PARKING RAMP EVALUATION REPORT

Best Western Plus Como Park Hotel Parking Ramp
1015 Bandana Boulevard East
Saint Paul, Minnesota 55105

®Google Image

Project Consultant:

Encompass, Inc.
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Minnetonka, MN 55343
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Encompass Project #: 22-8144-000

January 3, 2023

SCOPE OF REPORT

This report is intended to provide a condition assessment and general repair and maintenance guidance. It is not intended to give detailed direction for bidding, repair, or restoration. A separate proposal to prepare repair and restoration documents should be obtained from Encompass, Inc. or another licensed professional engineer with experience in parking structure repair to initiate repairs.

STANDARD OF CARE

This report is prepared based on observations and review of the material available as of this date. The conclusions and recommendations contained herein represent our professional opinions. These opinions were arrived in accordance with accepted engineering practices at this time and location. Our opinions may be revised based on the availability of additional data.

These services, performed by a licensed professional engineer for Encompass, Inc., were conducted in a manner consistent with the level of skill and care ordinarily exercised by licensed professional engineers that are currently practicing in this area and under similar fee, scope, and schedule requirements.

No other warranty is implied or intended. Should you have any questions, please call.

Prepared by:
Encompass, Inc.

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Reviewed by:
Encompass, Inc.

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Senior Project Engineer - Structural

Cc: Curt Isernhagen, PE, Principal

CERTIFICATION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Michael Tilleman, P.E.
MN Registration Number: 54526

Date: January 3, 2023

Encompass
engineering consultants
forensic analysis

January 3, 2023

Mr. Blai Vang
Vice President - Facility Services
JB Vang
1335 Pierce Butler Road
St. Paul, MN 55104
bvang@jbvang.com

Re: Best Western - 2022 Parking Ramp Review
1015 Bandana Boulevard East
Saint Paul, Minnesota 55105

Encompass Project No.: 22-8144-000

Dear Mr. Vang:

Encompass has conducted a visual observation of the parking ramp at the Best Western Plus Como Park Hotel Parking Ramp located at 1015 Bandana Boulevard East in Saint Paul. The purpose of the observation is to provide recommendations on the overall condition of the structural supporting components of the parking ramp. This report provides a description of our observations and recommended actions.

1.0 INTRODUCTION

1.1 The parking structure consists of four structurally supported levels and two slab-on-grade levels. The ramp is located west of the hotel and is not connected to other structures.

1.2 The ramp is roughly 390 feet long north-south and 114 feet wide east-west – see SK-1 for an aerial image with grid references. The long north south dimension is broken into three approximately sections by two east-west expansion joints through all four supported levels on both halves of the building.

1.3 The ramp is composed of six offset levels. Levels 1 (lower slab on grade) ,2,3 are the eastern side of the structure. Levels 1 1/2 (the higher slab on grade), 2½, 3½ are located on the western side.

1.4 The ramp is constructed with unbonded reinforced post tensioned (PT) continuous concrete slabs supported by unbonded reinforced post tensioned concrete beams and mild reinforced columns. The beams are single span from column to column, span east to west on both sides of the ramp, and are approximately 58 feet long. The columns on the north-south gridline B in the center of the ramp supports four vertically offset beams, two from each side. The exterior columns on grids A and C support two beams.

1.5 The foundation walls are cast in place concrete, with some areas of masonry.

1.6 A nonfunctioning elevator is located near the center of the ramp on the eastern half.

1.7 There are four locations of vehicle ramps going from level to level, one ramp at each end and two ramps in the center. Next to each vehicle ramp is an open steel stairway.

1.8 The ramp has parking spaces for an estimated 400 cars. Car counts were taken from aerial images of the top levels and estimated for lower levels. The vehicle distribution estimate is as follows:

LEVEL 3.5	71		
		54	LEVEL 3
LEVEL 2.5	71		
		65	**LEVEL 2**
LEVEL 1.5	71		
		65	LEVEL 1
	397		

1.9 Representative photographs of the observed items discussed below are attached at the end of the report for review. The individual photographs will not be referenced in the report unless it is a unique or critical item. There are Google™ Street images included to illustrate the ramp without snow.

2.0 OBSERVATIONS

2.1 The ramp was initially observed by Craig Kuske, PE, SE of Encompass on November 29, 2022.

2.2 A further evaluation was completed by Michael Tilleman, P.E. of Encompass on December 9, 2022.

2.3 **Top Surfaces of PT Slabs and Beams on Four Structural Levels**

2.3.1 The top two levels 3 and 3.5 of the parking structure were not able to be evaluated as they were snow covered and are not used/plowed during the winter.

2.3.1.1 The uppermost level was chained off and does not appear to be used at any time which was confirmed in discussion between Encompass, Inc. and the management company prior to evaluation.

2.3.2 The top surfaces of Levels 2 and 2.5 PT slabs were in good condition with some cracking and ponding noted.

2.3.2.1 Deteriorated traffic coating was observed on level 2 with large tears and missing sections found. The detailing near expansion joints was found to be in the worst condition.

2.3.2.2 The condition of the snow-covered Levels 3 and 3.5 are not known at this time.

2.3.2.3 The PT slab surfaces had varying levels of roughness with the first covered level (level 2.5) having aggregate pops (pockmarks in the slab) with a higher occurrence of pop outs near the ramps.

2.3.3 No evidence of previous top surface crack repairs was found during the evaluation.

2.3.3.1 If there are areas of traffic coating, it may obscure some repairs, but they should still show through the coating based on the crack detailing before coating.

2.3.4 **Surface Coating:** Traffic coating is present on two of the four concrete surfaces of the garage, Levels 3.5 and 2.

2.3.4.1 The visible traffic coating on Level 2 was in poor condition and the Google aerial image of Level 3.5 shows a severely deteriorated traffic coating present.

2.4 **Top Surfaces of Expansion Joints**

2.4.1 Flexible expansion joints run east to west runs through four supported levels on Grids 7 and 13. See SK-1 for aerial image with gridlines for report reference only.

2.4.1.1 The expansion joints primarily serve to divide the full structure into three separate structures, allowing each section to expand and contract due to extreme outdoor temperature variations. The condition of the expansion joints was variable ranging from good to poor condition.

2.4.1.2 The expansion joints in poor condition had visible tears and debonding of the top horizontal wings (legs) at various points along the joint.

2.4.2 The vehicle ramps between levels of the parking structure have sealant joints at the top and bottom of each slope ramp, but they do not have a preformed expansion joint.

2.4.2.1 The underside of the ramp connections is solid, indicating it is structurally integral with the PT slabs.

2.5 Bottom Surfaces of PT Slabs and Beams

2.5.1 Bottom cracking is present on the underside of all PT slabs with varied levels of cracking.

2.5.1.1 At some locations the bottom surfaces have been recently painted and do not have the same appearance of cracking but based on other slabs, it is likely present underneath the paint.

2.5.1.2 Cracks in the underside of the slabs showed varied degrees of efflorescence present.

2.5.1.3 No evidence of crack repairs by epoxy injection or other means were observed on the underside of the slab.

2.5.2 Moisture penetration and wet spots were noted on all undersides of the PT slabs but was most noticeable at beams supporting the expansion joints on grids 7 and 13.

2.5.2.1 Corrosion staining from a steel angle or plate corrosion was present at all locations with the expansion joint above it.

2.5.2.2 Previous overhead patches/repairs made with a patching mortar have cracks and moisture penetration at them.

2.5.3 Several locations had deteriorated concrete and corroded non-epoxy coated rebar visible.

2.5.3.1 This typically was observed at or near the supporting beams.

2.5.3.2 No locations with exposed rebar showed the presence of epoxy coatings.

2.5.4 Several concrete spalls with exposed broken PT tendons were observed on the underside of slabs at all levels.

2.5.4.1 The 7 wire tendons were corroded, if they were present in the tendon sheathing sleeve. This was due to complete loss of wire section or tendon contraction as mentioned in 2.5.4.2.

2.5.4.2 At some locations, the broken tendons have contracted after breaking.

2.5.5 Locations on Levels 1.5 and 2.5 had four uniformly spaced holes drilled through the entire depth of the PT slab.

2.5.5.1 No bollards or other items were found on the topside of the slab.

2.5.5.2 Some locations had threaded rods with square washers and nuts in the holes while other locations were open.

2.5.6 Previous repairs were found on some of the PT slabs in different locations and appeared to be of differing ages.

2.5.6.1 One location had several concrete patches that extended 1-2 inches below the formed bottom surface of the slab.

2.5.6.2 No previous inspections or repair documents were provided to Encompass for review to determine if any engineer detailed repairs were installed as designed.

2.5.7 Most of the observed paint was cracked with some sections peeling.

2.6 Bottom Surfaces of Expansion Joints

2.6.1 Extensive and severe steel corrosion was present at the steel members, either plates or angles, that were integral in the expansion joint system. The steel angle or bent plate sitting on a PT beam ledge was to allow for a sliding slab condition. The angle is severely corroded all locations.

2.6.1.1 The vertical down leg of the steel angle is completely deteriorated and nonfunctional.

2.6.2 Water intrusion was noted at all expansion joints on bottom of the slabs and beams.

2.7 Columns

2.7.1 Most of the exterior columns on Grids A and C observed were significantly cracked with spalled concrete, or otherwise experiencing structural deterioration.

2.7.1.1 The extents of the damage varied by location and some still had the delaminated pieces of concrete attached.

2.7.1.2 Other locations had sections completely spalled off and corroded uncoated rebar is visible.

2.7.1.3 The cracks in the columns extended in all directions and from partial height to full height.

2.7.2 Interior columns on Grid B were cracked, spalled, and had evidence of corrosion of the PT tendon ends visible on the column vertical surface on the opposite side of the beam.

2.7.2.1 Rust staining coming from the PT tendon grouted pockets were found at the beam connection to the columns.

2.7.2.2 Previous repairs (likely regrouting) of the PT tendon pockets were observed on several columns.

2.7.2.3 One PT beam tendon end was observed to have broken and come out of the column surface. The 7 wire tendon strands were not tightly wound together, and the wedges used to hold the tendon in tension during installation were loose in the grout pocket.

2.7.3 All the observed column reinforcing steel (rebar) was uncoated and severely corroded.

2.7.4 Steel angles at the slab/column intersection were severely corroded.

2.7.5 Previous repairs were observed on some columns (not painted or coated like all other columns).

2.7.5.1 Previous repairs were cracking and spalling, similar to the original columns.

2.7.6 Paint on the columns was peeling/cracking in most locations.

2.8 **Foundation Walls**

2.8.1 Foundation walls were in good condition with some cracks and spalls noted.

2.8.2 Cracks did not appear to have water intrusion present and were less than 1/16th of an inch wide.

2.8.3 Exposed rebar observed at isolated spalls was corroded and not epoxy coated.

2.8.4 Vertical shrinkage cracks were noted on most exterior walls.

2.9 **Slabs on Grade**

2.9.1 The slabs on grade are in good condition with minimal cracking or settling noted.

2.9.2 Most of the cracking and settling occurred at the column/slab intersection point.

2.9.3 The finish on the slab on grade was a rough nonslip texture and appears to be original from finishing of the concrete.

2.10 **Slotted Drain Covers and Cast Iron Pipe Corrosion**

2.10.1 The cast iron or ductile steel drainpipes are in poor condition with corrosion and evidence of water leaks at the fittings.

2.10.2 Some locations were missing portions of the pipe.

2.10.3 The drain covers were generally in good condition with only minor corrosion and damage observed.

2.11 **Dry Standpipes**

2.11.1 The dry fire protection system standpipes located in the parking ramp were not in a useable condition. EXPLAIN MORE PLEASE

2.12 **Metal Stairs**

2.12.1 The metal stairs at the top levels of the parking ramp were in significantly corroded condition with some steel riser pan forms disintegrated and the filler concrete in the pan was missing.

2.12.2 These stairs had plywood placed over the damaged risers trying to make them accessible and able to be used.

2.12.3 The remaining stairs down to the lower levels were in varied condition but all of the stairs present showed signs of moderate to significant corrosion, water intrusion through them, and varied levels of deterioration of the concrete and/or metal structure.

3.0 ANALYSIS AND CONCLUSIONS

3.1 Our analysis is based on site observations and experience with similar structures.

3.2 Based on the visible evidence and without performing any destructive investigation or testing, we have reason to believe that the deterioration of the structure is significant and has resulted in a partial loss of structural capacity.

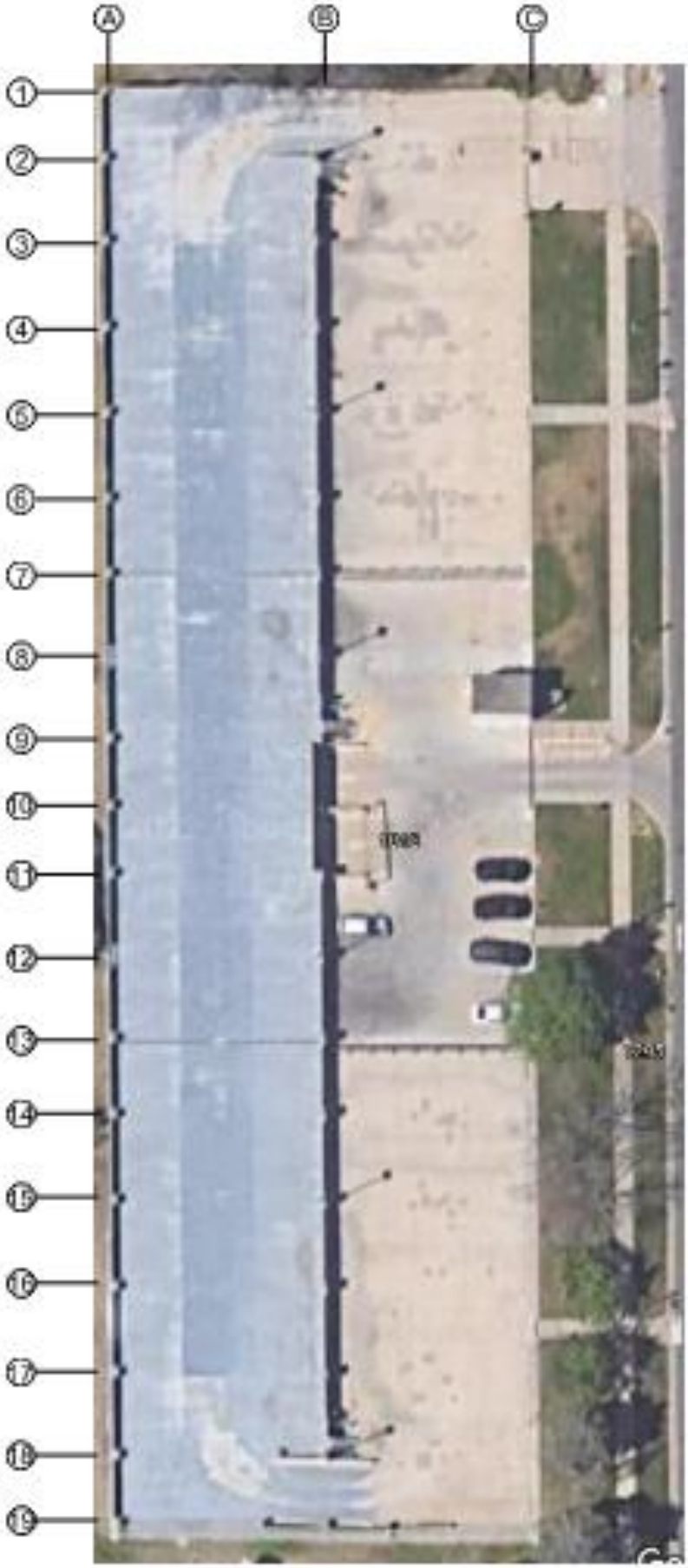
3.3 A full evaluation and quantification of the capacity of various deteriorated structural members can only be determined by extensive invasive investigation and testing.

3.4 Based upon the identified significant structural deterioration, it is our professional opinion that the structure cannot reliably support parking loads per requirements of the Minnesota State Building Code.

4.0 RECOMMENDATIONS

4.1 It is our recommendation that this structure is not used for any purpose, parking or otherwise, and total access to the structure be prohibited in the near future.

4.2 We recommend vacating this parking structure and preventing parking, storage, or entry via barricades on or before January 18th, 2023



SK-1: MAIN GRIDS FOR REPORT REFERENCE. NORTH IS UP.

SK-2: Google Image of Level 3 ½ PT Beam

SK-3: Google Image of South Vehicle Ramp Between Levels 3 and up to 3 ½. Stair A next to ramp

SK-4: Google Image of Center Vehicle Ramps from Level 3 going up and down to Levels 2 ½ and 3 ½. Stair B next to ramps. This is main vehicle entry from east between hotel and ramp.

SK-5: Google Image of North Vehicle Ramps from Level 3 going up Level 3 ½. Stair C next to ramp. This is alternate vehicle entry from east between hotel and ramp.

SK-6: Google Image of Southwest Corner of Levels 1 ½, 2 ½, and 3 ½ in foreground.

SK-7: Google Image of Northwest Corner of Levels 1 ½, 2 ½, and 3 ½. Note grade rising on north (left) end.

SK-8: Google Image of north end Levels 2½, and 3½. Note grade rising on east (left) end.

Top Surfaces of PT Slabs and Beams on Four Structural Levels

Level 2 looking south

Level 2.5

Expansion Joint Top

Bottom Surfaces of PT Slabs and Beams

Bottom Surfaces of PT Slabs and Beams (continued)






Bottom Surfaces of PT Slabs and Beams (continued)

Bottom Surfaces of PT Slabs and Beams (continued)


Left: Previous bottom of slab patch was formed lower than original bottom of slab. Right – Continued spalling next to patch.

Previous patch full length of beams.

Bottom Surfaces of PT Slabs and Beams (continued)

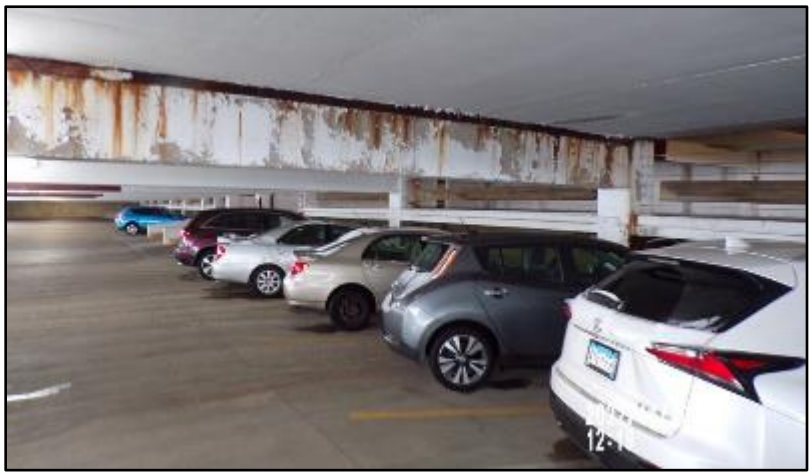
Previous bollard through bolt patching under Level 3.

Bottom of slab cracks intersecting beam-column connection at foundation wall.

Bottom Surfaces of PT Slabs and Beams (continued)

Bottom of slab cracks intersecting beam-column connection at foundation wall.

Expansion Joint Bottom



Columns


Level 2.5 southwest corner

Columns (continued)

Level 2.5 previous column base patching starting to recrack

Columns (continued)

Column spall below beam at east foundation wall

Columns (continued)

Broken PT Cable at column

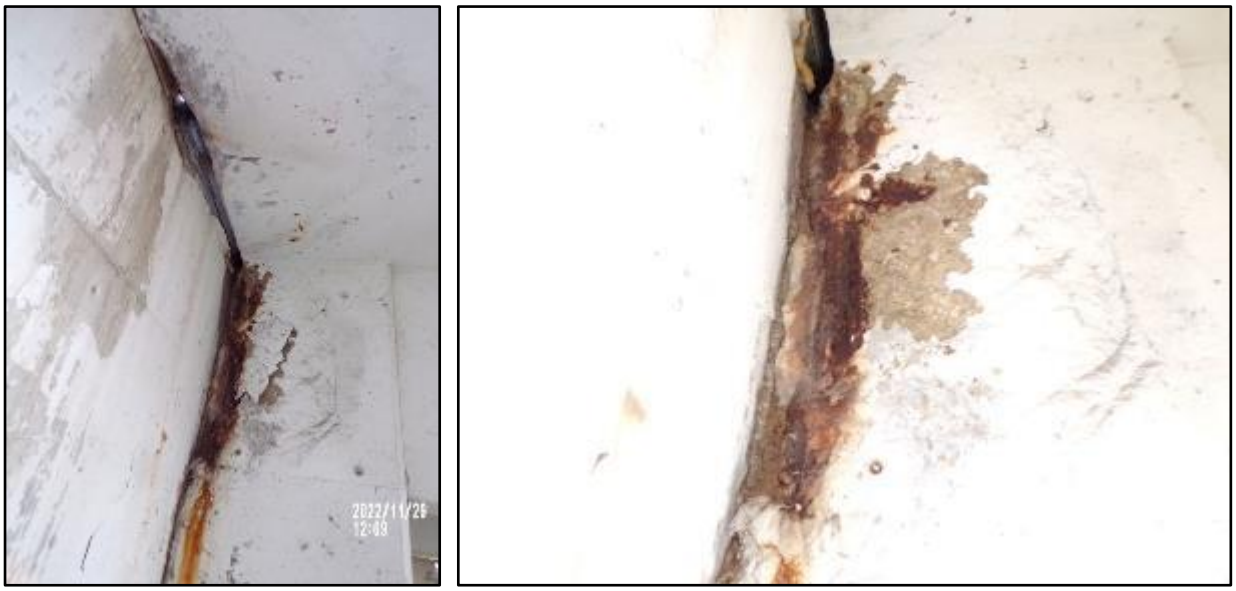
Foundation Walls

North foundation wall

East foundation wall between beam supporting columns Grid C

Foundation Walls (continued)

Level 3 Expansion Joint between Grid C east foundation wall on left and PT slab on right. Photo taken on Level 2



Loose concrete spall (left) removed (right)

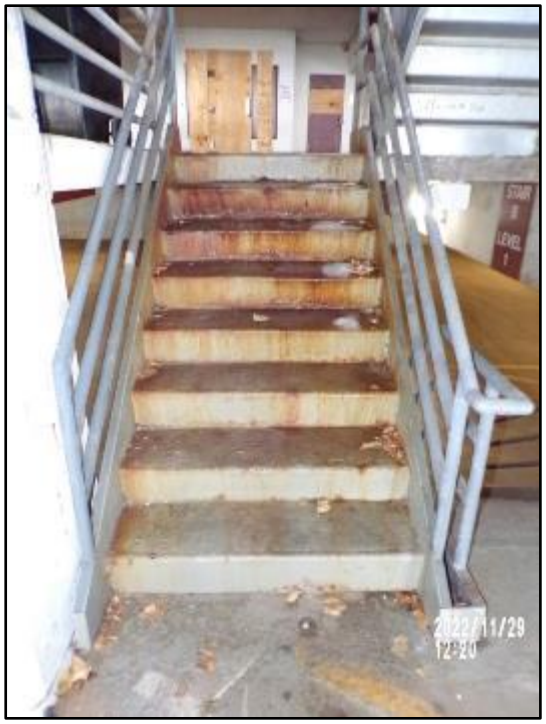
Slabs on Grade

Level 1 slab on grade east side

Slotted Drain Covers and Cast Iron Pipe Corrosion

Slotted Drain Covers and Cast Iron Pipe Corrosion (continued)

Metal Stairs



Metal Stairs (continued)

Miscellaneous Issues

Height warning bar not installed

END OF REPORT