CONDITION APPRAISAL (FY 2020)

270 STATE STREET PARKING GARAGE
NEW HAVEN, CONNECTICUT

NEW HAVEN PARKING AUTHORITY

PREPARED FOR:

NEW HAVEN PARKING AUTHORITY
232 GEORGE STREET
NEW HAVEN CONNECTICUT 06510

PREPARED BY:

DESMAN
Design Management

175 CAPITAL BOULEVARD, SUITE 402
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NHPA PROJECT NO. 20-001
DESMAN PROJECT NO. 20-19171.00-2

APRIL 2020

DESMAN
Design Management

NEW HAVEN PARKING AUTHORITY

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1. INTRODUCTION

The Condition Appraisal of the 270 State Street Parking Garage was performed by DESMAN in accordance with the executed agreement by and between the New Haven Parking Authority and DESMAN (NHPA Project No. 20-001).

The primary objectives of this appraisal are as follows:

A. Perform a detailed, on-site inspection and observation of the Air Rights Parking Garage in concert with DESMAN's applicable sub-consultants.

B. Compare the results of the inspection with those addressed in the 2019 Condition Appraisal Report prepared previously by DESMAN.

C. Prepare a report detailing the findings of the survey including, but not limited to, an update of the estimated construction costs, along with priorities for the various repairs, and recommended capital reserves (future repair and maintenance), to allow the New Haven Parking Authority flexibility in the implementation of structural repairs, mechanical and electrical modifications, and architectural improvements.

2. EXECUTIVE SUMMARY

The 270 State Street Garage consists of 268 parking spaces. Opened in 1992, this garage consists of three (3) levels of precast concrete, double tee construction with cast-in-place concrete washes, in excess of 83,500 gross square footage of parking area. The street level of the garage also contains commercial space. This 28 year old facility is in generally good condition.

This year's assessment report (FY 2020) indicates a total expenditure of approximately **$6,142,236.25** is required to maintain this structure over the next five (5) years.

Various capital improvements to be performed on this facility recommended for implementation over the next five (5) years relate to the work spanning the multiple disciplines; they consist of, but are not limited to:

- Concrete Repair
- Waterproofing Enhancements and Improvements,
- Architectural Enhancements,
- Stair Repairs and Elevator Modernization
- Electrical Repairs and Lighting Improvements
- HVAC Repairs and Replacement
- PARCs Replacement and Improvements

The Capital Projects currently in progress consist of the following:

PROJECT NUMBER	PROJECT TITLE	OPINION OF COST*	STATUS
20-005	Repairs and Improvements	$867,000	In Design

* Rounded, Inclusive of Contingencies, Engineering and Program Management costs.

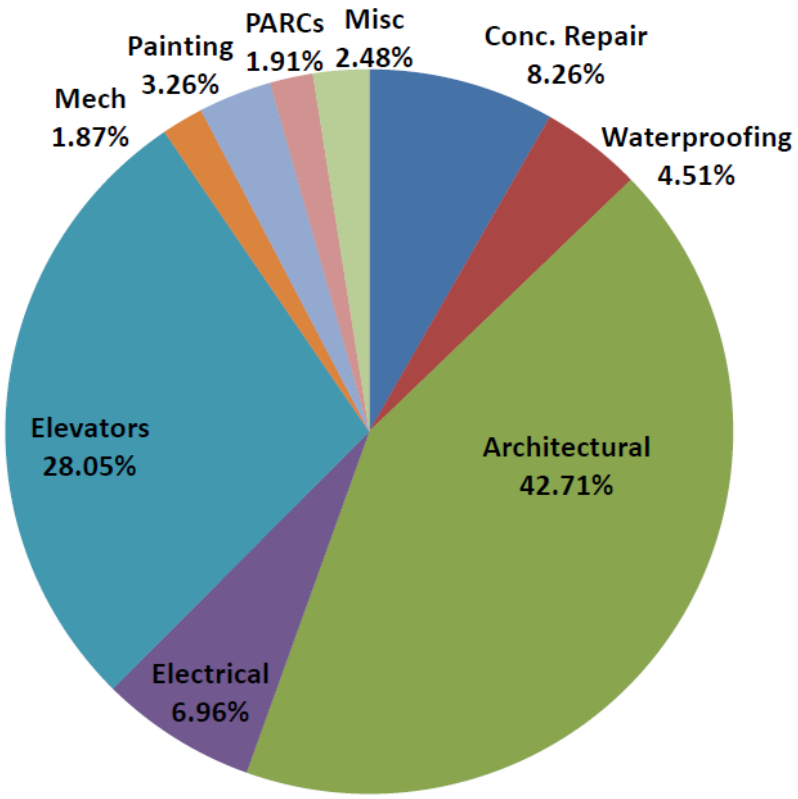
The costs associated with the implementation of future repairs and preventative maintenance for this garage is presented in more detail later in this report. The majority of the future repairs consist largely of ongoing preventative maintenance issues which would need to be performed on any parking facility of similar size and construction.

The repairs recommended to be performed over the next five yers have been prioritized into four courses of action: Prioritized Repairs (FY 2021), Early Repairs (FY 2022), Programmed Repairs (FY 2023), and Long-Term Repairs (FY 2024 - 2025). The table below is a summary of Desman's estimated construction cost for each category of work.

RECOMMENDED REPAIR PROGRAM	ESTIMATED CONSTRUCTION COST
Prioritized Repairs (FY 2021)	$1,763,200.00
Early Repairs (FY 2022)	$851,150.00
Programmed Repairs (FY 2023)	$1,412,336.25
Long-Term Repairs (FY 2024 – 2025)	$2,115,550.00
TOTAL ESTIMATED COST	**$6,142,236.25**

To further summarize, the projected costs may be split into the following discipline categories, in accordance with the associated percentages, as represented by the following pie chart:

Concrete Repair:	**8.26%**
Waterproofing:	**4.51%**
Architectural:	**42.71%**
Electrical:	**6.96%**
Elevators:	**28.05%**
Mechanical:	**1.87%**
Painting:	**3.26%**
PARCs:	**1.91%**
Miscellaneous:	**2.48%**
	100.00%



Recommended Repairs & Improvements split into Disciplines

Photo #1

Photo #2

Photo #3

Photo #4

3. DESCRIPTION OF THE STRUCTURE

The 270 State Street Parking Garage **(*Photo #1*)** is a three level self-park facility, located within the block surrounded by State Street, Chapel Street, Crown Street and Orange Street, in New Haven, Connecticut **(*reference Locator Maps #1 & #2 below*)**. Constructed in 1992, the garage was designed by Herbert S. Newman & Partners, P.C. with Lev Zetlin Associates, Inc./Engineers.

Locator Map #1, courtesy of www.Google.com

The parking facility has a total capacity of approximately 268 vehicles. The parking deck is rectangular in plan with a longitudinal dimension of 230 feet and a transverse dimension of 120 feet **(*Photo #2*)**, with a footprint of approximately 27,720 SF.

The facility's vehicular entrance is located on State Street, with additional pedestrian entry from the rear of the garage **(*Photos #3 & #4*)**, facing a plaza accessed from Orange Street. The facility consists of two parking bays (running north south), one bay being sloped, both bays with two-way traffic flow and 90° parking.

Photo #5

Photo #6

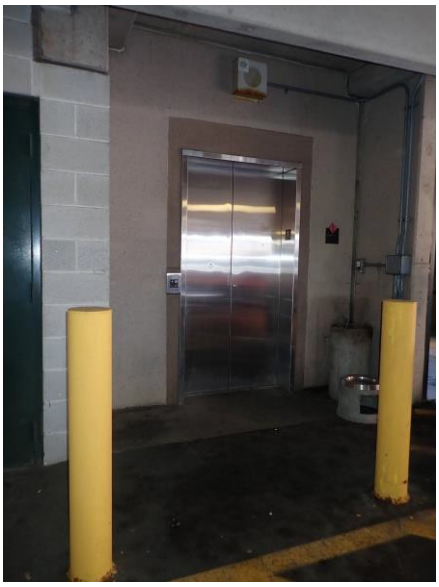


Photo #7

Locator Map #2, courtesy of www.Google.com

The Parking Garage is a precast concrete, double-tee structure with pre-cast concrete beams and columns **(*Photo #5*)**, with cast-in-place concrete aprons and washes. The facility has two stair towers **(*Photo #6*)** located diagonally across from one another at the southeast and northwest corners, and an elevator (2 total) within each tower as well **(*Photo #7)***.

The elevators are two (2) traditional in-ground hydraulic passenger elevators, manufactured and installed by Otis Elevator Company, and are controlled by Otis HC1 relay-logic controllers. The elevator machine rooms are located on the first floor landing, in close proximity to the elevator hoistways.

An elastomeric traffic bearing waterproofing membrane is installed on the second level **(*Photo #8)***, above the facility's commercial spaces that are located at-grade, one space curently occupied by a car rental company and the other space currently occupied by a hair salon.

Photo #8

Photo #9

The main lighting system consists of surface-mounted, 4-foot, 3-lamp vapor-tight flourescent light fixtures wired through surface mounted electrical conduit. There is apparently only limited control of the lighting, solely associated with the roof level light poles. There is a timeclock in the main electrical room which apparently is performing this function.

The drainage system consists of floor drains serving the roof and intermediate level drains **(*Photo #9)***, currently combined and piped to the City's storm sewer system. A sump pump is located at the lowest parking level (below grade) and picks up drainage from the lower level deck drains.

Heating and ventilation for the various spaces are independent and vary per need. HVAC for the Car Rental Office consists of a thru-wall air conditioning unit with electric heat **(*Photo #10)***, with the janitor's closet equipped with an exhaust fan and electric wall heater. The hair salon is provided with heating and cooling by a split system heat pump with supplemental electric heat **(*Photo #11)***. There is no provision for ventilation of the cashier booth, and air conditioning for the cashier booth is provided by a thru-wall air conditioning unit.

For informational purposes, NHPA's maintenance and repair obligations vary for each of the tenant space leases. DESMAN therefore understands that NHPA would negotiate accordingly with the applicable tenant, once costs are determined.

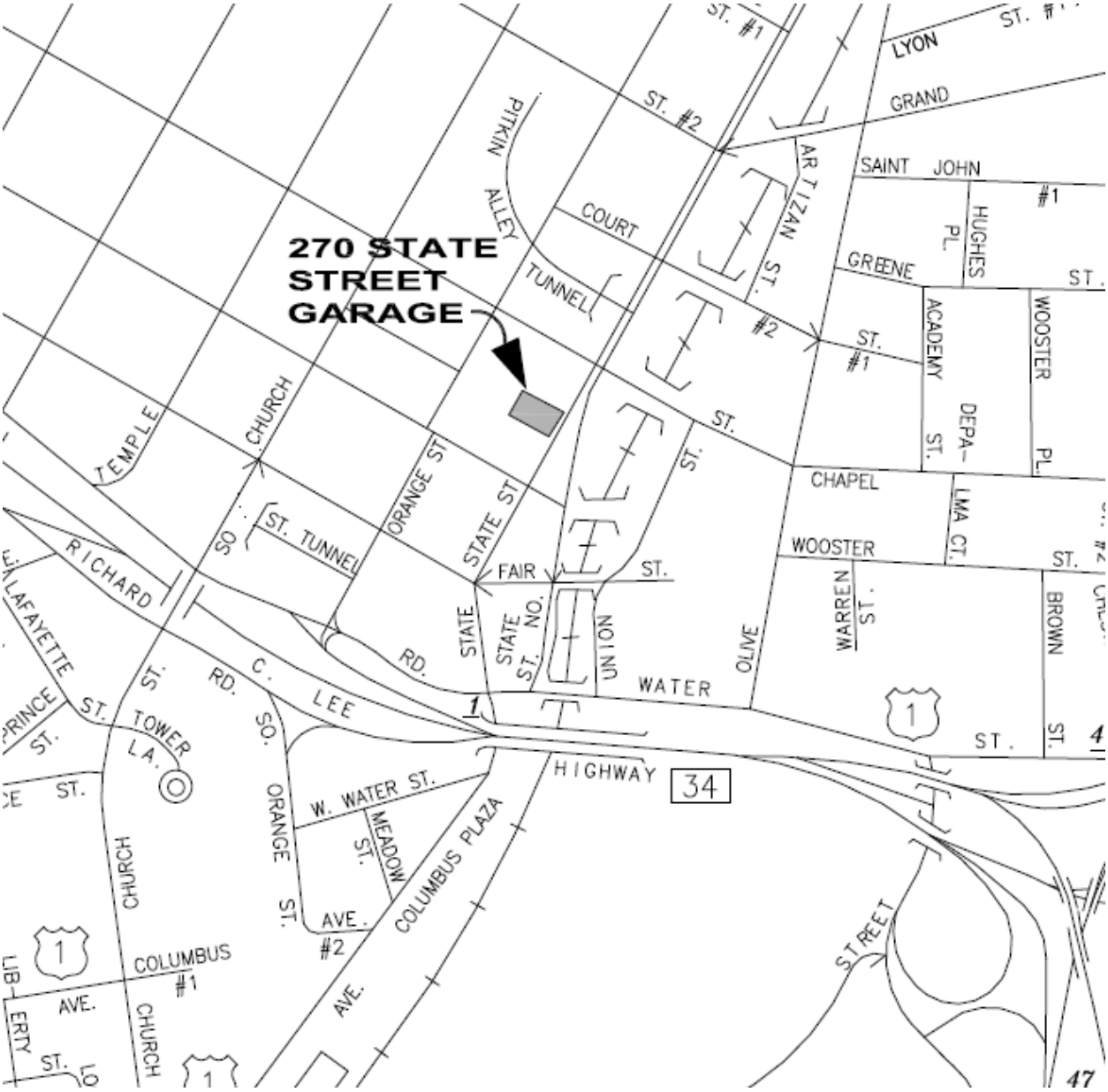
Photo #10

For the rental car lease, NHPA's obligations are to maintain and repair the exterior, roof, roof drains, gutters and downspouts, and structural portions of the building including the floor slab, bearing walls and foundations; to maintain and repair all systems including electrical, mechanical, plumbing, water and sewer, up to the point of entry into or hook-up with the Premises; to maintain and repair the compressors and other mechanical parts of the HVAC system; to maintain and repair all parking surfaces and structures; and as required because of the acts or omissions of NHPA or its employees, agents or contractors. Except for reasonable wear and tear required of NHPA, Tenant will repair and maintain its Premises in good order and condition. Tenant will maintain and repair the interior of its Premises, including wallcoverings, flooring, systems and personal property and equipment, plate glass within the office portion of the Premises, and its exterior signage, canopies and other trade-dress.

Photo #11

For the hair salon lease, NHPA has no responsibilities to make any repairs to the leased Premises except to the structure of the building which are not necessitated by any negligent or willful act or omission of the tenant. NHPA shall not be required to make any repairs to windows, plate glass, doors and any fixture and appurtenances composed of glass. Tenant at its own expense shall keep the Premises including all improvements neat and clean.

Floor plans, displaying the basic grid and architectural layout of the garage are included in Appendix A – Schematic Floor Plans.


270 STATE STREET GARAGE
ST. #1
LYON
GRAND
ST. #2
PITKIN ALLEY
COURT
TUNNEL
ARTIZAN ST.
SAINT JOHN #1
HUGHES PL.
GREENE
ST.
ACADEMY ST.
WOOSTER PL.
ST. #1
ST. #2
TEMPLE
CHURCH
ORANGE ST
STATE ST
ST.
CHAPEL
LMA CT.
WOOSTER ST.
SO. ST. TUNNEL
RICHARD
FAIR
STATE ST. NO.
UNION
OLIVE
WARREN ST.
BROWN
LAFAYETTE ST.
RD.
C. LEE
WATER
TOWER LA.
HIGHWAY 34
W. WATER ST.
MEADOW ST.
COLUMBUS PLAZA
COLUMBUS AVE. #1
AVE. #2
CHURCH
ORANGE ST.
LIBERTY ST.
STREET
47

Site Plan

Structural Data

270 State Street Parking Facility
New Haven, Connecticut

Legend:	**Square Feet**	**SF**
	Pounds Per Square Inch	**PSI**
	Pounds Per Square Foot	**PSF**

Date of Completion:	1992
Age of Structure:	28 Years
Plan Dimension:	120 FT x 232 FT
Floor to Floor Height:	±10'-3"

Floor Area:

▪ **Slab-On-Grade**	27,840 SF
▪ **Supported Slab**	55,680 SF
▪ **Commercial Space**	1,417 SF
▪ **Total**	83,520 SF

Parking Capacity:	268 Vehicles
Parking Efficiency:	306 SF/Vehicles

Note: All values listed above are approximations of actual values

Structural System:

- Pre-cast concrete double-tee structure with pre-cast concrete beams and columns.
- Ground level at grade is bituminous concrete pavement (asphalt).

Design Loads:

▪ Average Dead Load	138 PSF
▪ Live Load (Table 1106)	50 PSF
▪ Roof Snow Load	30 PSF
▪ Total Roof Live Load (including 30 PSF snow)	80 PSF

Photo #12

Photo #13

Photo #14

Photo #15

4. VISUAL OBSERVATIONS & REPAIR RECOMMENDATIONS

A visual examination of the facility's structural, mechanical and electrical components was performed as part of DESMAN's review of the 270 State Street Parking Garage.

CONCRETE DECK/RAMP REPAIR:

- Cast-in-place concrete aprons, washes and pour strips are located throughout the garage, around the perimeter and interior column lines; the cast-in-place concrete appears to be in fair condition.

  Isolated locations exhibit damage and the initial stages of deterioration due to environmental exposure and normal wearing ***(Photos #12, #13, #14, #15, #16 & #17)***. In many of these locations, snow removal operations, as typically performed on the roof level, have damaged the concrete aprons. In lower level locations, shallow steel coverage and cracking have resulted in extensive delaminations and spalling.

  DESMAN therefore recommends that the cast-in-place concrete all be programmed for full replacement, making certain that appropriate coverage of the steel is accommodated for. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

Photo #16

Photo #17

Photo #18

Photo #19

Photo #22

Photo #23

Similar to the washes and aprons, spalling was observed in a number of areas of raised cast-in-place concrete curbs as well, located around the parking facility. The damage appears to be a combination of shallow coverage of the steel, corrosion of embedded reinforcing steel and due to vehicular damage, especially on the roof level where the curbs are exposed to snow removal operations **(*Photo #18 & #19)***. Along with the concrete washes and aprons, DESMAN recommends that the curbs be replaced as well.

- DESMAN noted minor surface scaling and shallow-depth delamination and/or spalling throughout the garage, particularly in those areas constantly exposed to moisture (i.e. adjacent to vertical surfaces, adjacent to drains **(*Photo #20 & #21)***, exposed on the roof level, etc.).

Photo #20

Photo #21

Shallow-depth delaminations and spalling can be caused by insufficient coverage above the reinforcing steel, and scaling can be caused by cyclical freeze-thaw, typically exhibited by pitting on the concrete surface and an exposure of the aggregate within the concrete matrix **(*Photo #22)***. In each case, the reinforcing steel can become exposed, allowing further moisture penetration. DESMAN recommends that the scaling and shallow-depth deterioration be repaired using an appropriate epoxy/aggregate repair mortar. Any recommended concrete repair work should be coordinated with waterproofing/sealant work needed, as described later in this report.

- During erection and placement of the individual precast concrete double tee deck elements, each tee is tied to the adjoining tee with embedded shear connection assemblies spaced periodically along the length of the tee. Depending on the depth of the embedment, and the care utilized during the welding process to connect the adjoining tees, there can be instances where nominal spalling at various connections might occur **(*Photo #23)***.

If the precast concrete at the shear connections retain sufficient moisture, the heat generated during welding can vaporize the moisture into steam causing tensile failure in the concrete and nominal surface spalling at the connections.

Photo #26

Photo #27

Photo #24

The surface spalling at the shear connections can also be the result of insufficient embedment depth of the shear connection assembly and the surrounding concrete being stressed beyond its tensile capacity during erection, unintended restrained thermal movements in the entire structure in response to ambient temperatures. Failure can also potentially occur due to a temporary overstress condition as a vehicle or combination of vehicles move across the deck and up through the garage, or during snow removal operations.

Photo #25

Although the shear connections consist of stainless steel, the connections are welded to reinforcing steel within the concrete flanges that are not stainless. Therefore, due to moisture intrusion and chloride penetration over time, as cracking occurs at the shear connections, corrosion and subsequent spalling can still occur and should not be considered unusual. Preventative maintenance should be anticipated on any garage, though, and therefore budgeted for accordingly.

Photo #28

DESMAN recommends the use of an epoxy/aggregate repair mortar to infill the shallow surface spalls. This material can be applied with minimal surface preparation and its material properties and enhanced bonding characteristics allow it to be feathered into the adjoining concrete surface. The recommended repair material is also more flexible than typical concrete/cementitious repair mortars. Similar periodic repairs at the shear connections throughout the garage can be expected throughout the useful life of this facility. The recommended

Photo #29

Photo #30

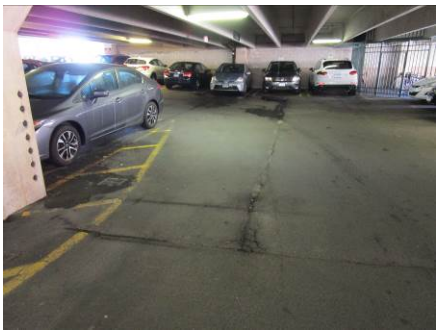


Photo #31

Photo #32

epoxy/aggregate repair work required at the shear connections will need to be coordinated with waterproofing/sealant work needed as described later in this report. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design

- Miscellaneous vertical and overhead concrete spalling was observed throughout the garage **(*Photo #28)***. Insufficient coverage of reinforcing steel, insufficient drainage and failed waterproofing above can allow moisture to access the steel, thus causing the spalling. Although cosmetic in nature, DESMAN recommends that these locations be repaired with a high-quality polymer modified repair mortar.

  DESMAN recommends that the underside of exterior spandrels specifically be monitored however **(*Photo #29 & #30)***. When casting the spandrels at the precast plant, the bottom surfaces can be susceptible to insufficient consolidation, thus resulting in voids and cracking, and thus compromising the durability of the concrete, especially the spandrels along the perimeter which are more exposed to the weather. Although the cracking and related deficiencies are not currently compromising the structural integrity of the spandrels, DESMAN suggests that a waterproofing coating may become appropriate at some point, and thus DESMAN recommends that it be programmed accordingly.

- Minor cracking and other deterioration mechanisms exist throughout the bituminous concrete (asphalt) slab-on-grade (basement level) **(*Photo #31)***. Since the slab-on-grade is typically considered a lesser priority than a supported deck, DESMAN recommends that the slab-on-grade be monitored to make certain no trip-and-fall hazards present themselves and the deterioration mechanisms don't expand or become exacerbated.

  DESMAN observed wheelstops placed on the first level **(*Photo #32)***; DESMAN typically does not recommend the use of wheelstops since they can become potential trip hazards as well as maintenance concerns. DESMAN recommends that these wheelstops be removed and/or an alternative means of vehicle barrier be employed.

Photo #33

Photo #34

Photo #35

WATERPROOFING ISSUES:

As a general rule, the life expectancy of tee-to-tee joint sealant is between 8 to 12 years depending on exposure and level of usage; joints on a roof level are further susceptible to more aggressive circumstances such as UV-exposure, environmental conditions and snow plow damage ***(Photos #33, #34, #35 & #36)***.

Repairs to leaking tee-to-tee joints typically requires that old sealant material be entirely removed down to bare concrete, the edges detailed and the substrate properly primed prior to new polyurethane sealant material being installed. Limited "spot" repair of tee-to-tee joints can be problematic as new polyurethane sealant materials do not adhere well to preexisting or previously cured polyurethane sealant. "Spot" repairs can be accomplished, as evident from the recently performed repairs, but the pre-existing sealants must be thoroughly cleaned and wiped down with solvents to soften the surface and enhance the bond between old and new materials. Unless there is only limited tee-to-tee joint failures along a 60 foot wide parking bay, DESMAN typically recommends that the entire length of tee joint be removed and repaired/replaced in its entirety.

For budgeting purposes, DESMAN recommends that all the joint sealant be removed and new sealant installed throughout the deck. While "spot" repair can be considered acceptable along certain joints, full replacement will provide a uniform life expectancy for all the sealant, as well as also avoiding varying and multiple warranties on the new sealant. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

Photo #36

Photo #37

Photo #38

Photo #39

DESMAN also recommends that new non-sag cove joint sealant be installed at all vertical and horizontal interfaces throughout the garage, thus preventing water infiltration down the columns below. The existing cove joint sealant should be removed, the concrete surfaces properly cleaned and primed, and new, two-component, non-sag cove sealant should be installed. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

DESMAN observed that various spandrel connections were installed recessed within the concrete, as well as various electrical components installed, penetrating the sealant **(*Photos #37 & #38)***. When replacing the cove joint sealant, we recommend that the recessed connections be cleaned, cold-galvanized and fully coated/filed with the sealant for further protection.

DESMAN further noted the lack of cove joints around various railings, bollards and other metal assemblies **(*Photos #39 & #40)***; installing new cove joints around the bases of these assemblies would protect them from moisture and related deterioration.

Similarly, DESMAN noted various spandrel-to-column connections installed in a shallow manner; although not unusual, the shallowness results in the concrete being susceptible to deterioration. DESMAN recommends that these connections, and all related metal connections be monitored, cold-galvanized as required, and then either repaired and/or protected by sealant for further protection **(*Photos #41, #42, #43, #44, #45 & #46)***. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

Photo #41

Photo #42

Photo #40

Photo #47

Photo #48

Photo #49

Photo #43

Photo #44

Photo #45

Photo #46

- Miscellaneous cracking **(*Photos #47, #48 & #49)*** was visually identified throughout the parking garage, some of which was previously routed and sealed. The cracking observed within the precast concrete tees is similar to cracking observed in most precast concrete tee construction, and is usually related to restrained concrete shrinkage. This cracking can also occur when the tees are pulled from their forms if minimum concrete strengths have not been achieved. Since this parking deck is fully exposed to the winter weather, the cracking may also be a result of wear-and-tear from snow removal operations during the winter, due to the heavier vehicles that may be utilized. None of the cracking identified is an immediate structural concern, although continued water infiltration into and through these cracks should be eliminated to prevent the egress of deicing chemicals and road salt, and thus the deck should continue to be monitored for potential distress.

  Although not overly significant, the magnitude of cracking across various miscellaneous tee surfaces and the noted defects in the concrete can be challenging to maintain with typical routing and sealing; we therefore consider routing and sealing of the cracking impractical in certain areas such as the roof level, and therefore suggest a more aggressive approach may be warranted, such as the installation of an epoxy-based wear

Photo #50

Photo #51

Photo #51

Photo #52

course/healer-sealer that could not only provide additional protection to the deck but also more permanently seal the cracking. Although DESMAN does not necessarily consider the application as a priority, DESMAN does suggest that the application be considered a proactive means of protection, prioritizing the roof level; DESMAN recommends that the intermediate levels be monitored in the near long-term and programmed accordingly.

DESMAN did also observe miscellaneous shallow cracking throughout the surfaces of the columns, various spandrels and shear walls as well, most specifically the roof level, especially when wet **(*Photos #50 & #51)***. Although the cracking is not uncommon and DESMAN does not consider the integrity of the surfaces to have been compromised, DESMAN certainly recommends that the condition be monitored. In the long-term, continued moisture contamination will be detrimental to the surfaces' condition. DESMAN recommends that the condition be monitored and the application of a waterproofing coating be programmed accordingly, inclusive of filling and/or sealing all the voids, to protect the various surfaces and enhance their longevity **(*Photos #52 & #53)***.

To address the significant cracking and defects observed throughout the floor decks, various options do exist.

Traffic bearing membranes are approximately 85%-90% effective as moisture and chloride screens inhibiting future chloride-ion migration into the deck. An elastomeric membrane will also traverse cracks that may form and joints that may be tooled. Upon completion of a membrane installation, though, DESMAN strongly suggests developing a yearly service contract with a qualified waterproofing contractor to assure that damaged portions of the membrane are successfully repaired each spring and autumn. It is important that all damage to waterproofing membranes be repaired, as continued and progressive de-bonding of the membrane will result if left unattended. DESMAN therefore cautions that installation of a membrane should be considered along with adequate funding for long-term maintenance.

Photo #53

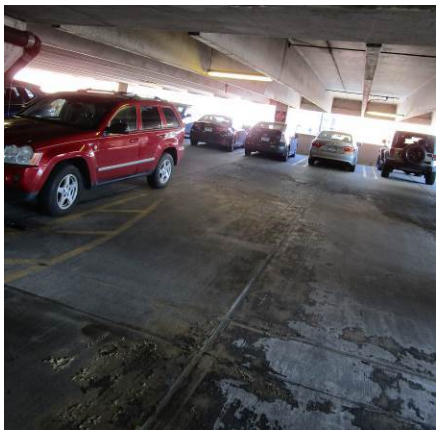


Photo #54

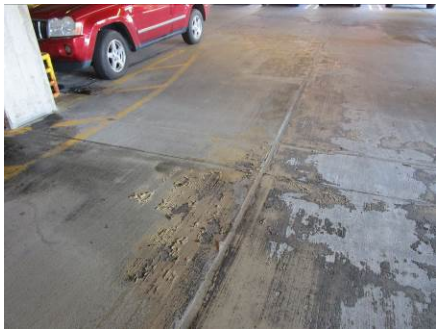


Photo #55

Photo #56

A less expensive option to a membrane would be the application of a silane-based, penetrating corrosion-inhibiting sealer. A corrosion inhibitor assists in raising the chloride threshold level necessary to support active corrosion of embedded reinforcing steel within the supported decks. Not only do these materials inhibit corrosion, they also offer the additional benefit of performing as a silane-based penetrating concrete sealer, acting as a moisture and chloride screen. Because these materials are unable to bridge cracks in concrete, though, the sealer is only approximately 60% to 65% effective in preventing moisture penetration. The application of corrosion inhibitors should be done in conjunction with a program of crack and control/construction joint repair and quite possibly combined with the application of an elastomeric traffic bearing waterproofing membrane in certain areas.

Although a traffic bearing membrane is a far superior chloride and moisture screen than a corrosion inhibitor, it is costly to install and to maintain, particularly if installed on precast concrete garages with their many tee joints; each joint acts as a location where a membrane can fail as each joint presents a discontinuous edge in the membrane where water can potentially enter, thus failing the membrane from below.

In conjunction with the repair of the cracking, DESMAN recommends that the penetrating corrosion-inhibiting sealer be applied first, followed by the installation of the heavy-duty epoxy-based wear course overlay as suggested. Installing an overlay, although not necessarily throughout the garage but rather in key areas or across specifically deteriorated tees, would also address the defects observed throughout the garage. Due to the localized failure that would subsequently be anticipated to occur over the tee joints due to the movement, DESMAN would recommend that the overlay be terminated on either side of the tee joints so that the tee joints remain exposed; the tee-to-tee joints would then be sealed following the overlay installation.

DESMAN recommends that the areas currently protected with a membrane system, such as floor areas above the tenant spaces, be monitored and re-coated as required to maintain their waterproofing integrity **(*Photos #54 & #55)***; at the time of re-

Photo #57

Photo #58

Photo #59

Photo #60

coat, additional materials may be considered to further enhance the durability of the membrane system as it spans the tee joints, if necessary.

- Various joints in the walls, not unusual due to the nature of connecting the many precast elements, were grouted with a cementitious mortar ***(Photos #56 & #57)***; although considered common practice, the mortar isn't a flexible material, and therefore is now exhibiting moisture penetration and leaking; similar with various retaining wall surfaces. DESMAN recommends that the grout be removed and a non-sag polyurethane sealant be installed within the exposed walls.

  Similar to the many wall joints, DESMAN recommends that all horizontal and vertical joints throughout the facade be sealed as well with a non-sag polyurethane sealant to maintain the waterproofing integrity of the building envelop ***(Photos #58, #59 & #60)***.

  DESMAN observed that, between a certain section of column-line, the slopes of the parking decks are such that a significant opening is provided between the ramp to the roof level and the adjacent bay that allows rain water to intrude onto the lower levels ***(Photo #61)***; this rain water will corrode the various mechanical and electrical systems that are routed through this space, and the falling rain water can provide a nuisance for the patrons of the garage. **DESMAN** recommends that a flashing system or barrier be installed to close the gap between the two bays; this can be accomplished on the roof level which could address the multiple levels below.

- An expansion joint is currently installed on the first level, where the asphalt meets the supported deck ***(Photos #62, #63 & #64)***. Expansion joints are typically created within a structure to allow for thermal movements within the structure in response to ambient temperature variation and are also sometimes necessary to separate structural elements which are anticipated to move contrary to one another due to differential settlement or potential seismic activity. These expansion joints need to be closed off to prevent water infiltration through the joint opening or to allow for a smooth transition between adjoining

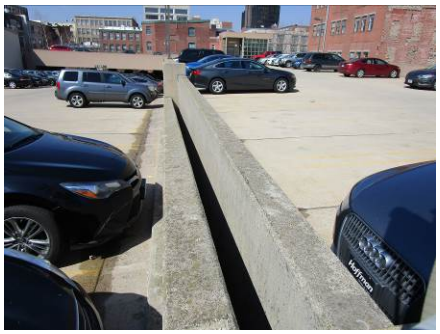


Photo #61

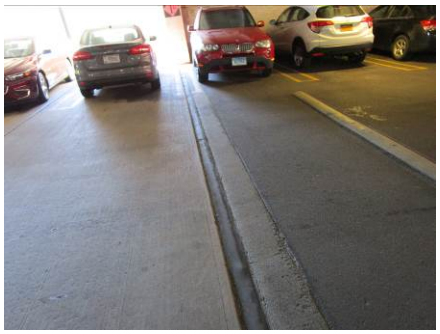


Photo #62

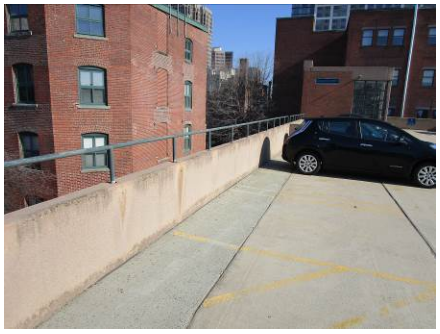


Photo #65

Photo #66

structural elements; typically, a flexible material or gland is designed to handle the extent of movements experienced. These glands can be comprised of any number of materials and need to be tough enough to handle vehicular and/or pedestrian traffic as may be required and still allow for unimpeded pedestrian access. DESMAN recommends that this joint be replaced with a new heavy-duty expansion joint gland.

Photo #63

Photo #64

ARCHITECTURAL ENHANCEMENTS:

- The existing perimeter railing system currently does not provide appropriate pedestrian protection systems ***(Photos #65 & #66)***. While DESMAN assumes that the existing systems was installed per Code at the time of construction, and therefore exempt from current requirements and updates, DESMAN recommends that the existing railing system be removed and replaced with a new railing system per current code requirements, with no gaps or openings greater than 4 inches.

- Although the handrail/guardrail systems throughout the stairs generally remain in good condition, DESMAN observed miscellaneous, minor corrosion throughout the stairs ***(Photos #67, #70 & #71)***; DESMAN recommends that the deterioration be monitored and repaired as required, programming priming and re-painting the stairs on a regular basis.

  DESMAN also observed, however, that the railings do not appear to be in compliance with current Code ***(Photos #68 & #69)***; as DESMAN understands, the applicable Code specifies that handrails are to be provided at 2'-10" from the surface of the floor with guardrails at 3'-6", as well as no openings be greater than that which would allow a 4" diameter sphere to

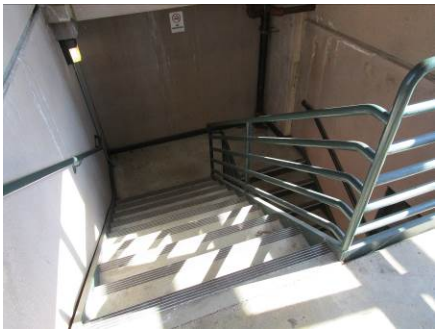


Photo #67

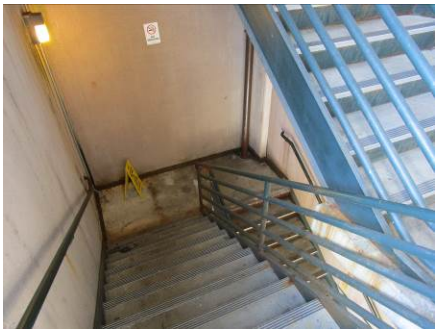


Photo #68

Photo #69

Photo #74

pass through. Although DESMAN assumes that the railing systems were installed in compliance with the applicable Code at time of construction (and thus may be exempt from current requirements), DESMAN recommends that the railing systems be considered for modification and/or replacement to comply with current Code requirements.

Photo #70

Photo #71

DESMAN also recommends that the railing/guardrail system be extended to terminate at the lower level's wall ***(Photos #72 & #73)***. The configuration of the stairs results in a space below the last flight of steps, which, due to the lack of visibility may be difficult to maintain. DESMAN recommends that a locked gate be installed within the guardrail to allow access to the space as required.

Photo #72

Photo #73

- The stair and elevator tower roofs are all in poor condition ***(Photos #74 & #75)***; indications of moisture penetration and concrete deterioration appear throughout the stair towers and throughout the roof slabs. Considering the age of the roofing systems and the indications of system failures, DESMAN recommends that the roofing systems be programmed for replacement. This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

Photo #75

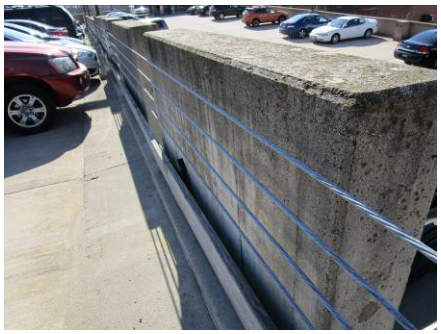


Photo #76

Photo #77

Photo #80

- The cable systems are in dis-repair and no longer properly tensioned, and the wood boards installed throughout the garage, acting as vehicle protection, are in various states of disrepair as well ***(Photos #76, #77, #78 & #79)***. In order to continue to provide appropriate vehicle protection, the cables should be re-tensioned and wood boards should all be replaced. As an alternative, however, to avoid the future need to maintain the tensioning of the cables and replacing cracked wood boards, another option could be to install a more traditional highway-type guardrail with metal screen-infill for pedestrian protection (PNH has installed similar types guardrail systems elsewhere, that have proven to be appropriate and durable long-term).

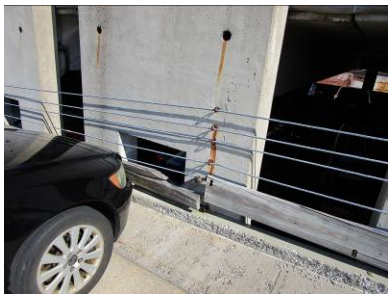


Photo #78

Photo #79

- Decorative metal fencing has been installed along the perimeter of the garage. Although generally in good condition, certain portions of the fencing has been damaged, and the various mountings have been exposed to moisture and are exhibiting corrosion. DESMAN recommends that the fencing system be monitored for repair and re-painted on regular intervals; a cove joint can be installed around the base of the posts to protect the metal ***(Photos #80, #81 & #82)***.

Photo #81

Photo #82

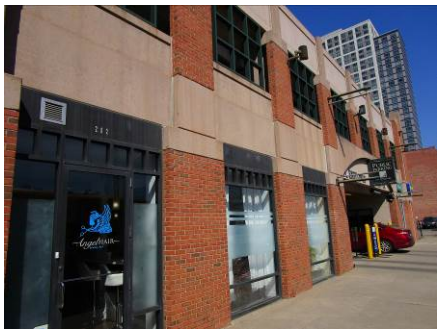


Photo #83

Photo #84

Photo #87

Photo #88

Tenant Space Storefront Replacement:

The storefront systems, of the tenant spaces, are aged and showing indications of leaking and water penetration **(*Photos #83, #84, #85 & #86)***; moisture damage to the flooring was observed. DESMAN recommends that these systems be replaced with new storefront systems.

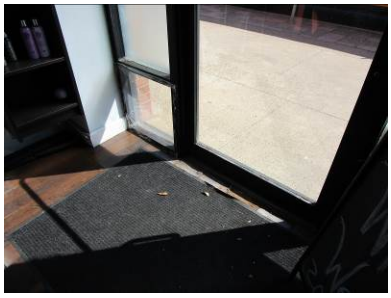


Photo #85

Photo #86

Garage Entrance (from State Street) Enhancements:

The entrance and façade of the 270 State Street Garage along State Street has become aged **(*Photos #87, #88, & #89)***. Although architecturally unique in conjunction with its twin on George Street, recent and ongoing changes in the immediate area continues to provide a challenge for the garage to stay current.

In conjunction with ongoing development in the area, additional opportunities have developed that could assist in revitalizing the garage. Enhancements, such as incorporating signage and lighting into a unifying architectural element, additional lighting to accent and identify the tenant spaces as well as the pedestrian entrance from the street, creation of new tree planting zones along the sidewalk as well as new planting locations across the façade with metal trellis to accommodate vegetation growth, could assist in transforming the garage (various concepts as follows).

DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.

Photo #89

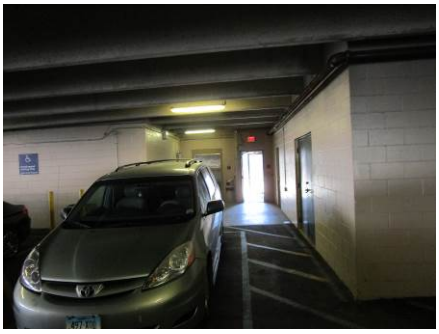


Photo #90

Photo #91

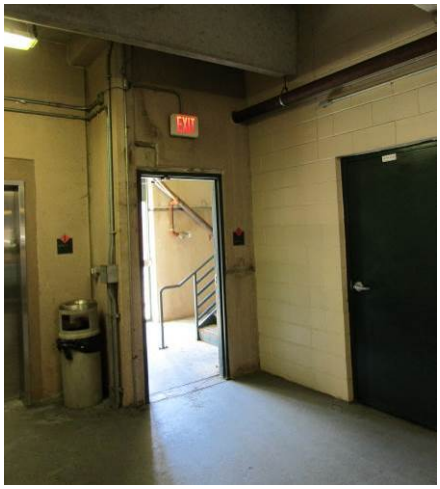


Photo #92

Stair/Elevator Lobby Enhancements (Ground Level from State Street)

The ground level stair & elevator lobby serves as the primary first impression as patrons enter the garage from State Street, but this portal has become aged and is in need of a modern update **(*Photos #90, #91, & #92)***.

Enhancements, such as incorporating decorative accent lighting, installation of a new decorative but durable flooring system, utilization of identification colors and/or graphics along with cove-mounted wash lighting, installation of a mural (or decorative mosaic or illuminated panels, to integrate the history of Ninth Square, could assist in transforming this area and the patron experience (various concepts as follows).

DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.

Typical Stair/Elevator Lobby Enhancements:

The lobbies on the typical levels are also aged and would benefit from updating **(*Photo #93)***, but, considering the existing outdated storefront configuration, provide opportunities for significant enhancements.

Photo #93

Photo #94

Photo #95

Enhancements could include decorative and accent lighting incorporating a ceiling element to conceal the conduit and integrating wall wash lighting, installation of a new decorative but durable flooring system, modification and/or replacement and/or limited removal of the storefront systems (since doors/storefront enclosure systems are no longer required for stairs in an open parking structure) with new systems but incorporating local and/or historic artwork related to Ninth Square (various concepts as follows). DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.



<u>Exterior Pedestrian Corridor Enhancements:</u>

The existing pedestrian walkway adjacent to the garage is currently under-utilized, due to aged fencing, deteriorated asphalt and a gate preventing access to the courtyard **(*Photos #94, #95 & #96)***.

DESMAN recommends that this pedestrian corridor (leading to the adjacent Courtyard) be enhanced and coordinated to provide a continuous experience. In conjunction with potential improvements to the Courtyard, enhancements could include replacing the asphalt with a decorative concrete, installation of decorative fencing incorporating new plantings, a screen, or a structural lighting element integrating the Ninth Square history along with intermittent translucent illuminated history and/or art panels, all highlighting this pedestrian corridor (various concepts as follows).

DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.

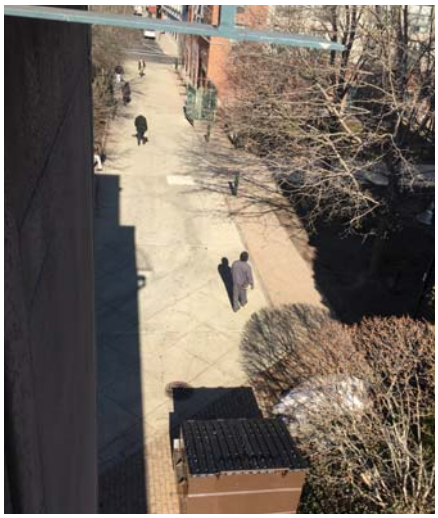


Photo #96

Photo #97

Photo #98

Typical Stair/Elevator Enclosure (Roof Level) Enhancements:

The lobbies on the roof level are also aged and would benefit from updating **(*Photos #97, #98 & #99)***, but, considering the existing outdated storefront configuration, provide opportunities for significant enhancements.

Although doors/storefront enclosure systems are no longer required for stairs in an open parking structure, we do recommend that some form of enclosure remain on the roof level in order to protect the stairs and elevators from the elements. However, enhancements could include decorative and accent lighting incorporating a ceiling element to conceal the conduit and integrating wall wash lighting, installation of a new decorative but durable flooring system, incorporating of major colors and/or themes with an accent wall and/or mosaic, modification and/or replacement and/or limited removal of the storefront systems with new systems but incorporating local and/or historic artwork related to Ninth Square (various concepts as follows).

Photo #99

DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly. Miscellaneous repair to the storefronts is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.



Photo #100

Courtyard Pedestrian Entrance Enhancements

The rear stair & elevator tower serves as a secondary but can be a first impression as patrons enter the garage from the rear Courtyard ***(Photos #100 & #101)***, but this portal has become aged and is in need of a modern update as well.

Enhancements, such as relocating the dumpster, removal of the gate to allow a continuous pedestrian connection, incorporating decorative accent lighting and signage to emphasize the pedestrian entry, could assist in transforming this area and modernizing this portal and patron experience (various concepts as follows).

DESMAN understands that this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.

Photo #101


Courtyard Enhancements:

In conjunction with enhancements to be considered for the rear stair and elevator tower, the adjacent Courtyard also could benefit from updates and enhancements **(*Photo #102)***.

Enhancements, such as replacement of portions of the existing concrete walk with stamped and/or decorative concrete that is appropriate for a pedestrian pathway, creation of new and/or additional plantings (or a planting zone) and/or screen walls along the border with the adjacent buildings, installation of a free-standing sculptural lighting element (and/or tree sculpture, translucent panels, etc.) along the pedestrian path relating to the history of the City and/or surrounding neighborhood, relocate the existing dumpster and trash receptacles to allow a continuous pedestrian connection to the corridor adjacent to the garage, all could assist in transforming this area and modernizing this Courtyard and patron experience (various concepts as follows).

DESMAN understands that jurisdiction of this Courtyard would need to be considered and coordinated, and subsequently this work would be subject to funding, and so DESMAN recommends that NHPA program this work accordingly.

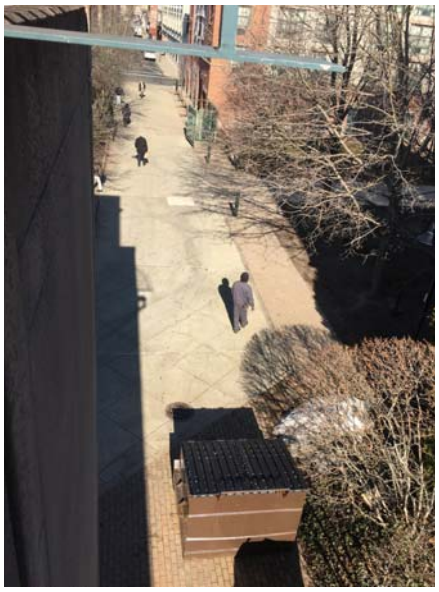


Photo #102

Photo #103

ELECTRICAL WORK:

The main electrical service **(*Photos #103 & #104)*** for the garage is a 208 volt, 3-phase, 400 amp system with a fused main switch and single section main distribution panel. A single 175 amp garage sub-panel is located in the main electrical room near the southeast corner of the garage. This room also has electrical equipment which appears to serve the two tenant spaces (labeled National and 282 State). The 282 State service is UI metered separately from the garage service, but the National panel appears to only have a non-utility customer meter.

While most of the electrical distribution equipment apparently dates from original construction, it apparently has been kept dry and does not appear to be damaged. Interior inspection and infrared testing of the equipment is recommended, however, but the equipment can be assumed to have at least 15 years of useful life remaining.

The main garage panel has three large breakers which are not labeled. These breakers should be evaluated to confirm if they are spare at the time of any interior inspection.

Photo #104

Electrical Distribution: The original electrical conduit installation in the garage was performed with rigid galvanized steel (RGS) using malleable iron straps with clamp backs. Although the majority of the conduit appears to still be in good condition, miscellaneous deterioration does exist throughout and should be replaced. The conduit is primarily surface mounted rather than embedded, except the conduit serving the roof level light poles **(*Photos #105 & #106)***, and thus is readily accessible for the most part.

Photo #105

A small amount of wiring has been installed in Electrical Metallic Tubing (EMT). These installations appeared to be recent and apparently related to tenant space work; none were showing signs of corrosion at this time.

Upon repair and/or replacement **(*Photos #107, #108, #109 & #110)***, DESMAN recommends that consideration be given to adjusting certain isolated locations where routing of the conduit could be improved for extending the life of the conduit. Certain existing conduit, primarily for the exterior, wall-mounted decorative light fixtures are mounted in such a manner that the conduit penetrates the joint sealant materials; to avoid exposure to moisture, the conduit could be sleeved with PVC and sealed.

Photo #106

Photo #111

Photo #112

Photo #113

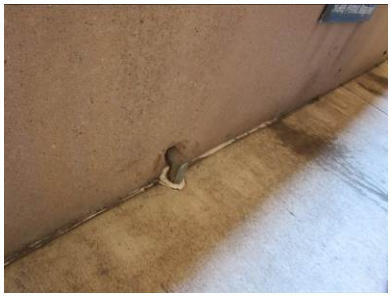


Photo #107

Photo #108

Photo #109

Photo #110

Lighting Replacement with LED: The general garage lighting consists of 4-foot, 3-lamp, vapor-tight fluorescent fixtures with fiberglass housings, and are currently spaced on approximately 30' x 30' centers ***(Photo #111)***. Although our observation of the garage occurred during the daylight hours and therefore were limited in allowing for meaningful measurements of the current light levels, the fixture type and spacing indicates that these levels would only be marginally acceptable by current IES standards and below the enhanced safety levels expected by NHPA.

The fixture housings, although generally in good condition with only a few outages, many of the acrylic lenses were significantly yellowed due to UV exposure. This yellowing will worsen the already low light level condition of the garage.

There are a reasonable number of good quality LED garage lighting fixtures currently available at this time, and many of these fixtures have a proven track record of reliability and good photometric performance. Use of LED lighting will reduce energy use and maintenance expenses and based on these factors, DESMAN recommends that LED lighting be considered for use when the existing garage fixtures near the end of their useful life.

Photo #114

Photo #115

Photo #116

Photo #117

While replacements for the fluorescent fixture lenses are likely still available and LED replacement lamps could be retrofit into the fixtures, we recommend that full replacement of the fixtures with LED garage fixtures be programmed in the near future; retro-fit solutions are available, but these raise concerns with UL Listing and they do not typically have the same efficiency levels as dedicated LED fixtures. LED garage fixtures can be more easily controlled via occupancy sensors, daylight sensors and dimming controls. Such control enhancements can significantly increase the energy savings realized by use of the fixtures but must be carefully evaluated during design to ensure that they are a proper fit for the facility. Most enhanced control strategies will either require the installation of separate control wiring or local controls on each fixture.

To that end, DESMAN recommends that the balance between ongoing maintenance costs, related to regular re-lamping and other associated expenses, and the potential savings from an improved technology, such as LED be considered.

The stairwells are lit with a combination of vapor-tight fluorescent fixtures matching the garage style and wall-mounted high pressure sodium fixtures **(*Photos #112 & #113)***. These should be considered for replacement whenever the garage fixture replacement is done.

The roof is lit using four twin-head high pressure sodium pole lights **(*Photo #114)***. The fixtures are shoebox style with a slight up-tilt. The poles are approximately 12’ high and mounted to the extended interior columns of the garage. Replacement of the fixtures should be considered when the main garage lights are done.

The only lighting control that was evident during our visit was for the roof lights. There is a timeclock in the main electrical room which may be performing this function. Enhancement of the lighting control system should be considered when the garage fixtures are replaced.
Exit Signs & Emergency Lighting

Exit signs **(*Photo #115)*** are located appropriately in the garage to mark egress paths. The signs are in fair physical condition but testing of the battery function was not preformed. The signs utilized are polycarbonate housing style which will not stand up to physical abuse and are more susceptible to moisture issues. A full test of the exit sign emergency function is recommended.

Emergency lighting **(*Photos #116 & #117)*** is provided throughout the garage and the stairwells with wet location rated twin-head battery units. These units are in fair physical condition, but several that were tested did not function. It is likely that the unit batteries have failed due to lack of maintenance. In the general garage area, these battery units are located along the center column line. This location will prove ineffective at providing a reliable path for pedestrian traffic, especially when vehicles are parked in the center stalls.

Immediate testing and battery or other parts replacement should be considered. Full replacement of the battery units with the addition of remote heads in the drive aisle should be programmed within the next 5 years.

While there may be opportunities to improve and/or enhance the lighting in the tenant spaces **(*Photos #118 & #119)***, we understand that maintenance/replacement of those light fixtures is a tenant responsibility.

Photo #120

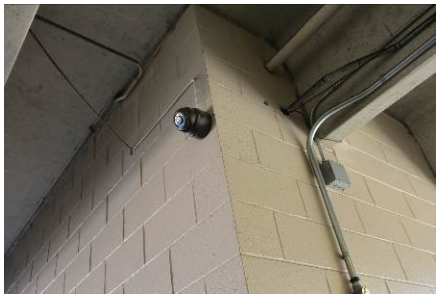


Photo #121

Photo #122

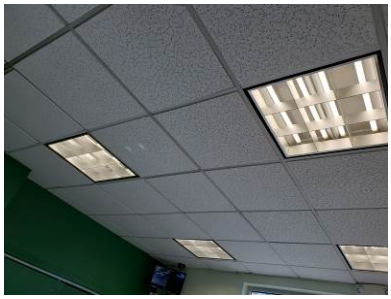


Photo #118

Photo #119

Fire Alarm and Communications: There is no fire alarm system in the garage. Based on classification of the space as an S-2 occupancy, open parking garage, current Connecticut code does not mandate a fire alarm system be installed. It is assumed that a fire alarm system was also not required at the time the garage was constructed, but provision of a system is a typical NHPA standard. Installation of full garage fire alarm system could be considered as a long term programmed enhancement.

Security Systems: There is an emergency call-for-aid system, as well as audio monitoring devices, located throughout the garage with call stations and speakers located near the stairwells on each level **(*Photos #120, #121, #122 & #123)***. The system does not appear to be ADA compliant and it was not tested. While this system is not mandatory, proper operation and monitoring of the equipment should be verified. Subsequently however, considering the age of the existing system, replacement of the system should be considered which would result in a new and updated system fully compatible with PNH's operations elsewhere.

Photo #123

Photo #124

Photo #125

Photo #126

Several security cameras were noted on the ground floor of the garage, but these appear to all be associated with the tenant and not related to garage operations. Installation of full garage security equipment could be considered as a long term programmed enhancement, compatible with PNH's operations elsewhere.

Surge protection: The garage electrical distribution currently has no surge protection equipment. Although only minor electronic equipment is currently in the garage typically worthwhile of protection, future lighting or revenue control upgrades may trigger a greater need. At a minimum, we recommend that installation of one surge protection device on the main incoming electrical service should be considered.

PLUMBING WORK:

Drainage: The current drainage system consists of floor drains serving the roof and intermediate level drains **(*Photos #124, #125 & #126)***, all of which are currently combined and piped to the City Storm Sewer. In accordance with current WPCA's requirements for parking garage drainage, intermediate level drains are to be separate from the roof drainage system and subsequently discharge to the City's Sanitary Sewer via a sand/oil interceptor; roof drainage may continue to drain to the storm sewer. DESMAN therefore recommends that a sand/oil interceptor be installed, and roof drainage and intermediate level drainage be separated accordingly.

At that time, due to their deteriorated condition, all floor drains should be replaced. The piping appears to be in serviceable condition however miscellaneous replacement should be anticipated, along with new pipe supports.

This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

A sump pump **(*Photo #127)***, installed at the lower parking level below grade, supports drainage from the lower level deck drains. It is not known what the reliable condition of the pump currently is, but due to the water level in the sump observed near the top of the pump, it appears that the pump is not operable. The pump appears to be a common 120v unit connected to a GFI plug-in receptacle; DESMAN therefore recommends that the pump be replaced with a new one. At the time of replacement , in accordance with WPCA's requirements, DESMAN recommends that the pump be disconnected from the storm system and routed to the City's sanitary sewer via the new sand/oil interceptor.

Photo #127

This work is currently scheduled to be performed as part of NHPA Project No. 20-005, currently in design.

Domestic Water: The domestic water service entry is in a janitor's closet accessed via a tenant space; the backflow preventer, water meters and main shutoff valve appear to be in serviceable condition. A domestic hot water heater and janitors sink are also located in the space, and both appear to be in good condition.

Hose bibbs are located on each level for washdown of the facility **(*Photos #128, #129, #130, #131 & #132)***. The hose bibbs appear to be in serviceable condition, however there appears to be damage by freezing of the cold water distribution piping. The full extent of the damage is uncertain due to insulation wrapping the piping. DESMAN recommends that the system receive a full-pressure test to confirm its condition and serviceability. However, it is unlikely that the pressure available from the domestic water system is adequate for effective washdown of the parking decks, to fully remove all dirt, oil, residual ice-melt materials, etc.

Photo #128

DESMAN emphasizes it is important that accumulated sand and other contaminants be removed from the garage decks each spring as they hold concentration of chloride (road salt) and moisture in direct contact with the concrete deck; causing an increase in the amount of deterioration which could take place.

Photo #129

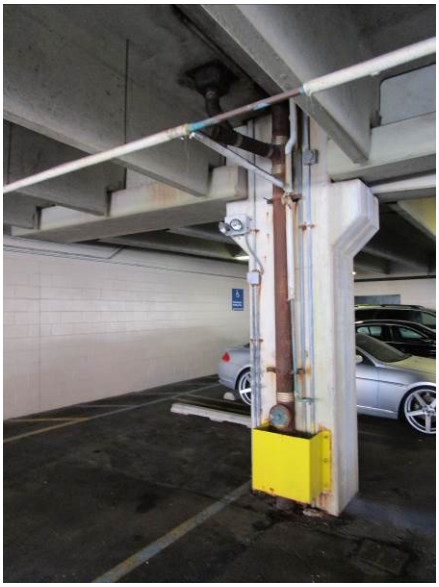


Photo #130

Photo #131

Photo #132

Subsequently, sand carried into the garage can clog drains and associated drain lines. In combination with periodic garage wash down, it is imperative that the facility's drainage system be kept clean and operational. The costs associated with the flushing of the facility's drainage system, in conjunction with construction work, has been included within our opinion of repair and preventative maintenance costs to be performed in the future. The costs associated with cleaning and flushing down the deck surfaces should however be included in the operating budget and, therefore, are not included within projected capital budget costs.

ELEVATOR UPGRADES AND IMPROVEMENTS:

Photo #133

Photo #134

The (2) in-ground hydraulic passenger elevators ***(Photos #133, #134, #135, #136 & #137)*** were installed in 1993 and appear to be original to the garage's construction, inclusive of mechanicals, controllers, power units, in-ground cylinders and plunger assemblies. Based upon an average useful service life of (25) years from date of installation, the elevators have reached the end of their useful service life, and therefore should be programmed for modernization accordingly.

In conjunction with modernization of the elevators, temperatures are maintained in the Elevator Machine Room by an electric unit heater and an exhaust fan, and are controlled by separate thermostats. The exhaust fan maintains space temperature during periods of high elevator use by exhausting the space with ducted makeup air drawn from outside providing what cooling is available depending on the outside air temperature. Both the exhaust and makeup air ducts are provided with motorized dampers to isolate the space from the outdoors when the fan is not running. Cooling elevator control equipment in this manner is no longer considered acceptable because the space temperature and humidity cannot be maintained within the parameters required for the elevator control equipment, especially

Photo #135

Photo #138

Photo #139

when newer electronic controls have been provided. DESMAN therefore recommends that upgrade of the HVAC system be considered as part of the modernization program. In the meantime, DESMAN recommends that the existing fan heater and motorized dampers be tested for proper operation and repaired/replaced as required.

Photo #136

Photo #137

The elevators are currently maintained by Schindler Elevator Corporation under the terms of a full-service maintenance agreement. In order to assist PNH in the execution of the Maintenance Agreement, DESMAN recommends that PNH program the services of DESMAN and its elevator sub-consultant, Sterling Elevator Consultants, to oversee an elevator maintenance audit on a regular basis.

MECHANICAL REPAIRS AND IMPROVEMENTS:

Cashier Booth Ventilation/AC: There is currently no provision for ventilation of the cashier booth ***(Photo #138)***. DEMAN recommends supplying outside air directly to the booth by installation of a supply fan, duct heater and ductwork to draw outside air from a location on the face of the facility, above the sidewalk, the intention being to ventilate the booth with fresh air, creating a slight pressurization which would help to prevent infiltration of auto exhaust. Air conditioning for the cashier booth, however, is provided by a thru-wall air conditioning unit. The unit appears to be in poor condition, and DESMAN therefore recommends that the unit be replaced.

Photo #140

Photo #141

Photo #142

Photo #143

Tenant Space HVAC: HVAC for the Car Rental Office consists of a thru-wall air conditioning unit with electric heat ***(Photos #139 & #140)***. The age of the unit is unknown, but it appears to have been replaced at least once. A replacement for this type of unit is apparently readily available and so DESMAN recommends that it be replaced accordingly when needed.

The janitor's closet, located within the car rental office, is equipped with an exhaust fan and electric wall heater; both appear to be from original construction and are likely to be near the end of their useful lives. DESMAN recommends that the units be replaced; although the exhaust fan may be replaced relatively quickly upon failure, the heater is the sole source of heat in the space and thus failure could result in freezing of the water service.

The second tenant space at the front of the facility is currently occupied by a hair salon and is provided with heating and cooling by a split system heat pump with supplemental electric heat, along with a ceiling exhaust fan to exhaust the toilet room to the outdoors ***(Photo #141)***. The equipment appears to be 5 to 10 years old and apparently is in good condition with approximately 10 years of useful life remaining. The owner of the salon commented however that the unit does not maintain comfortable temperatures in the heating season and that a new supply duct was added to the Heat Pump System to improve air distribution.

Fire Standpipe Maintenance: The dry-manual standpipe system was recently replaced ***(Photos #142 & #143)***; however, it has not yet been painted. DESMAN recommends that the piping be painted to further protect and enhance its durability.

The State Fire Safety Code requires periodic maintenance and testing of Fire Protection Systems in accordance with the provisions of NFPA 25 – "Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems". At a minimum, owners' maintenance personnel should conduct a quarterly visual inspection of piping, fire department connections and hose valves to ensure that systems have not been damaged. A more thorough detailed inspection should be conducted annually to verify that all system piping and components are in proper working order which should include testing and inspection of all valves and components. Flow tests should be conducted every five years at a minimum. Additional requirements for inspection testing and maintenance of Standpipe Systems are outlined in NFPA 25.

Photo #144

Photo #145

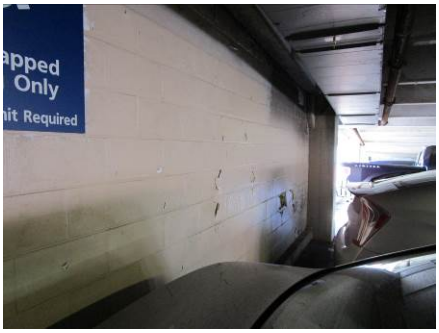


Photo #148

Photo #149

Mechanical Preventative Maintenance: DESMAN recommends the periodic maintenance and repair of various components of the buildings mechanical systems; the costs should be included in the operating budget and are therefore not included as separate and distinct items within our projected repair and preventive maintenance costs. Periodic maintenance and service of the mechanical systems should be in accordance with the O&M requirements for the individual systems.

PAINTING:

Miscellaneous Metal Surfaces: All miscellaneous metal components should be painted to protect and enhance their useful lives. Metal systems include, but are not limited to, doors & frames, stair systems and railings, bollards, pipeguards, decorative grillwork, etc. ***(Photos #144, #145, #146 & #147)***

Photo #146

Photo #147

Miscellaneous Concrete & Masonry Surfaces: Various surfaces, essentially consisting of the rear of the tenant spaces, are currently painted ***(Photos #148 & #149)***; however, the surfaces are showing indications of failure due to moisture (not unusual in a garage subjected to extensive temperature swings). DESMAN recommends that all currently painted surfaces be programmed for re-painting, but with a paint system appropriate for exterior conditions subjected to significant moisture. At the time of re-painting, DESMAN recommends that objectives be coordinated with applicable architectural enhancements also planned for.

Parking Stall & Lane Striping: Following completion of repairs, DESMAN recommends that all traffic markings (i.e. parking stalls, directional arrows, etc.) be re-painted, including updates to ADA requirements as may be required. DESMAN recommends that all conflicting markings, if any, first be removed prior to re-painting.

ACCESS & REVENUE CONTROL EQUIPMENT REPLACEMENT:

Due to age, improved technology and compatibility with PNH's operations, DESMAN recommends that PNH review the current system for potential enhancements and/or replacement, and plan accordingly ***(Photos #150, #151, #152 & #153)***.

Photo #150

Photo #151

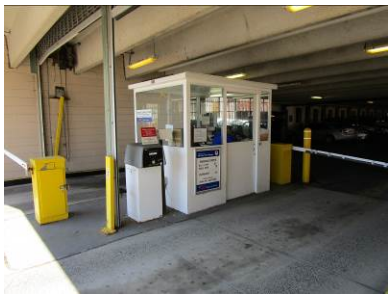


Photo #152

Photo #153

MISCELLANEOUS CONSIDERATIONS:

Façade Repairs: The exterior surfaces of the garage appear to be in good condition, however, miscellaneous damage should be repaired, as required; DESMAN recommends that the facade be monitored and the repairs performed on an as-needed basis, including a comprehensive cleaning, replacement of all sealant materials and flashing, removal of excess vegetation ***(Photos #154, #155, #156 & #157)***.

Photo #154

Photo #156

Photo #157

Photo #155

Photo #158

Photo #159

Photo #160

<u>Update of Garage Signage:</u> Although the garage is a simpler type of facility and wayfinding requirements of the garage are comparatively limited, opportunities for updating and modernizing do exist, especially in conjunction with new development occurring within downtown New Haven, designating the facility as a parking garage and directing patrons to park in this facility.

In conjunction with NHPA's branding of the facility as well, the existing exterior identification signage can be refurbished and updated with new sign box materials and new graphic faces to be more in keeping with NHPA's logo and graphic standards.

Photo #161

Photo #162

Photo #163

Photo #164

DESMAN notes that illuminated signs at several locations, throughout the garage, indicate the presence of an Area of Refuge. Since the garage is considered an "open structure" and Areas of Refuge are no longer required, the applicable signs may be removed.

At the time of signage improvements, DESMAN recommends that objectives be coordinated with applicable architectural enhancements also planned for ***(Photos #158, #159, #160, #161, #162, #163 & #164)***

Garage Cleaning: As mentioned previously, it is important that this facility be cleaned periodically to remove accumulations of sand and other debris that is not only unsightly, but is also a hindrance to proper deck drainage. It is DESMAN's opinion that facility cleaning should be included in the operating budget which should be performed on an as-needed basis. The cost associated with this work is not included within our projected repair costs.

Ice-Melt and Snow Removal: DESMAN notes that chloride-based ice-melt products can be detrimental to the long-term durability of the concrete matrix, and DESMAN therefore recommends that an alternative product be used. While DESMAN does not specifically endorse a specific product or manufacturer, DESMAN does suggest that in lieu of a calcium chloride product, an alternative product such as Cryotech NAAC®, as manufactured by Cryotech Deicing Technology, of Fort Madison, IA be used.

However, we do acknowledge that use of an alternate product can be more expensive (Cryotech NAAC® is used frequently at airports), and many snow-removal vendors have not budgeted and are not prepared to obtain and use the alternate product. Since NHPA is performing its snow/ice removal operations in-house, NHPA may be able to find an equal product in mind by forwarding a performance-based requirement to various sources and that the source provide simply a non chloride-based product (not necessarily Cryotech NAAC®).

As a final option, should it be necessary that NHPA use a chloride-based ice-melt, we strongly recommend that NHPA continue to remove the ice-melt product immediately after the snow and ice is melted, and the slabs be washed clean as soon as temperatures allow.

Lighting Maintenance: NHPA should implement a planned lighting maintenance schedule for the facility's lighting, whereby lamps and ballasts are replaced throughout the facility at the same time in lieu of the current practice of intermittent replacement on an as needed basis.

No doubt there is a need to periodically replace a limited number of lamps or individual ballasts due to premature failure, but programmed replacement is typically more cost-effective.

A recommended maintenance schedule and associated facility checklists which can be used or referenced in the preventative maintenance of this parking facility are included in Appendix B – Maintenance Schedules and Checklists.

In summary, DESMAN recommends that the above outlined repair and preventative maintenance program be implemented to assure the continued safe usage and long-term durability of the structure.

5. Prioritized Repair Programs & Estimated Costs

A revised repair and preventive maintenance program has been developed to assure the long-term durability of the 270 State Street Parking Garage. The repairs required have been prioritized into three courses of action:

- Prioritized Repairs (FY 2021)
- Early Repairs (FY 2022)
- Programmed Repairs (FY 2023)
- Long-Term Repairs (FY 2024 - 2025)

Below is a summary of the estimated construction cost for each category.

Recommended Repair Program	Estimated Construction Cost
Prioritized Repairs (FY 2021)	$1,763,200.00
Early Repairs (FY 2022)	$851,150.00
Programmed Repairs (FY 2023)	$1,412,336.25
Long-Term Repairs (FY 2024 – 2025)	$2,115,550.00
Total Estimated Cost	**$6,142,236.25**

A detailed cost estimate is provided in the table on the following page, entitled “Projected Construction Costs.”

The construction costs are based on current prices in the New Haven area for labor, equipment and materials. The estimated construction costs also include a 20% contingency factor to account for uncertainties in the restoration market at the time of bidding, and a preliminary design, construction management fee and program management fee estimated at 25% of total construction cost has been provided for budgeting purpose.

In addition, the costs presented do not Include Typical Operational & Maintenance Costs except as noted, include a 15% allowance for General & Special Conditions, and future costs incorporate a cumulative 5% inflation for all costs, to be adjusted annually.

Table 1
270 State Street Parking Garage
Projected Five Year Construction Cost
(FY 2020)

DESMAN Design Management

		Work Description	Prioritized Repairs (FY 2021)	Early Repairs (FY 2022)	Programmed Repairs (FY 2023)	Long-Term Repairs (FY 2024- 2025)
A.		**Miscellaneous Concrete Repair:**				
	1	Concrete Apron/Wash Replacement/Repair	$ -	$ -	$ -	$ -
	2	Miscellaneous Precast Concrete Tee Repair	$ -	$ -	$ -	$ -
	3	Concrete Curb Replacement/Repair	$ -	$ -	$ -	$ -
	4	Miscellaneous Overhead Concrete Repair	$ -	$ -	$ -	$ -
	5	Miscellaneous Vertical Concrete Repair (including spandrel connections)	$ -	$ -	$ -	$ -
	6	Miscellaneous Shear Connector Repair	$ -	$ -	$ -	$ -
	7	Miscellaneous Spandrel/Column Connections	$ -	$ -	$ -	$ -
	8	Application of Healer/Sealer & Overlay	$ -	$ 254,000.00	$ -	$ -
	9	Bituminous Concrete (asphatl) Repair	$ -	$ 96,000.00	$ -	$ -
B.		**Waterproofing Issues:**				
	1	Crack Repair	$ -	$ -	$ -	$ -
	2	Control/Construction Joint Repair/Replacement	$ -	$ -	$ -	$ -
	3	Cove Joint Repair/Replacement (including vertical joints at columns/spandrel connections)	$ -	$ -	$ -	$ -
	4	Vertical/Wall Joint Replacement (including shear walls)	$ -	$ -	$ -	$ -
	5	Precast Concrete Tee Joint Repair/Replacement (including lifting pockets)	$ -	$ -	$ -	$ -
	6	Waterproofing Membrane Repair/Recoat	$ -	$ 23,000.00	$ -	$ -
	7	Application of Corrosion inhibitor	$ -	$ 105,000.00	$ -	$ -
	8	Flashing Installation along center-line	$ -	$ 13,000.00	$ -	$ -
	9	Façade Joint/Sealant Replacement	$ -	$ 26,000.00	$ -	$ -
	10	Misc. Flashing Repair/Replacement	$ -	$ 4,000.00	$ -	$ -
	11	Expansion Joint Replacement	$ -	$ 20,000.00	$ -	$ -
C.		**Architectural Enhancements:**				
	1	Wheelstop Replacement	$ -	$ -	$ 34,000.00	$ -
	2	Spandrel Railing Replacement	$ -	$ -	$ 40,000.00	$ -
	3	Stair Railing Replacement	$ -	$ -	$ 134,000.00	$ -
	4	Metal Stair Repair	$ -	$ -	$ 67,000.00	$ -
	5	Stair/Elevator Tower Roof Replacement	$ -	$ -	$ 67,000.00	$ -
	6	Vehicle Guardrail Installaton	$ -	$ -	$ 200,000.00	$ -
	7	Fencing Repair	$ -	$ -	$ 34,000.00	$ -
	8	Tenant Storefront Replacement	$ -	$ -	$ 80,000.00	$ -
	9	Garage Entrance Enhancements (conceptual budgetary allowance)	$ -	$ -	$ -	$ 140,000.00
	10	Stair/Elevator Lobby Enhancements (Ground Level from State Street)	$ -	$ -	$ -	$ 91,000.00
	11	Typical Stair/Elevator Lobby Enhancements	$ -	$ -	$ -	$ 168,000.00
	12	Exterior Pedestrian Corridor Enhancements	$ -	$ -	$ -	$ 210,000.00
	13	Typical Stair/Elevator Enclosure (Roof Level) Enhancements	$ -	$ -	$ -	$ 210,000.00
	14	Courtyard Pedestrian Entrance Enhancements	$ -	$ -	$ -	$ 105,000.00
	15	Courtyard Enhancements	$ -	$ -	$ -	$ 210,000.00
	16	Replacement of Pipe Guards	$ 19,000.00	$ -	$ -	$ -
D.		**Electrical Work:**				
	1	Miscellaneous Electrical (Distribution) Repairs	$ -	$ -	$ 20,000.00	$ -
	2	Installation of New LED Light Fixtures (including exit signs, emergency lighting, stair lights and control improvements)	$ -	$ -	$ 167,000.00	$ -
	3	Fire Alarm System Installation	$ -	$ -	$ 67,000.00	$ -
	4	Security System Iimprovements	$ -	$ -	$ 34,000.00	$ -
	5	Surge Protection	$ -	$ -	$ 4,000.00	$ -
E.		**Elevator Upgrades and Improvements:**				
	1	Modernization of Elevators (and related enhancements, including machine room improvements)	$ 1,184,000.00	$ -	$ -	$ -
	2	Maintenance Audit (Bi-Ennial)	$ -	$ -	$ 2,000.00	$ 2,000.00
F.		**Mechanical Repairs and Improvements**				
	1	Cleaning of Floor Drains (with construction)	$ -	$ -	$ 10,000.00	$ 11,000.00
	2	Misc. Plumbing Repairs	$ -	$ -	$ 11,025.00	$ 14,000.00
	3	Replacement of Floor Drains	$ -	$ -	$ -	$ -
	4	Installation of Sand/Oil Separator/Separation of Storm & Sewer	$ -	$ -	$ -	$ -
	5	Repair of Drain Piping	$ -	$ -	$ -	$ -
	6	Replacement of Sump Pump	$ -	$ -	$ -	$ -
	7	Cashier Booth Improvements	$ -	$ 13,000.00	$ -	$ -
	8	Tenant Space Improvements	$ -	$ 20,000.00	$ -	$ -
	9	Fire Standpipe Repairs/Maintenance	$ -	$ -	$ -	$ -
	10	Fire Standpipe System Replacement	$ -	$ -	$ -	$ -
G.		**Painting:**				
	1	Miscellaneous Metal Surfaces (including cold-galv of connections)	$ -	$ -	$ -	$ 70,000.00
	2	Miscellaneous Concrete & Masonry Surfaces	$ -	$ -	$ -	$ 28,000.00
	3	Parking Stall & Lane Striping	$ -	$ 13,000.00	$ -	$ 14,000.00
	4	Fire Standpipe Piping	$ 13,000.00	$ -	$ -	$ -
H.		**Access/Revenue Control Equipment Renewal & Replacement**				
	1	Study for the Replacement of the Revenue Control Equipment	$ -	$ -	$ -	$ 4,000.00
	2	Replacement of the Revenue Control Equipment	$ -	$ -	$ -	$ 77,000.00
	3	Replacement of Overhead Door System	$ -	$ -	$ -	$ -
I.		**Miscellaneous Repairs & Improvements**				
	1	Façade Repairs/Cleaning	$ -	$ -	$ -	$ 35,000.00
	2	Signage Improvements	$ -	$ -	$ -	$ 70,000.00
		Sub-Total:	**$1,216,000.00**	**$587,000.00**	**$974,025.00**	**$1,459,000.00**
		20% Contingencies (Unless Depicted Otherwise)	$243,200.00	$117,400.00	$194,805.00	$291,800.00
		25% Engr. & Construction Management, incl. Program Management (Unless Depicted Otherwise)	$304,000.00	$146,750.00	$243,506.25	$364,750.00
		Total Phased Construction Costs with contingencies:	**$1,763,200.00**	**$851,150.00**	**$1,412,336.25**	**$2,115,550.00**

TOTAL Construction Cost with Contingencies:	**$6,142,236.25**

Note 1: Costs Presented do not Include Typical Operational & Maintenance Costs Except as Noted
Note 2: Costs include a 15% allowance for General & Special Conditions.
Note 3: Future costs incorporate a cumulative 5% inflation for all costs, to be adjusted annually

6. DETERIORATION MECHANISMS

Reinforced concrete deterioration is typically caused by one or more factors of deterioration mechanisms including corrosion of reinforcement, water penetration, freeze-thaw cycling, volume change, or chemical attack. Any one or combination of these deterioration mechanisms can adversely affect the behavior/performance of a reinforced concrete structure. These adverse impacts include corrosion-induced distress, loss of reinforcing cross section, scaling, leaking, cracking, and delamination of concrete. The following is a brief discussion of each of the mechanisms noted above, and their effect on reinforced concrete structures.

WATER PENETRATION:

The primary cause of the majority of reinforced concrete deterioration within parking structures is directly related to the penetration of water into the concrete. Reinforcing corrosion, concrete scaling, water leakage, leaching, and concrete delamination are all caused at least partially by water penetration.

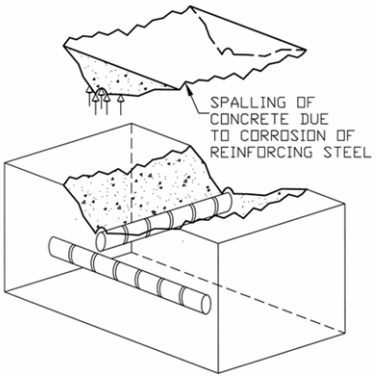


Fig. A

Concrete is a porous material, susceptible to water penetration which can result in increased potential for deterioration. Corrosion of reinforcing steel is an electrochemical process accelerated by the presence of water acting as an electrolyte. In addition, water penetrating into concrete (*Fig. A*) can carry water-soluble chlorides (de-icing salts) to the reinforcing. The combination of chlorides and water further accelerates this corrosion process.

Scaling is also directly related to water penetration into concrete. Scaling is a surface deterioration resulting from pressures by freeze-thaw cycling of saturated concrete. These pressures within the pore structure cause progressive failure of the cement/sand paste. This progressive failure begins with degradation of the exposed surface, advances to the exposure of coarse aggregate, and in severe cases, causes paste failure surrounding the coarse aggregate, destroying the paste/aggregate bond.

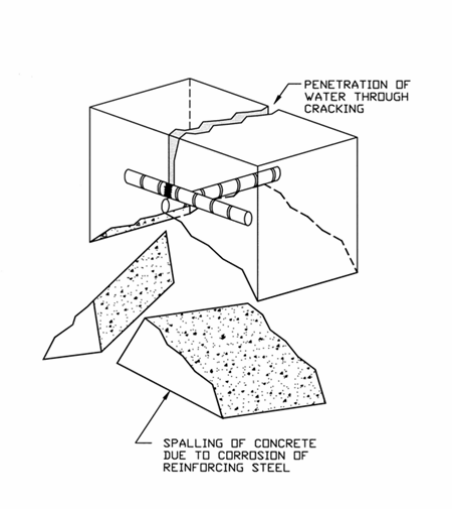


Fig. B

Water penetration through a concrete section, cracked or not, can cause leaching of minerals from within the concrete matrix. Leaking of the parking deck exposes embedded reinforcing steel and underlying structural members to water and chloride ions (road salt) resulting in structural deterioration and potentially a loss of load carrying capacity of these building elements. Leaching is the result of frequent water penetration carrying water-soluble products from within the concrete to the surface below. Leached materials that tend to collect on overhead concrete surfaces are unsightly and potentially damaging to patron's vehicles using the parking facility.

Water penetration can also cause delamination of concrete along subsurface fractures through pressures generated during freeze-thaw cycling.

CORROSION OF REINFORCEMENT:

Corrosion of reinforcing steel or other embedded ferrous items such as electrical conduit is a second major factor contributing to deterioration of reinforced concrete (*Fig. B*).

The corrosion process is an electrochemical process, which produces iron oxide (rust) and other by-products. These by-products occupy a minimum of 250% of the volume of the parent metal. This increase in volume produces tensile stresses within the surrounding concrete.

Because concrete has poor tensile strength properties, cracking occurs within the concrete matrix allowing additional moisture and chlorides to reach the reinforcing causing acceleration of the corrosion process. The deterioration caused by this corrosion includes the reduction of cross sectional area of the reinforcing, and the delamination of concrete surrounding the reinforcement.

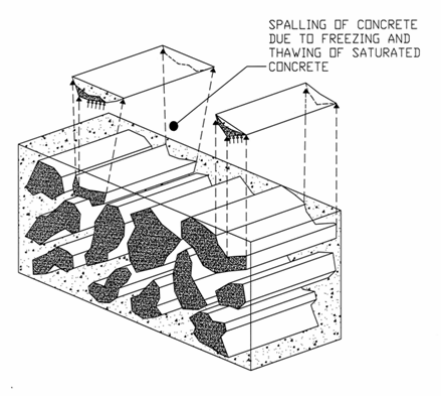


Fig. C

FREEZE-THAW DAMAGE:

Concrete deterioration caused by freeze-thaw cycles is a third major deterioration mechanism. The mechanism occurs within saturated concrete subjected to freezing and thawing due to the pressures generated within the pores of the concrete paste resulting from the volume changes of water during the freeze/thawing process. These pressures are even greater in the presence of de-icing chemicals/chlorides as these chemicals reduce the freezing point and indirectly increase the pore pressures.

As previously mentioned, these pressures can cause progressive failure of the cement paste and result in scaling of the concrete, and delamination of concrete along subsurface fracture planes (*Fig. C*).

VOLUME CHANGES:

Volume changes are a fourth major contributing factor of deterioration of reinforced concrete structures. These volume changes occur in both plastic and cured concrete. These volume changes can cause various types of cracking within the concrete member.

These cracks allow access for water and contaminants to the concrete and reinforcing, resulting accelerated deterioration to occur. The cracking most often associated with plastic concrete is shrinkage cracking produced by the reduction in volume of the concrete during curing. Improper detailing, proportioning, placement, or curing of the concrete can affect the extent of this cracking, but the primary cause is the volume change that occurs during curing.

Volume changes due to thermal movement, shrinkage, creep, and loading can also contribute to the deterioration of reinforced concrete. These volume changes will produce stress in restrained members, often resulting in cracking of the member (*Fig. D*). These cracks also provide access to water and other deterioration mechanisms to attack the member.

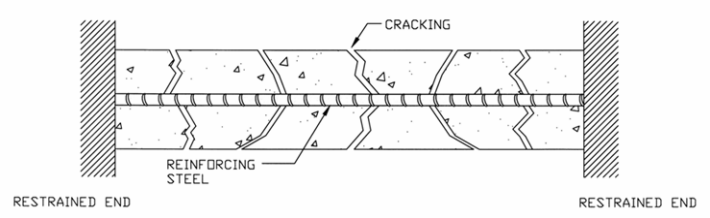


Fig. D

CHEMICAL ATTACK:

Chemical attack is a fifth major deterioration mechanism affecting the performance of reinforced concrete. The effect of de-icing chemical/chlorides upon reinforcing steel and scaling is one example of chemically influenced deterioration. Severe exposure to other chemicals, notably sulfates and acids, can also cause deterioration of cement paste, cement paste/aggregate bond, and reinforcing steel. Chemical properties occurring within certain types of aggregates can also cause an adverse reaction with the cement paste. The resulting volume changes can cause cracking of the concrete.

7. Appendix A –Selected Drawings (Floor Plans), taken from "Ninth Square Parking Structure – Block 236," dated 9/20/1992

EXISTING BUILDING

EXISTING BUILDING

231'-10"

STATE STREET

SITE PLAN DATUM EL. 17.47' (EL. 00.00')

ACTUAL SITE PLAN DATUM
EL. 17.47'

REFERENCE DATUM
EL.00.00'

GROUND LEVEL BLOCK 236

595 + 130 + 54 = 77 CARS

PLUMBING CHASE CONSTRUCTED OF 5⅛" W.P. GYP. BD. ON MET. STUDS CERAMIC TILE FLOOR AND BASE WITH MARBLE SILL
EMPLOYEE TOILET W/H.C. WATER CLOSET AND LAVATORY SINK WITH RIM MOUNTED 30 INCHES ABOVE THE FLOOR. FIXED 3'-6" SIDE GRAB BAR AND A 5'-0" REAR GRAB BAR MTD. 36" A.F.F. IN ACCORDANCE WITH CODE REQUIREMENTS
3'-0" x 4'-0" MIRROR WITH ST.STL. FRAME MOUNTED 3'-6" A.F.F. OVER LAVATORY
TOILET TO BE EQUIPPED WITH ONE TOWEL DISPENSER, SOAP DISPENSER, TOILET PAPER DISPENSER AND WASTE DISPOSAL MOUNTING HEIGHTS AS REQUIRED BY CODE.

1 DETAIL CLOSURE @ N.L. EXIT & BLDG.
SCALE: 3/8"=1'-0"

LEGEND
- PIPE PROTECTION SEE DETAIL 20 SHT A-11
- METAL PIPE BOLLARD SEE DETAIL 9 SHT. A-11

SPECIAL NOTES
- FIRESTOP ALL SEPARATIONS AND OPENINGS SHALL
- PROVIDE DAMPROOFING BENEATH SLAB ON GRADE WITHIN OFFICE, EMPLOYEE TOILET AND RETAIL AREAS
- PROVIDE PRECAST CONC. WHEELSTOPS AT ALL GROUND LEVEL PARKING SPACES

NINTH SQUARE PROJECT
290 STATE STREET
NEW HAVEN, CONNECTICUT

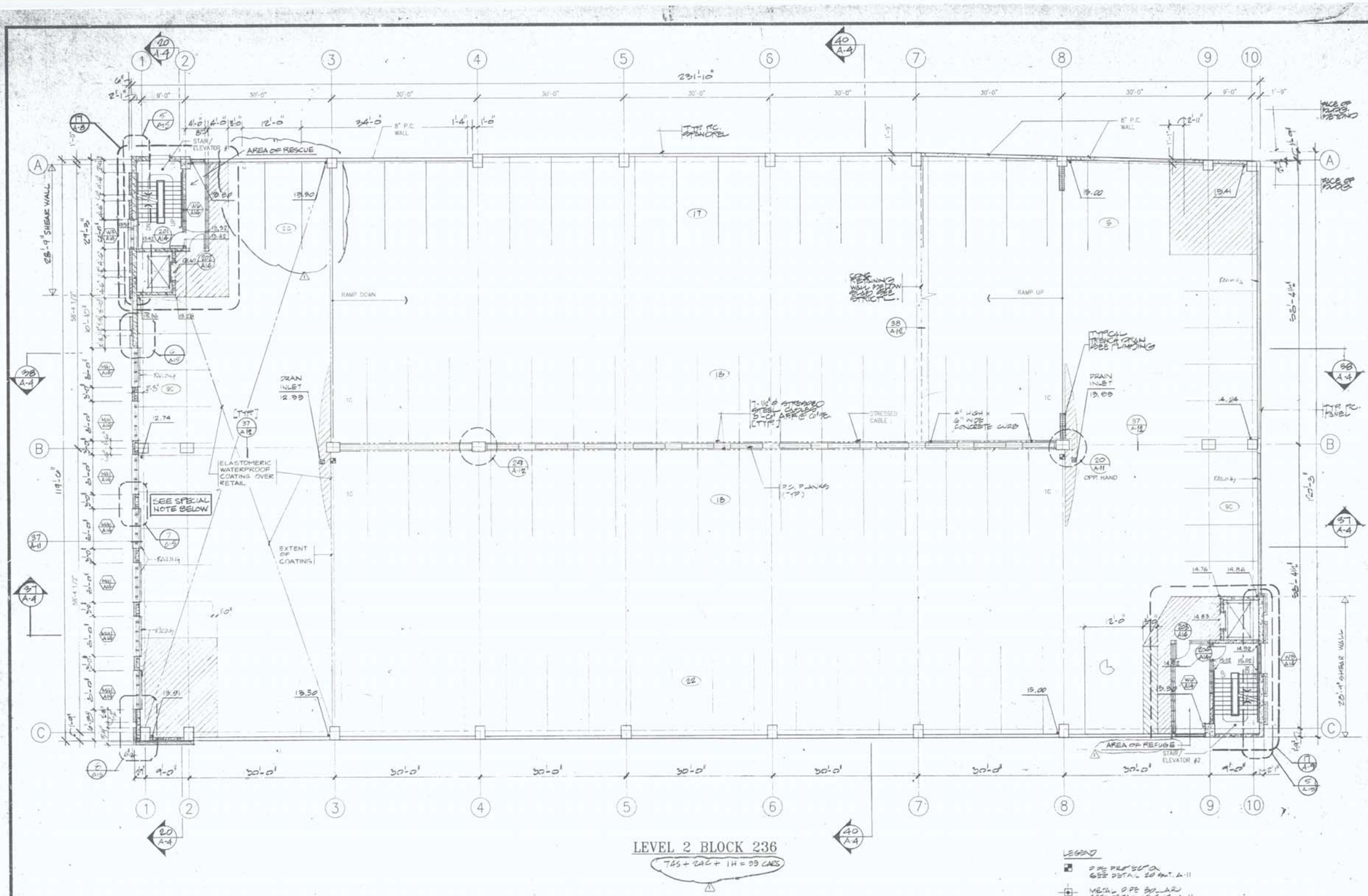
ARCHITECTURAL DESIGN CONSULTANT:
HERBERT S. NEWMAN & PARTNERS, P.C.
300 YORK STREET
NEW HAVEN, CONNECTICUT 06511

LZA LEV ZETLIN ASSOCIATES, INC. ENGINEERS
641 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10011
(212) 741-1300

GROUND LEVEL
– BLK. 236

DRAWN: LO | CHECKED: SB
SCALE: 1/16"=1'-0" | DATE: 7-29-91
JOB NO: 9206

A-1



NINTH SQUARE PROJECT
290 STATE STREET
NEW HAVEN, CONNECTICUT

ARCHITECTURAL DESIGN CONSULTANT:
HERBERT S. NEWMAN & PARTNERS, P.C.
300 YORK STREET
NEW HAVEN, CONNECTICUT 06511

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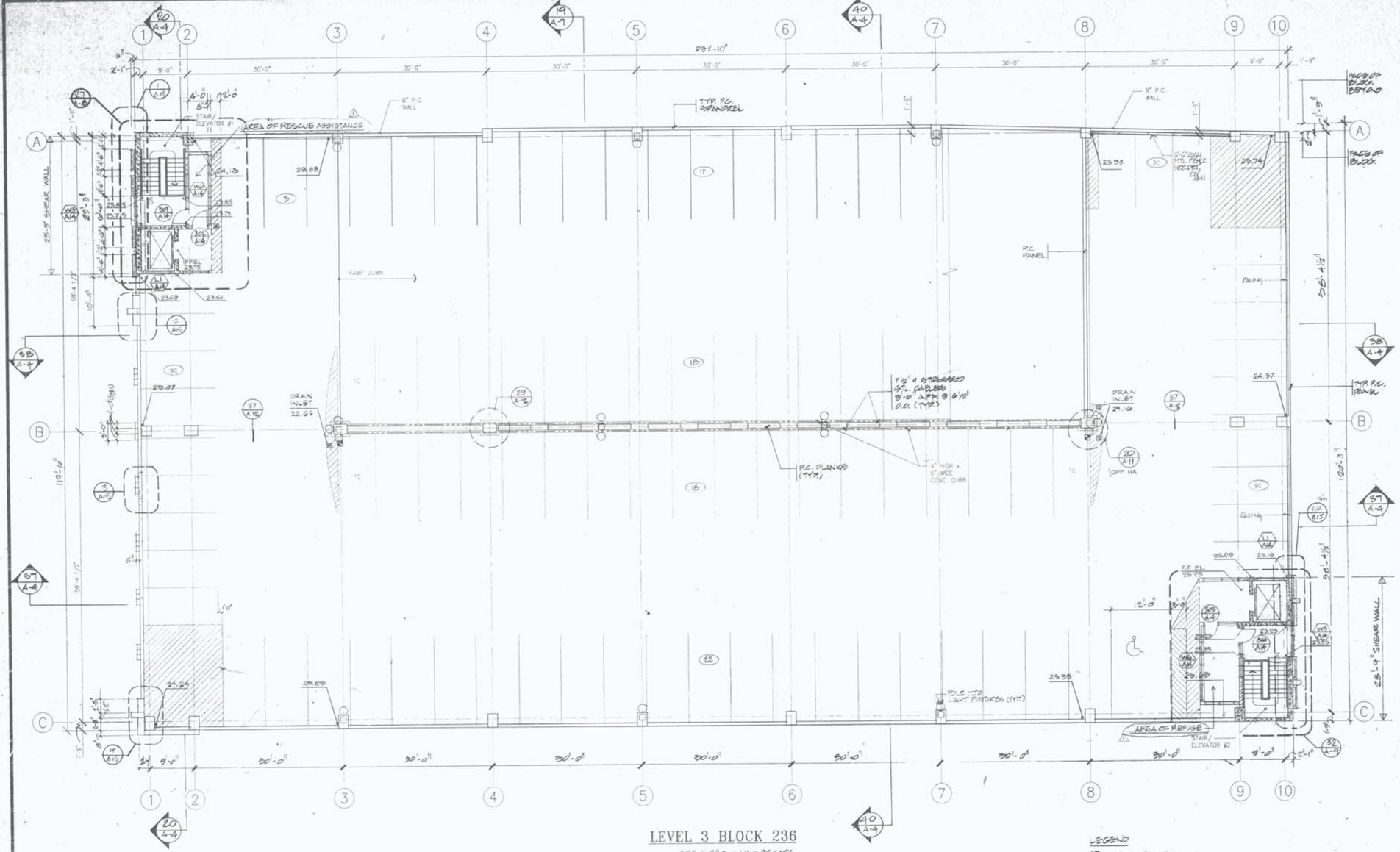
841 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10011
(212) 741-1300

2ND LEVEL
- BLK. 236

A-2



LEVEL 3 BLOCK 236

67S + 24C + 1H = 92 CARS

LEGEND

- FIRE PROTECTION SEE DETAIL 20 SHT. A-11
- VERT. FIRE PROTECTION SEE DETAIL 10 SHT. A-11

DATE	REV.	ISSUE
11/15/82	1	CONTRACT

DRAWING ORIENTATION

SEAL

NINTH SQUARE PROJECT
290 STATE STREET
NEW HAVEN, CONNECTICUT

ARCHITECTURAL DESIGN CONSULTANT
HERBERT S. NEWMAN & PARTNERS, P.C.
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LZA LEV ZETLIN ASSOCIATES, INC.
ENGINEERS
641 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10011
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3RD LEVEL
- BLK. 236

TITLE

DRAWN	CHECKED
SCALE: 1/8"=1'-0"	DATE: 7/6/82
PROJECT NO. 8205	DRWG. NO. A-3

8. APPENDIX B – MAINTENANCE SCHEDULES AND CHECKLISTS

MAINTENANCE SCHEDULE

A. Cleaning:	Daily	Weekly	Monthly	4 Month Interval	6 Month Interval	Yearly	Other
1. Sweeping - Localized	R	M					
2. Sweeping - all Areas (including curbs)		R	M				
3. Expansion Joints		R	M				
4. Empty Trash Cans	R	M					
5. Restrooms:							
a. Floors	R	M					
b. Fixtures		M					
c. Walls		R	M				
6. Cashier's Booths:	R						
a. Floors		M					
b. Fixtures		M					
c. Walls		R	M				
d. Windows	R	R	M				
7. elevators:							
a. floors	R	M					
b. Doors		R	M				
c. Door Tracks		M					
d. Windows (if glass back elevator):							
- Interior Elevator Glass		R	M				
- Exterior Elevator Glass (exterior of cab/interior of shaft)						R/M	
8. Stairs:							
a. Floors		R	M				
b. Handrails		R	M				
c. Windows:							
- Interior Window Surfaces			R	M			
- Exterior Window Surfaces (inclusive of exterior of back elevator shaft)						R/M	
9. Offices (Management/Security):							
a. Floors	R	M					
b. Windows:							
- Interior Surfaces		R	M				
- Exterior Surfaces			R	M			
10. Electrical/Mechanical Rooms							
11. Wash Down Parking Decks					*R	*M	
12. Wash Down Revenue Control Equipment		R	M				Note 3

MAINTENANCE SCHEDULE

B. Doors & Door Hardware:	Daily	Weekly	Monthly	4 Month Interval	6 Month Interval	Yearly	Other
1. Doors close & Latch Properly	R	M					
2. Mechanized Doors:							
a. Pedestrian Doors	R	M					
b. Rolling Grill Doors	R	M					
3. Panic Hardware at Security Doors	R	M					
4. Lubricate mechanized Doors:							
a. Pedestrian Doors			R		M		
b. Rolling Grill Doors			R		M		
C. Electrical System:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check Lighting Fixtures		R	M				
2. relamp Fixtures		R		M			
3. Replace Fixture Ballasts			R	M			
4. Inspect - Specialized Electrical Equipment:							
a. Time Clocks				R	M		Note 3
b. Photo Cells				R	M		Note 3
c. Lighting Control Equipment				R	M		Note 3
d. Other						R/M	Note 1
5. Electrical Distribution Panels					R	M	
6. surface Mounted conduit					R	M	
7. Sprinkler System Compressor					R	M	
8. fire alarm System				R	M		Note 2
D. Elevator Operation:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check for Normal Operation	R	M					
2. Check Elevator Indicator Lights:							
a. Interior	R	M					
b. Exterior	R	M					
3. Check Audible Tones (ADA level enunciators)		R	M				
4. Elevator Service - Preventive Maintenance					R	M	Note 2
E. Heating, Ventilation & Air Conditioning:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check for Proper Operation:							
a. Heating Equipment		R		M			Note 3
b. Ventilation Equipment		R	M				Note 3
c. A/C Equipment		R		M			Note 3
2. Check Filters						R/M	Note 1
3. HVAC Service - Preventive Maintenance						R/M	Note 1

MAINTENANCE SCHEDULE

F. Painting:	Daily	Weekly	Monthly	4 Month Interval	6 Month Interval	Yearly	Other
1. Check for repaint Failure & Rusting:							
a. Doors & Door Frames				R	M		
b. Handrails & Guardrails				R	M		
c. Steel Bollards/Pipe Guards				R	M		
d. Exposed Piping (fire suppression system & storm drainage)					R	M	
e. Other Miscellaneous Metals				R	M		
2. Check for Appearance:							
a. Striping				R	M		
b. Curbs			R		M		
c. Walls				R	M		
d. Ceilings					R	M	
e. Signs			R	M			
f. Touch-up Paint			R		M		
3. Repainting						R/M	Note 1
G. Parking/Revenue Control Equipment:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check for Proper Operation	R	M					
2. Parking/Revenue Control Equip - Preventive Maintenance							Note 3
H. Plumbing/Drainage Systems:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check for Proper Operation:							
a. Sanitary Facilities	R	M					
b. Portable Water System			R		M		
c. Deck Wash down System							
d. Floor Drains/Storm Risers					R	M	
e. Fire Suppression Systems:							
- Sprinkler System						R/M	Note 3
- Dry Fire Standpipe System						R/M	Note 3
2. Drain Down Systems for Winter						R/M	Note 3

MAINTENANCE SCHEDULE

I. Waterproofing:	Daily	Weekly	Monthly	4 Month Interval	6 Month Interval	Yearly	Other
1. Check for Leaks:							
a. Roofing			R		M		
b. Joint/Crack Sealants			R		M		
c. Expansion Joints			R		M		
d. Windows, Doors & Walls			R		M		
e. Parking Deck - Waterproofing Membrane			R		M		
2. Check for Deterioration:							
a. Roofing					R	M	
b. Joint/Crack Sealants					R	M	
c. Expansion Joints					R	M	
d. Windows, Doors & Walls					R	M	
e. Parking Deck - Waterproofing Membrane					R	M	
J. Safety Checks:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Handrails & Guardrails			R	M			
2. Emergency Exit Signs		R	M				
3. Emergency Lights		R	M				
4. Tripping Hazards:							
a. Supported Concrete Slabs	R	M					
b. Concrete Slab-on-grade	R	M					
c. Stairs (interior & exterior)	R	M					
d. Sidewalks & Curbs (interior & exterior)	R	M					
K. Pedestrian & Vehicular Signage:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check Signs:							
a. Proper Placement/Positioning		R	M				
b. Clean				R	M		
c. Legibility			R	M			
d. Illuminated Signs or Changeable Information Signs	R	M					

MAINTENANCE SCHEDULE

L. Snow & Ice Removal:	Daily	Weekly	Monthly	4 Month Interval	6 Month Interval	Yearly	Other
1. Check for Icy Spots (in season)	R/M						
2. Remove Snow & Ice (in season)	R/M						
M. Structural System:	**Daily**	**Weekly**	**Monthly**	**4 Month Interval**	**6 Month Interval**	**Yearly**	**Other**
1. Check Structure for:							
a. Soffit (overhead) Deterioration			R	M			
b. Floor Surface Deterioration (see safety checks)				R	M		
c. Wall & Column Deterioration			R	M			
d. Cracking Concrete				R	M		
e. Water Leakage				R	M		
f. Rusting Structural Steel				R	M		
g. Rusting Embedment's within Concrete				R	M		
h. Unusual and/or Unequal Settlement					R	M	
N. Repair	As per Engineer's Recommendation						
O. Repair and/or Replace Protective Concrete Coatings	As per Engineer's Recommendation						

Frequency	
R=Recommended	R*=Spring & Fall
M=Minimum	M*=Spring

Notes for Maintenance Checklist:

1. A frequency should be selected that is appropriate for that element in the specific parking garage. Spot repairs or replacements should be performed as needed.

2. This equipment should be under a service contract for regular preventative maintenance and emergency service. The equipment manufacturer's recommendations for inspection and preventative maintenance should be followed.

3. This equipment should either be under a service contract for regular preventative maintenance and emergency service, or in-house staff should be specifically trained to provide the required service. The equipment manufacturer's recommendations for inspection and preventative maintenance should be followed.

MAINTENANCE CHECKLISTS
DAILY CHECKLIST

DESMAN Design Management

A. Cleaning:

1. Sweeping - Localized ☐
2. Empty Trash Cans ☐
3. Restrooms:
   - a. Floors ☐
   - b. Fixtures ☐
4. Cashier's Booths:
   - a. Floors ☐
   - b. Fixtures ☐
5. Elevators:
   - a. Floors ☐
   - c. Door Tracks ☐
6. Offices (Management/Security):
   - a. Floors ☐

B. Doors & Door Hardware:

1. Doors Close & Latch Properly ☐
2. Mechanized Doors:
   - a. Pedestrian Doors ☐
   - b. Rolling Grill Doors ☐
3. Panic Hardware at Security Doors ☐

C. Elevator Operation:

1. Check for Normal Operation ☐
2. Check Elevator Indicator Lights:
   - a. Interior ☐
   - b. Exterior ☐

D. Landscaping:

1. Remove Trash ☐
2. Water/Irrigate *(dependent upon time of year & type of planting)* ☐

E. Parking/Revenue Control Equipment:

1. Check for Proper Operation ☐

F. Plumbing/Drainage Systems:

1. Check for Proper Operation:
   - a. Sanitary Facilities ☐

G. Safety Checks:

1. Tripping Hazards:
   - a. Supported Concrete Slabs ☐
   - b. Concrete Slab-on-Grade ☐
   - c. Stairs (Interior & Exterior) ☐
   - d. Sidewalks & Curbs (Interior & Exterior) ☐

H. Security System:

1. Check for Proper Operation
   - b. Intercom System ☐
   - c. CCTV Surveillance System ☐

I. Pedestrian & Vehicular Signage:

1. Check Signs:
   - a. Illuminated Signs or Changeable Information Signs ☐

J. Snow & Ice Removal:

1. Check for Icy Spots (in season) ☐
2. Remove Snow & Ice (in season) ☐

Supervisor:	
Date:	

MAINTENANCE CHECKLISTS
WEEKLY CHECKLIST

DESMAN Design Management

A. Cleaning:

1. Sweeping - All Areas *(including curbs)* ☐
2. Expansion Joints ☐
3. Restrooms:
   a. Walls ☐
4. Cashier's Booths:
   a. Walls ☐
   b. Windows ☐
5. Elevators:
   a. Doors ☐
   b. Windows *(if glass back elevator)* :
      - Interior Elevator Glass ☐
6. Stairs:
   a. Floors ☐
   b. Handrails ☐
7. Offices (Management/Security):
   a. Windows:
      - Interior Surfaces ☐
8. Wash Down Revenue Control Equipment ☐

B. Electrical System:

1. Check Lighting Fixtures ☐
2. Relamp Fixtures ☐

C. Elevator Operation:

1. Check Audible Tones *(ADA level annuciators)* ☐

D. Heating, Ventilation & Air Conditioning:

1. Check for Proper Operation:
   a. Heating Equipment ☐
   b. Ventilation Equipment ☐
   c. A/C Equipment ☐

E. Landscaping:

1. Mow Lawns ☐

F. Safety Checks:

1. Emergency Exit Signs ☐
2. Emergency Lights ☐

G. Security System:

1. Check for Proper Operation
   a. Elevator Communication Equipment (Telephone) ☐

H. Pedestrian & Vehicular Signage:

1. Check Signs:
   a. Proper Placement/Positioning ☐

Supervisor:	
Date:	

MAINTENANCE CHECKLISTS
MONTHLY CHECKLIST

A. Cleaning:

1. Stairs:
   a. Windows:
      - Interior Window Surfaces ☐
2. Offices (Management/Security):
   b. Windows:
      - Exterior Surfaces ☐

B. Doors & Door Hardware:

1. Lubricate Mechanized Doors:
   a. Pedestrian Doors ☐
   b. Rolling Grill Doors ☐

C. Electrical System:

1. Replace Fixture Ballasts ☐

D. Landscaping:

1. Weed Landscaping ☐

E. Painting:

1. Check for Appearance:
   a. Curbs ☐
   b. Signs ☐
   c. Touch-up Painting ☐

F. Plumbing/Drainage Systems:

1. Check for Proper Operation:
   a. Potable Water System ☐

G. Roofing & Waterproofing:

1. Check for Leaks:
   a. Roofing ☐
   b. Joint/Crack Sealants ☐
   c. Expansion Joints ☐
   d. Windows, Doors & Walls ☐
   e. Parking Deck Waterproofing Membrane ☐

H. Safety Checks:

1. Handrails & Guardrails ☐

I. Pedestrian & Vehicular Signage:

1. Check Signs:
   a. Legibility ☐

J. Structural System:

1. Check Structure for:
   a. Soffit (overhead) Deterioration ☐
   b. Wall & Column Deterioration ☐

Supervisor:	
Date:	

MAINTENANCE CHECKLISTS
QUARTERLY CHECKLIST

A. Electrical System:

1. Inspect - Specialized Electrical Equipment:
   - a. Time Clocks ☐
   - b. Photo Cells ☐
   - c. Lighting Control Equipment ☐
2. Fire Alarm System ☐

B. Painting:

1. Check for Paint Failure & Rusting:
   - a. Doors & Door Frames ☐
   - b. Handrails & Guardrails ☐
   - c. Steel Bollards/Pipe Guards ☐
   - d. Other Miscellaneous Metals ☐
2. Check for Appearance:
   - a. Striping ☐
   - b. Walls ☐

C. Pedestrian & Vehicular Signage:

1. Check Signs:
   - a. Clean ☐

D. Structural System:

1. Check Structure for:
   - a. Floor Surface Deterioration (See also Safety Checks) ☐
   - b. Cracking Concrete ☐
   - c. Water Leakage ☐
   - d. Rusting Structural Steel ☐
   - e. Rusting Embedment within Concrete ☐

Supervisor:	
Date:	

MAINTENANCE CHECKLISTS
6 MONTH & YEARLY CHECKLIST

DESMAN Design Management

	6 Month Interval	Yearly Interval
A. Cleaning:		
1. Elevators:		
a. Windows *(if glass back elevator)* :		
- Exterior Elevator Glass (exterior of cab and interior of shaft)		☐
2. Stairs:		
a. Windows:		
- Exterior Window Surfaces *(inclusive of exterior of elevator shaft if glass back elevator)*		☐
3. Wash Down Parking Decks	☐	
B. Electrical System:		
1. Electrical Distribution Panels	☐	
2. Surface Mounted Conduit	☐	
3. Sprinkler System Compressor	☐	
C. Elevator Operation:		
1. Elevator Service - Preventive Maintenance	☐	
D. Heating, Ventilation & Air Conditioning:		
1. Check Filters		☐
2. HVAC Service - Preventive Maintenance		☐
E. Landscaping:		
1. Prune Trees		☐
2. Trim Shrubs	☐	
3. Fertilize	☐	
F. Painting:		
1. Check for Paint Failure & Rusting:		
a. Exposed Piping (fire suppression system & storm drainage)	☐	
2. Check for Appearance:		
a. Ceilings	☐	
3. Repainting		☐
G. Plumbing/Drainage Systems:		
1. Check for Proper Operation:		
a. Floor Drains/Storm Risers	☐	
b. Fire Suppression Systems:		
- Sprinkler System		☐
- Dry Fire Standpipe System		☐
2. Drain Down Systems for Winter		☐
H. Roofing & Waterproofing:		
1. Check for Deterioration:		
a. Roofing	☐	
b. Joint/Crack Sealants	☐	
c. Expansion Joints	☐	
d. Windows, Doors & Walls	☐	
e. Parking Deck Waterproofing Membrane	☐	
I. Structural System:		
1. Check Structure for:		
a. Unusual and/or Unequal Settlement	☐	

Supervisor:	
Date:	