewalk and barrier walls were found to be damaged and deteriorated.
- Ceiling defect: Major defects were found on the ceiling at the key joist ends on this deck. (damaged concrete cracks and concrete spall with steel reinforcement exposed. Some areas had been previously repaired but now show signs of cracking.
- Barrier wall cable: In some areas, this cable has become loose and has lost its ability to remain tight to prevent any cars running off the ramp.

#### **East Ramp Departure (3 levels to 2 levels):**

- Hairline cracks: The majority of floor cracks observed were classified as hairline cracks, running in various directions on the deck. Hairline cracks were found around column bases and the columns at several locations. Barrier walls were also observed to have cracks throughout this level.
- Structural cracks: Random crack line patterns (< 1/4" thick) were observed on top of the deck slab, running along the beams supporting the slab in a north-south direction.
- Cracks were observed on the sidewalk where they meet the column locations. The columns themselves have cracks running horizontally and vertically.
- Cracks on barrier walls: Vertical cracks were found in various locations along the barrier walls. Most crack lines appear on the inside face of the barrier wall.
- Spall with rebar exposed: There are several locations where steel reinforcement was seen rusting and exposed to the exterior elements. This can be seen on the ceiling and beams above the ramps, especially at the ends where they intersect with the columns. The columns themselves have reinforcement exposed in several areas.
- Joint sealant defects: Sealants along the joints between the sidewalk and barrier wall were found to be damaged and deteriorated.





- Ceiling defects: On this deck, significant deficiencies were found on the ceiling at the key joist end, which was damaged (concrete cracks and concrete) and spalled with exposed steel. Some areas had been previously repaired but now show signs of cracking.
- Barrier wall cable: In some areas, this cable has become loose and has lost its ability to remain tight to prevent cars from running off the ramp.

## 5. COMMENTS AND RECOMMENDATIONS

It is this office's considered opinion that the existing 42-year-old parking garage is structurally adequate for the proposed use; however, based on our structural condition survey and analysis of site findings, it is the professional opinion of LYE that the deterioration of many structural components at City Hall Parking Garage has warranted structural restoration and protection. LYE Recommends the following courses of action: There are a few items that require early action

The Following Restoration Task Should Be Completed Within 6 Months:

- Provide support to minimize cantilever slab extension beyond slab supporting beams on the north and south sides of the garage's 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> levels.
- Provide new steel brackets to support deteriorated joist bearings at soffit beams.
- Provide connections to the deck for deteriorated steel plate connections of the precast wall panel connections at the top of each Floor.
- Fill the planter boxes with a light in-filler and seal.
- Provide connections to the deck for deteriorated steel plate connections of the precast planter box connections at the top of each floor.

The Following Structural Restoration Task Should Be Completed Within 12 Months:

1. Repair damaged concrete spalls by removing concrete near corroded reinforcing steel, cleaning and preparing reinforcing steel, and installing epoxy concrete.
2. Repair of all concrete cracks with epoxy injection.
3. Repair of concrete around exposed pre-tension cable strands or cable system in accordance with spall concrete repair at each end of the key joist.
4. Repair delaminated concrete at key joist and soffit beam deficient locations.
5. Remove the existing joint sealant at the floor deck where the joist bearing is at grids B and J.



6. Remove the existing expansion joint and construct a new joint at grid 9/10.
7. Remove existing floor deck joints and replace them with new joints at grids 6 and 13.
8. Install new joist hangers at grids B and J.
9. Install new beam hangers at grids six and 1B.
10. Remove all rusted steel tube handrails in all staircases and replace them with new aluminum handrails to match the existing (mill finish).
11. Correction of the slab slope to address the ponding issue, facilitate drainage with a new epoxy concrete overlay and add additional drains at the west side of the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> levels (See WGI Recommendations).
12. Repair cracks and spalls in the precast wall panels at each floor level and on all sides.
13. Pressure wash the entire 4th-floor deck and Drive Isle of the 2nd and 3rd levels and apply deck coating (after completing all repair work).
14. The exterior of the building and the top of the slabs (excluding Drive Isle) of the 2nd and 3rd levels, pressure-wash and apply penetrating sealant.

The Following Restoration Task Should Be Extended for 24 Months:

1. Pressure clean the entire deck, apply deck coating on Drive Isles, and seal the parking area at the 2nd and 3rd levels.
2. Paint the garage with a cementitious base exterior paint on both sides of each wall.

### **Suggested Building Maintenance Tasks**

The following tasks are common to the facility and are as follow:

1. Pressure washing (Building exterior and top of each floor slab)
2. Painting and sealing concrete (Building exterior).





The cost of deck coating is significantly higher than the seal coating, where seal coating can be applied in the parking area at the 2nd and 3rd levels; however, the seal coating life span is less than half the life span of deck coating, which is 6 to 7 years (depending on traffic).

The year 2024 will include the following:

- All repairs that LYE identified to be structural defects must be repaired within the next six months for Category II and within 12 months for Category III.

Based on our site findings and proposed corrective work, it is this office's considered opinion that structure restoration for this project would cost the following:

**Table 5.1 – Cost of Repair by Location/Task**

Location / Tasks	Total Cost (\$)
Ground	\$ 60,100.00
Level 2	\$ 2,047,225.00
Level 3	\$ 2,032,250.00
Level 4	\$ 3,289,575.00
*Pressure Wash (Common Area)	\$ 100,000.00
*Exterior Painting (Common Area)	\$ 120,000.00
*Allowance	\$ 406,000.00
General Condition and Engineering Services	\$ 1,250,000.00
<b>Grand Total Cost (\$)</b>	<b>\$ 9,305,150.00</b>

\*See Allowance Table (Page 21)

The total cost of structural repair without any inflation or market conditions, the cost of structural repair and preventive maintenance would be \$9,305,150.

Should the City decide to spread the restoration work over two years, exterior wall painting and deck coating of the partial 2nd and 3rd floors can be carried out in 2025.

The remaining work specified under our recommendations should be carried out within the next twelve months, with some work in the 1st half of 2024 identified as early action.

This office offers our engineering service and is ready to prepare construction documents for corrective work and the required inspection services during construction.

Once all of the recommended repair work has been completed to maintain a major structural defect-free parking garage, this office recommends pressure washing the structure yearly and carrying out a routine evaluation of the condition of the structural elements every other year, specifically all joint sealant, expansion joint and exposed structural elements and joint connections.



LYE performed the above reference structural condition survey through Kittelson & Associates, who have a general engineering consultant services contract with the City of Fort Lauderdale.

We appreciate the opportunity to provide the above-referenced engineering evaluation services of the parking garage for the City of Fort Lauderdale.

Please do not hesitate to contact us if you require any additional information or clarification of any technical evaluation and cost estimate of repair work.

Sincerely,

Lakdas Nanayakkara, P.E.#37590





## APPENDIX

1. Cost Estimates Per Floor
2. Plans and Elevation With Structural Defects
3. Photographs of Each Defect Per Floor



# APPENDIX 1



**Cost of Structural Defects Repair at 1st Floor  
Final Submittal 04-11-24**

<b>FIRST LEVEL TOP OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Structural Repair Within 24 Months</b>	<b>QUANTITY</b>	<b>UNITS</b>	<b>UNIT COST FOR</b>	<b>TOTAL COST</b>
ANGLE BRACKET TO SUPPORT KNEE WALL				0	EACH	\$125.00	\$0.00
CRACK REPAIR		✓		314	LF	\$125.00	\$39,250.00
SPALL REPAIR			✓	39	SF	\$150.00	\$5,850.00
JOINT SEAL REPLACEMENT			✓	30	LF	\$125.00	\$3,750.00
EXPANSION JOINT REPLACEMENT				0	LF	\$125.00	\$0.00
SPALLED REPAIR WITH REBAR		✓		24	LF	\$125.00	\$3,000.00
DEACK COATING				0	LF	\$125.00	\$0.00
SPALL ON STAIR RISER		✓		15	SF	\$150.00	\$2,250.00
CRACK ON WALL		✓		30	LF	\$125.00	\$3,750.00
SURFACE SCALING IN LANDING		✓		15	SF	\$150.00	\$2,250.00

<b>\$60,100.00</b>						
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**Cost of Structural Defects Repair at 2nd Floor  
Final Submittal 04-11-24**

<b>SECOND LEVEL TOP OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>DIMENSIONS</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
ANGLE BRACKET TO SUPPORT KNEE WALL	✓			Stainless Steel Angle/WT/Epoxy Bolt		\$300.00	225	\$67,500.00
CRACK REPAIR		✓		600	LF	\$50.00	600	\$30,000.00
SPALL REPAIR		✓		15	SF	\$125.00	15	\$1,875.00
JOINT SEAL REPLACEMENT		✓		3000 x 1½"	LF	\$40.00	3000	\$120,000.00
EXPANSION JOINT REPLACEMENT		✓		900 x 1½"	LF	\$150.00	900	\$135,000.00
SPALLED REPAIR WITH REBAR		✓		10	SF	\$125.00	10	\$1,250.00
DECK COATING & PRESSURE WASH (ONLY DRIVE ISLE)			✓	¾" x 60000	SF	\$20.00	60000	\$1,200,000.00
SPALL ON STAIR RISER		✓		4	SF	\$150.00	4	\$600.00
CRACK ON WALL		✓		100	LF	\$125.00	100	\$12,500.00
BUILD UP FLOOR AREA FOR DRAINAGE			✓	50'x60'x¼x' to 1"	LF	\$175.00	250	\$43,750.00
<b>Total</b>								<b>\$1,612,475.00</b>

<b>SECOND LEVEL UNDERSIDE OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>DIMENSIONS</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
GALVANIZED STEEL BRACKET TO SUPPORT BALCONY SLAB NORTH AND SOUTH SIDE	✓			Galvanize	EACH	\$2,000.00	34	\$68,000.00
JOIST HANGERS	✓				EACH	\$1,250.00	204	\$255,000.00
BEAM HANGERS	✓				EACH	\$2,500.00	6	\$15,000.00
CRACK REPAIR		✓		100	LF	\$100.00	100	\$10,000.00
SPALL REPAIR		✓		50	SF	\$175.00	50	\$8,750.00
KNEE WALL CRACK REPAIR		✓		60	LF	\$175.00	60	\$10,500.00
ANGLE BRACKET TO SUPPORT KNEE WALL	✓			Stainless Steel Angle/WT/Epoxy Bolt		\$300.00	225	\$67,500.00
<b>Total</b>								<b>\$434,750.00</b>

<b>\$2,047,225.00</b>							
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**Deck Coating only at Drive Island, If Considering The Entire Area Add \$1,200,000**

**Should the city decide to deck seal in lieu of deck coating, the price per square foot of deck seal would be \$4.50 per square foot.**

**Cost of Structural Defects Repair at 3rd Floor  
Final Submittal 04-11-24**

<b>THIRD LEVEL TOP OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>Dimensions</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
STAINLESS STEEL ANGLE BRACKET TO SUPPORT KNEE WALL	✓			150		\$300.00	225	\$67,500.00
CRACK REPAIR		✓		220	LF	\$50.00	220	\$11,000.00
SPALL REPAIR		✓		1½" -6 x 50	SF	\$125.00	50	\$6,250.00
JOINT SEAL REPLACEMENT		✓		1½ x 3000	LF	\$40.00	3000	\$120,000.00
EXPANSION JOINT REPLACEMENT		✓		1½ x 900	LF	\$150.00	900	\$135,000.00
SPALLED REPAIR WITH REBAR		✓		24	SF	\$125.00	24	\$3,000.00
DECK COATING & PRESSURE WASH			✓	¼" x 60000	LF	\$20.00	60000	\$1,200,000.00
SPALL ON STAIR RISER		✓		15	SF	\$150.00	15	\$2,250.00
CRACK ON WALL		✓		50	LF	\$125.00	50	\$6,250.00
SURFACE BUILD UP FLOOR AREA FOR DRIANAGE			✓	50x60x¼" to 1'-0"	LF	\$175.00	250	\$43,750.00
<b>Total</b>								<b>\$1,595,000.00</b>

<b>THIRD LEVEL UNDERSIDE OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>Dimensions</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
STEEL BRACKET TO SUPPORT BALCONY SLAB NORTH AND SOUTH SIDE	✓				EACH	\$2,000.00	34	\$68,000.00
JOIST HANGERS	✓				EACH	\$1,250.00	204	\$255,000.00
BEAM HANGERS	✓				EACH	\$2,500.00	6	\$15,000.00
CRACK REPAIR		✓		125	SF	\$100.00	125	\$12,500.00
SPALL REPAIR		✓		80	LF	\$175.00	80	\$14,000.00
KNEE WALL CRACK REPAIR		✓		30	SF	\$175.00	30	\$5,250.00
STAINLESS STEEL ANGLE BRACKET TO SUPPORT KNEE WALL	✓			150		\$300.00	225	\$67,500.00
<b>Total</b>								<b>\$437,250.00</b>

<b>\$2,032,250.00</b>
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**Deck Coating only at Drive Island**

**If Considering The Entire Area Add \$1,200,000**

**Should the city decide to deck seal in lieu of deck coating, the price per square foot of deck seal would be \$4.50 per square foot.**



**Cost of Structural Defects Repair at 4th Floor  
Final Submittal 04-11-24**

<b>FOURTH LEVEL TOP OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>DIMENSIONS</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
KICKER TO ANGLE BRACKET TO SUPPORT KNEE WALL	✓			Stainless Steel Angle/WT/Epoxy Bolt	EACH	\$300.00	225	\$67,500.00
CRACK REPAIR		✓			314 LF	\$50.00	314	\$15,700.00
SPALL REPAIR		✓			1½" dp 75 SF	\$125.00	75	\$9,375.00
JOINT SEAL REPLACEMENT		✓			1½ x 3000 LF	\$40.00	3000	\$120,000.00
EXPANSION JOINT REPLACEMENT		✓			1½ x 900 LF	\$150.00	900	\$135,000.00
SPALLED REPAIR WITH REBAR		✓			24 LF	\$125.00	24	\$3,000.00
DEACK COATING		✓			¼" x 114300 LF	\$20.00	114300	\$2,286,000.00
SPALL ON STAIR RISER		✓			15 SF	\$150.00	15	\$2,250.00
CRACK ON WALL		✓			130 LF	\$125.00	130	\$16,250.00
SURFACE SCALING AT LANDING		✓			50 SF	\$125.00	50	\$6,250.00
ANGLE SUPPORT TO REPAIR PLANTER WALL	✓			Stainless Steel Angle/WT/Epoxy Bolt	EACH	\$300.00	270	\$81,000.00
Fill the Planter Boxes with a Light In-Filler and Seal	✓				700 Feet	\$35.00		\$24,500.00

**\$2,766,825.00**

<b>FOURTH LEVEL UNDERSIDE OF DECK DEFECTS SCHEDULE REALTIVE TOTALS</b>	<b>Structural Repair Within 6 Months</b>	<b>Structural Repair Within 12 Months</b>	<b>Repair Within 24 Months</b>	<b>DIMENSIONS</b>	<b>UNITS</b>	<b>UNIT COST FOR REPAIR/ REPLACEMENT</b>	<b>QUANTITY</b>	<b>TOTAL COST</b>
STEEL BEACKE TO SUPPORT BALCONY SLAB NORTH AND SOUTH SIDE	✓				EACH	\$1,500.00	34	\$51,000.00
JOIST HANGERS	✓				EACH	\$1,000.00	360	\$360,000.00
BEAM HANGERS	✓				EACH	\$2,500.00	6	\$15,000.00
CRACK REPAIR		✓			100 LF	\$100.00	100	\$10,000.00
SPALL REPAIR		✓			50 SF	\$175.00	50	\$8,750.00
KNEE WALL CRACK REPAIR		✓			60 LF	\$175.00	60	\$10,500.00
KICKER TO ANGLE BRACKET TO SUPPORT KNEE WALL	✓			Stainless Steel Angle/WT/Epoxy Bolt	EACH	\$300.00	225	\$67,500.00

**\$522,750.00**

<b>Total</b>	<b>\$3,289,575.00</b>
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**Should the city decide to deck seal in lieu of deck coating, the price per square foot of deck seal would be \$4.50 per square foot.**

**City Hall Parking Garage Allowances  
Final Submittal 04-11-24**

	<b>Allowances</b>	<b>Fee</b>	
1	Stripping All 4 Floors	\$ 200,000.00	Optional
2	Signage All 4 Floors	\$ 40,000.00	Optional
3	Replace Existing Steel Handrail with New Aluminum Handrail \$40,000 per Staircase (\$5,000 per flight)	\$ 120,000.00	
4	Pressure Wash & Paint	\$ 220,000.00	Optional
*5	Remove Miscellaneous Spalled Concrete at Stairs and Provide Aluminum Checker Plate Ramp at Each Level	\$ 16,000.00	
6	Replace Broken and Loose Cable Railing at Ramps \$5,000 per Each Flight of Ramps	\$ 30,000.00	

**Allowances Total** **\$ 626,000.00**

**\*Repair work of existing steel handrail per flight (average) \$1,200. This repair requires maintenance.**



June 19<sup>th</sup>, 2024

Mitxi Sanchez, BAS  
Project Manager  
City of Fort Lauderdale  
290 NE 3<sup>rd</sup> Avenue  
Fort Lauderdale, FL 33301

**RE: City Hall Parking Garage  
Phase I: Immediate Repair (Repair Work within 6 months)**

With reference to our recent joint site visit made with the city Assistant and Chief Building Officials on May 17<sup>th</sup>, 2024, it is this office's considered opinion that to keep the city hall parking garage in operation; proposed repair work must be completed within 6 months from April 23<sup>rd</sup>, 2024.

Should you require any clarification or additional information, please do not hesitate to contact me.

Sincerely,

Lakdas Nanayakkara, P.E. #37590