

## **Appendix D : Parking Structure Report**





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October 25, 2013

Mr. Thomas Whetstone AIA, LEED AP BD+C  
Senior Project Principal  
HDR Architecture, Inc.  
1670 Broadway Suite 3400  
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Re: *Herschler Building Parking Structure*  
*Letter Report*  
*Project No. 23-7441.00*  
*Cheyenne, Wyoming*

Dear Mr. Whetstone,

Walker Restoration Consultants performed a walk through condition assessment of the Herschler Building Parking Structure. The assessment consisted of visual observations from the walk-through evaluation of the facility on October 16, 2013. The objectives of the evaluation were as follows:

- Review the existing condition of the facility's parking.
- Review parking and circulation patterns of the parking structure.
- Provide our findings and recommendations for any repair items needed.
- Provide recommendations for repair maintenance of observed conditions.
- Provide an estimated cost range to implement recommended repair actions for budgeting purposes.
- We have included repair items that would normally be expected over the next ten (10) years.
- We have included repair recommendations required if an expansion of the building is considered.

The following summarizes information obtained from our on-site findings.

## FACILITY DESCRIPTION

The configuration of the parking deck is as follows:

This parking facility comprises one underground parking level under a 4 story municipal building and open plaza area to the north consisting of cast in place planters, sidewalks and lawn area. Our understanding is the original construction of the parking structure and building was circa 1983. The construction is of cast in place concrete and columns configured in a V shape with the base around a central core and connector building on the south. The center core has a connector building underground which connects with the State Capital Building to the south. Columns are spaced at 30 foot on center

Extending the Life  
of the built environment

LETTER REPORT

## HERSCHLER BUILDING PARKING STRUCTURE - CONDITION ASSESSMENT

CHEYENNE, WYOMING

Prepared for:  
HDR ARCHITECTURE, INC.

OCTOBER 25, 2013





running generally in a north/south direction and the columns running east /west along the north section of the structure are at 42 foot on center.

The parking level is accessed from both the east and west sides of the property with entrance /exit ramps from the street level down to the subgrade level. Traffic flow in the parking is shown on Figure 1 in Appendix B.

Our review was limited to the footprint of the parking area and drive access ramps into the underground parking facility.

Drawings used for references were State Office Building North, State of Wyoming 1980 by architects Kemper & Pappas, P.C., architectural consultants RNL, Inc.

CONCLUSIONS AND RECOMMENDATIONS

Based on our visual inspection of the parking structure, we found that the structure was in overall fair to good condition for a parking structure for this age and location. It does require concrete preventive maintenance actions (waterproofing) to extend the useful service life of the structure.

Since the structure is 30 years old, we suspect the waterproofing membrane and expansion joints in the plaza area (roof of parking structure) are from the original construction. These waterproofing systems are at the end of their respective service life and we recommend they be replaced.

We recommend that the following items be replaced or repaired to address the existing conditions and extend the service life of the facility:

- 1. Replace plaza area (north) waterproofing which is the roof of the parking structure located outside of the building footprint. Photos 18, 19.
- 2. Replace expansion joints on the exterior plaza level.
- 3. Replace plaza area waterproofing and hardscape over entrance tunnel on the west entrance. Photo 14.
- 4. Repair cracked beam on west entrance tunnel. Photo 5.
- 5. Epoxy inject cracks in west tunnel elevated slab. Photo 4.
- 6. Waterproof interior of plaza planters over the parking structure. Photos 12, 13.
- 7. Install cove sealant at perimeter of plaza level planters.
- 8. Repair spalled and deteriorated concrete foundation walls in select locations. Photo 1.
- 9. Repair minor deteriorated slab on grade concrete in select locations.
- 10. Re-paint traffic markings.

Specific repair programs and maintenance programs can be tailored to the structure requirements. Implementation of a proactive repair and maintenance program to maximize the remaining service life of the structure is recommended.



OPINION OF PROBABLE COST

If this work is performed in a single year construction contract, we estimate that the cost for this work would range between the following values:

TABLE I – OPINION OF PROBABLE COST SUMMARY

Herschler Building Parking Structure	Recommended Repairs Range	
Concrete Repair	\$165,000	\$200,000
Waterproofing Plaza Systems (30,000 sf)	\$1,200,000	\$1,500,000
Waterproof Planters (13,000 sf)	\$165,000	\$ 220,000
Mechanical Allowance	\$25,000	\$50,000
Electrical Allowance	\$50,000	\$ 100,000
Architectural and Misc.	\$10,000	\$30,000
Base Repair Cost	\$1,600,000	\$ 2,100,000
Construction Contingency 10%	\$160,000	\$ 210,000
Contractor General Conditions 10%	\$160,000	\$ 210,000
Engineering Fees 10%	\$160,000	\$ 210,000
Total	\$2,080,000	\$2,730,000

- 1. The estimated costs are in 2013 dollars and do not include the cost of phasing, impact of inflation, or financing.
- 2. Costs have been rounded to the nearest thousand dollars.
- 3. Costs may vary due to time of year, local economy, or other factors.
- 4. Does not include "soft costs" such as lost revenue.

DISCUSSION

Wear from 30 plus years of service, exposure to the elements and general deterioration of plaza area concrete and waterproofing are impacting the durability of the parking structure. There are select areas of the structure that are exhibiting deterioration mechanisms.

Corrosion induced deterioration is the most dominant and aggressive form of deterioration in parking structures. The impact of concrete deterioration due to corrosion of embedded reinforcement is as follows:

- Serviceability and operational problems. Shallow concrete floor spalls can be a trip hazard for the facility users.
- Loss of reinforcement cross sectional area can adversely affect the load carrying capacity of slabs, beams, joists, columns and other structural members.
- Reinforcement debonds from the concrete in delaminated areas, which can result in reduced load carrying capacity due to loss of anchorage. This loss can lead to redistribution of stresses to other load carrying structural members within the structure.





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Concrete restoration and replacement of waterproofing systems are paramount to a successful and durable repair and maintenance program for the parking structure.

## WATERPROOFING

The plaza area to the north foot print of the building is the roof of the underground parking structure. This area is approximately 30,000 sf in its present configuration. There are areas of the plaza where we observed evidence of leaking through the concrete slab/roof into the parking level below. This appears to be an ongoing occurrence as collection devices have been installed in an attempt to collect the active moisture leaks and discharge it to the slab on grade concrete and ultimately into the slab on grade floor drains in the parking structure. We assume the waterproofing membrane and expansion joints in the plaza area are from the original construction. These waterproofing systems are breached in a number of locations and we recommend they be replaced as they are beyond their expectant service life.

The concrete ceiling slab and beams of the west entrance tunnel appear to be cracked and efflorescence was observed at the cracks. This indicates that there is moisture coming through the slab and carrying leachates through the concrete. Moisture infiltration of the concrete slab can accelerate the corrosion of the structural reinforcement in the concrete. Waterproofing of the elevated slab is required from above.

Cracks and active leaks through the planters on the perimeter of the building wings were evident in the parking structure below. Waterproofing of the planters is recommended as part of the plaza waterproofing replacement.

## SUPPORTED CONCRETE TOPPING SLABS

Select locations of the structure exhibit deterioration primarily due to moisture infiltration of the concrete ceiling slab. The deterioration is located primarily on the concrete slab over the west entrance /exit. Cracks in the slab allow moisture infiltration from the plaza above and heavy signs of efflorescence are present. Cracks in a beam on the west entrance are also exhibiting cracking and effervesce staining.

Cracking and deterioration of the supported slabs allow water infiltration of the structural components of the garage. Water and moisture infiltration of the concrete can lead to corrosion of the embedded reinforcement which can impact the load capacity of the structural members of the parking structure. Repairs to the beam and cracked slab by epoxy injection are required to repair the cracked concrete.

Spalling/Deterioration of the concrete foundation walls was observed in select locations of the structure. Concrete repair of the spalled walls is required. The spalled concrete areas should be squared up, chipped out, prepared and repaired with a polymer modified repair concrete.



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Concrete repair recommendations are based on repairs completed according to restoration industry standards. Expected service life of repair patches is generally 10 years, dependent on exposure and level of service.

## MECHANICAL

PVC pipe was attached to the ceiling below the plaza expansion joints and is actively leaking. This PVC pipe was installed presumably as a gutter system to remediate active leaking of the plaza above. This gutter runs the length of the building and then discharges through downspouts directly on the slab on grade floor with the intent of traveling across the slab on grade to the floor drains.

This supplemental gutter system is causing deterioration to the north foundation wall in two locations and is depositing excess water on the slab on grade adjacent to columns. There is no cove sealant around the columns and the water is traveling through the slab on grade concrete and possibly causing erosion of the sub grade base.

These gutters should be removed during the replacement of the expansion joint in the plaza repair work.

## ELECTRICAL

Light fixtures appear to be original fixtures. Walker recommends a lighting survey of the parking for illuminance and possible retro fitting of the light fixture to a more energy efficient fixture which could save money over the life of the structure. Lighting is key to visibility and security within a parking structure.

## PARKING LAYOUT

Parking layout is dictated by the column spacing. The parking stalls are numbered with a total number of marked stalls at 220. There are two handicapped stalls that are not numbered and maintenance has fenced off 4 number spots for storage. Handicapped accessible stalls are located on the east and west walls of the perimeter of the parking structure. Traffic flow appears to be acceptable through the structure; however traffic markings are worn and handicapped accessible parking traffic markings do not appear to meet current ADA requirements.

## SUMMARY OF OBSERVATIONS

This evaluation included a visual survey of the topside and underside of the supported levels, concrete slab, sealants, columns, beams, ramp, drainage systems, and other miscellaneous items. Conditions observed include:

## CONCRETE

- Concrete cracks in ceiling and beams at west drive entrance.
- Cracking of the floor slab on grade around drainage areas.





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- Active leaks under plaza areas. Photos 8, 9, 10.
- Metal catch pans installed to control leaks. Photo 7.
- Slab on grade was scaling in select locations.

WALLS

- Delaminated concrete walls were observed in select locations. Photo 1.

COLUMNS

- Missing sealant around columns at slab on grade.

SEALANTS

- Cove sealant on the plaza level has failed along the perimeter of the plaza planters. Photo 16.
- Sealant has failed in all concrete sidewalks in plaza area over parking structure below. Photos 15, 17.
- Sealant was missing in all control joints on slab on grade.

MECHANICAL

- PVC pipe was attached to the ceiling between the double column rows presumably under the plaza expansion joint. This PVC drain pipe was then connected to a downspout which discharged on the slab on grade slab. Photos 1, 2, 3.
- Trench drains at the bottom of the entrance/exit ramps had debris and leaves in the bottom of the basin.
- Fire sprinkler system appears to be in good condition.

ELECTRICAL

- Light fixtures were illuminated during the day and the parking structure appeared to have some dark areas.
- Electrical conduit and junction boxes appear to be in good condition.

PARKING LAYOUT

- Spaces were between 9'0" to 11' 0" in width and were dictated by column spacing.
- Handicapped spaces we marked with HC signs placed on the wall; however parking traffic markings didn't appear to conform to ADA standards.
- Traffic markings were worn throughout the structure.

MISCELLANOUS

- Metal catch pans were installed in the past under problematic leaks of the plaza above in select locations of the structure.
- There is a metal catch pan located on the east exit ramp ceiling over a bank of electrical conduit. Photo 6.



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- The entrance ramps are marked with 8"0" clearance however there are a number of areas in the parking structure that are marked 6'7" clearance.

At any time in the future, we recommend using a qualified restoration consultant to provide repair and maintenance planning, program budgeting, construction documents and administration for the future repair and maintenance of the property. We would welcome the opportunity to propose our services to assist you with the design and detailing of repairs.

We hope that the above information is satisfactory in your decision making process. If you have any questions at all please do not hesitate to call me at (303) 694-6622.

Sincerely,

WALKER RESTORATION CONSULTANTS

Ray Charbonneau  
Project Manager

Attachments:      Appendix A – Photographs  
                                 Appendix B – Parking Flow

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## LIMITATIONS

This report contains the professional opinions of Walker Restoration Consultants based on the conditions observed as of the date of our site visit and documents available to us. This report is believed to be accurate within the limitations of the stated methods for obtaining information.

We have provided our opinion of probable costs from visual observations and field survey work. The opinion of probable repair costs is based on available information at the time of our evaluation and from our experience with similar projects. There is no warranty to the accuracy of such cost opinions as compared to bids or actual costs. This condition assessment and the recommendations therein are to be used with additional fiscal and technical judgment.

It should be noted that our renovation recommendations are conceptual in nature and do not represent changes to the original design intent of the structure. As a result, this report does not provide specific repair details or methods, construction contract documents, material specifications, or details to develop the construction cost from a contractor.

Based on the proposed scope of services, the evaluation was based on certain assumptions made on the existing conditions. Some of these assumptions cannot be verified without expanding the scope of services or performing more invasive procedures on the structure.

The recommended repair concepts outlined represents current available technology for parking facilities and other structures. This report does not provide any kind of guarantee or warranty on our findings and recommendations. Our evaluation was based on and limited to the proposed scope of work. We do not intend to suggest or imply that our appraisal has discovered or disclosed all latent conditions or has considered all possible improvement or repair concepts.

A review of the facility for compliance with the Americans with Disabilities Act (ADA) requirements was not part of the scope of this project. However, it should be noted that whenever significant repair, rehabilitation or restoration is undertaken in an existing structure, ADA design requirements may become applicable if there are currently unmet ADA requirements.

Similarly, we have not reviewed or evaluated the presence of, or the subsequent mitigation of, hazardous materials including, but not limited to, asbestos and PCB.

This report was created for the use of HDR Architecture Inc. and use of this report by others is at their own risk.

## HERSCHLER BUILDING APPENDIX A - PHOTOS

OCTOBER 24, 2013



WRC PROJECT 23-7441.00



Photo 1 – Deteriorated foundation wall.



Photo 2 – Leak under plaza expansion joint.



Photo 3 – Downspout discharging on floor surface.



Photo 4 – Cracked and leaking cast-in-place slab at west entrance /exit.

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HERSCHLER BUILDING  
APPENDIX A - PHOTOS

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Photo 5 – Cracked and deteriorating beam at west entrance.



Photo 6 – Cracked & leaking cast-in-place slab over electrical conduit at east entrance/exit.



Photo 7 – Metal pan fabricated to collect leaking water from plaza above.



Photo 8 – Evidence of leaking from plaza area above (typical).

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APPENDIX A - PHOTOS

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WRC PROJECT 23-7441.00



Photo 9 – Evidence of leaking from plaza above.



Photo 10 – Evidence of leaking below plaza planter.



Photo 11 – Evidence of leaking at drain penetration in plaza planter.



Photo 12 – Planter on west side of building over parking.

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## HERSCHLER BUILDING APPENDIX A - PHOTOS

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Photo 13 – Plaza planter over parking below.



Photo 14 – Plaza planter over west entrance.



Photo 15 – Failed core sealant plaza level over north foundation wall of parking.



Photo 16 – Failed cove sealant at planter plaza level.

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## HERSCHLER BUILDING APPENDIX A - PHOTOS

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Photo 17 – Failed sealants plaza level.



Photo 18 – North plaza area over parking garage below.



Photo 19 – North plaza area over parking garage below.



Photo 20 – Cracked slab on grade concrete in parking garage.

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HERSCHLER BUILDING  
APPENDIX A - PHOTOS

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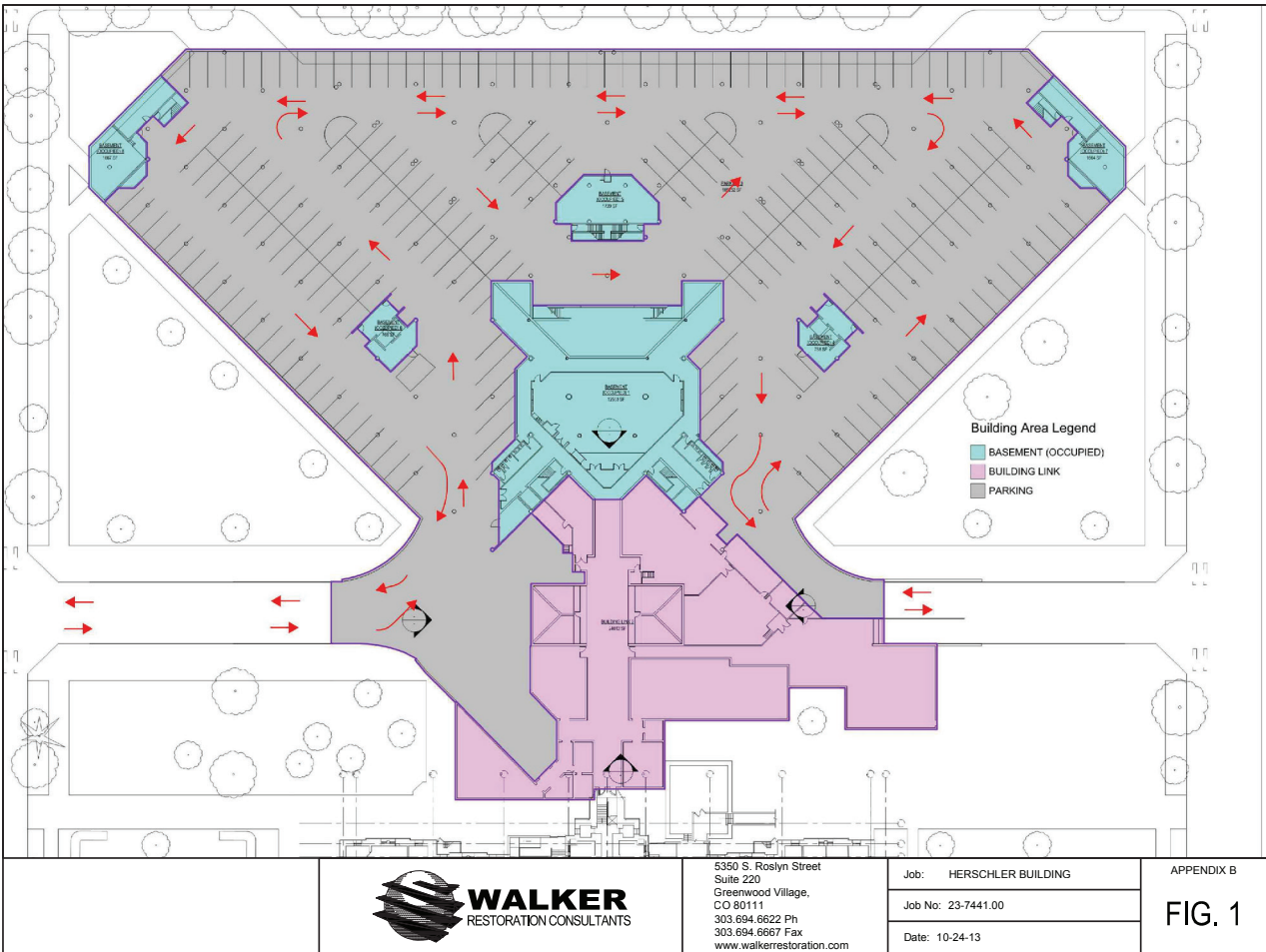
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Photo 21 – Cracked slab on grade floor.



Photo 22 – Sealed concrete surface.









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