We are pleased to submit within these three volumes the Programming and Feasibility Studies prepared by KGA and its consultant team for the Grant Sawyer State Office Building. As home to a range of critical state agencies and departments, and as a touchpoint for the many citizens who visit these agencies each year, the Grant Sawyer State Office Building is an important facility for the operations of the state of Nevada.

In Volume One, the Program Needs Assessment, we provide a comprehensive overview of the current and projected future space needs of the twenty-three subject departments and agencies. Volume Two, the Property Condition Assessment, provides a detailed overview of the current condition and future needs of building systems and components.

In the third volume, Proposed Implementations, the project team proposes a series of potential courses of action for facility improvements. These six concepts are organized by the three ‘R’s – Repair, Reprogramming and Replacement - which represent a broad range of options which will address the needs of Grant Sawyer occupants looking forward to the year 2040.

As the vital service of the building’s occupants to the citizens and economy of the state of Nevada will continue until 2040 and beyond, it is our hope and intent that in the contents of this study, the State will find the best way forward to supporting the physical space needs of the subject departments and agencies through the next two decades.

We thank the State for the opportunity to be involved in this important and exciting project. Please contact us at any time if we can be of further assistance in the process of interpretation and implementation of this study.

Sincerely,

James C. Lord II
Partner, CEO

Brian Henley
Partner, Director of Design

Scott Carter
Associate, Senior Project Manager

Kris Pyaachayna
Senior Designer

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Austin
1701 Directors Boulevard, Suite 770
Austin, TX 78744

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Executive Summary

In this volume, the project team, consisting of architects, civil, structural, mechanical, plumbing and electrical engineers, mechanical and electrical contractors, and an elevator consultant, provides findings and analysis which is the result of detailed investigation and consideration of the building’s systems, their current condition, and their projected needs for repair, upgrade or replacement in order to keep the facility in operation through the target year of 2040.

The project team, in concert with State representatives from the Public Works Division with the Buildings and Grounds Section, has conducted a series of extensive facility visits and investigations which have covered a wide range of building systems and components.

Visual investigation of each system has been conducted at numerous locations throughout the building, and the resulting observations have been accounted for in the narratives, illustrations and drawings contained in Volume Two. Additionally, the prior knowledge provided in the form of several prior studies and tests, which have been conducted separately by the State Public Works Division, has been taken into account. This abundance of information allows for a deep understanding of the status and needs of the Grant Sawyer Building looking into the future.

The narratives, illustrations and drawings contained within Volume Two provide a thorough basis of understanding for the conceptual design and engineering recommendations and associated cost analysis which will follow in later sections of this study.
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Civil Engineering Assessment
CIVIL CONDITION ASSESSMENT REPORT

1.0 General Information

On October 17, 2018, Lochsa Engineering reviewed the subject site located at 555 East Washington Avenue, Las Vegas, Nevada. Record drawings were also reviewed and compared to field conditions.

Identified as APN 139-26-201-012, the property is located at the northeast corner of North Las Vegas Boulevard and East Washington Avenue, Las Vegas, Nevada. It covers approximately 22.77 acres.

Approximately 25 years ago, the site previously served as Lions Park. The property sits in the areas of the original Las Vegas Creek and was one of the original settlements within the Las Vegas Valley. Since the original construction of the Grant Sawyer office site, a Veteran’s Memorial was constructed south of the building’s main entrance, and a solar panel farm was installed on the east side of the site near Fantasy Lane. Other than these site modifications, the remainder of the site appears unchanged.

John Youngberg from the State Facilities Staff escorted Lochsa staff and provided information on problem areas and site maintenance known to him.

2.0 Drainage and Grading

The site appears to drain well during storm events and few obvious ponding areas were observed. Primary roof drains appear to connect to underground storm drain pipes and are directed away from the building. The west plaza area drainage is collected, directed north, then east, through and with the truck dock drainage to a large storm drain pump station just east of the dock. From there the water is pumped up to the east to a surface gutter north of the northeast corner of the building. From there, runoff flows east then southeast toward Washington Avenue. The south and east sides of the site drain south and east as well. All runoff originating from the site drains to Washington Avenue and its underground storm drain facilities. Note that the original design at the southeast side of the building showed a combination of primary roof drains from three locations combining and outletting at one point to a south curb face. It appears that the primary roof drains do not combine but outlet through three separate curb face outlets. These appear to function adequately. Maintenance and clean up appears to be very good with all area drains clean and open and very little silt, debris, leaves or trash was observed.

All storm facilities appear to function adequately except the valley gutter crossing the access gate controlled southeast driveway. The original design was for all site runoff to flow on the surface via a 5-foot wide valley gutter east through the Fantasy Park area then south to an existing drop inlet along the north side of Washington Avenue at the southeast corner of the site. At some point in time, it appears an 8-inch diameter steel pipe was placed on the bottom of the 5-foot valley gutter and was covered with fill material. This appears to create a ponding condition on the valley gutter crossing this driveway. While the site may generate over sixty six (66) cubic feet per second of runoff volume during a 100-year storm event, it is doubtful the 8-inch pipe can convey any more than one (1) cubic foot per second of flow. This creates a ponding situation that slowly drains and appears to create the need for excess maintenance. It is our recommendation to remove the pipe and to clean the valley gutter of all fill and debris along the length of the parking lot to the back of the Washington Avenue drop inlet.

The future Fleet Maintenance Facility should not impact the Sawyer drainage conditions.

Future expansion of the Sawyer building appears to be something that can be accomplished with limited impact to existing conditions. This is dependent on location and size. Locating any expansion on the west side of the site could be challenging due to slopes and grade differences. It should be noted that underlying soils below improvements installed as a part of the Grant Sawyer office site may require modifications and improvements for future structures. Ground water levels should also be measured and elevation fluctuations determined for future design considerations since this area is known to have shallow ground water.

The property is covered by the Federal Emergency Management Agency (FEMA) and Flood Insurance Rate Map (FIRM) for the Clark County, Nevada and incorporated areas, Community Panel Number: 32003C2170F, effective date: November 16, 2011. The majority of the project site is located within a FEMA Shaded Zone X defined as: “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 1% annual chance flood.” The remaining project site area is located within a FEMA Zone X (unshaded), defined as: “Areas determined to be outside the 0.2% annual chance floodplain.” The FEMA Flood Insurance Rate Map is included in the attachments.
3.0 Utilities

Water service to the site is provided by two 8-inch by 2-inch combined fire/domestic meters. One is located at the northwest corner of the site and one at the northeast corner of the site. These meters are somewhat outdated and may need to be replaced at some point in time since parts for these sort of antiquated water meters become scarcer. They are no longer allowed or produced. The backflow preventers behind each meter are detector check valves and may need to be replaced with current standard reduced pressure backflow devices at some point in time. If Las Vegas Valley Water District (LVVWD) has not notified the need to replace these items, it may be required as a part of any expansion.

Onsite combined fire and domestic waterlines are 8-inch in size and loop around the building. All located valves and hydrants appear to be built per plans. A designed gate valve near the southeast building corner was not located. The fire hydrant northeast of the dock appears to have been moved west to accommodate a parking expansion area. This hydrant may be more than 100-feet away from the Fire Department connection located on the north side of the fire pump building. A fire hydrant south of the southwest corner of the building and east of the Veteran’s Memorial may not be accessible by fire fighting vehicles. All gate valves designed near this hydrant were not located. Static water pressure on site is estimated to be approximately 40 psi.

Site sewer exits the site via an 8-inch on-site main at the southwest corner of the site out to Washington Avenue. We are not aware of any site sewer problems with this main. We are aware that a grease line was recently replaced through the west side of the building. Three previously designed cleanouts on the south side of the building were not located in the field. The 8-inch onsite sewer main should be of adequate size to accept future flow for reasonable expansions.

Dry utilities appear to enter the building on the north side and appear to originate along Las Vegas Boulevard or Fantasy Lane. Capacities are unknown at this time.

4.0 Hardscape

Existing exterior concrete (curbs, gutters, sidewalks) appear to be in good condition with no apparent failures and minimal cracking. Drainage under sidewalks and through curbs appears satisfactory.

The site asphalt appears to be in fair condition for its age. Some cracking and slow draining areas were observed but failure was not. Regular asphalt maintenance should occur every five ± years for a maximum life extension. This maintenance should include heavy crack sealing with a thick asphalt material and slurry seal with a thinner emulsion. Restriping will also be required during this maintenance and as warranted.

5.0 Summary

The site appears to have aged quite well. We assume this can be attributed to adequate initial design and construction as well as persistent and comprehensive maintenance. Minor site issues were observed and expansion opportunities appear to exist.

Attachments:
Assessor’s Parcel Map
Assessor’s Aerial Photo
Assessor’s Aerial Photo with 2’ Contours
Flood Insurance Rate Map
City of Las Vegas Improvement Plans
Improvement Plans with Review Walk Comments from 10/17/2018
Photographs
ASSESSOR’S AERIAL PHOTO WITH 2’ CONTOURS
IMPROVEMENT PLANS FOR THE GRANT SAWYER OFFICE SITE WITH REVIEW WALK COMMENTS FROM 10/17/2018
FIRE HYDRANT AND A CONCRETE THROUGH DRAINAGE LOCATED AT THE NORTHEAST PORTION OF THE SITE

SIDEWALK AND PARKING AREA AT THE NORTHEAST PORTION OF THE SITE
LOOKING WEST FROM THE NORTHEAST PORTION OF THE SITE

STORM SEWER PUMP STATION EAST OF THE TRUCK DOCK
SECURED PARKING AREA TO THE NORTH

SIDEWALK LEADING TO DOOR LOCATED AT NORTH OF THE BUILDING
ROOF DRAIN EAST OF THE NORTH ENTRANCE

TRUCK DOCK AND TRASH AREA LOCATED NORTH OF THE SITE
A RAISED DOCK AND A DOCK TRENCH DRAIN LOCATED NORTH OF THE SITE

GAS METER AT THE NORTHWEST BUILDING CORNER, NOT THE ACCESS LADDER.
FIRE HYDRANT MAY BE INACCESSIBLE – LOCATED AT THE EAST PORTION OF THE SITE, AT THE VETERAN’S MEMORIAL AREA

NEAR THE SOUTHWEST BUILDING CORNER LOOKING WEST
WEST VIEW OF THE COVERED WALK LOCATED AT THE SOUTHEAST

EAST VIEW OF THE COVERED WALK LOCATED AT THE SOUTHEAST. NOTE THE SEWER CLEANOUT
WEST VIEW OF THE DRY WASH AREA LOCATED AT THE SOUTHEAST BUILDING CORNER.

SOUTHEAST VIEW OF THE DRY WASH AREA LOCATED AT THE SOUTHEAST BUILDING CORNER.
PONDING ON THE VALLEY GUTTER AT THE SOUTHEAST.
NOTE THE FILL OVER PIPE

VALLEY GUTTER AT THE SOUTHEAST, EXITING THE PARKING LOT
EAST PARKING LOT. SOME CRACKS AND SLOW DRAINING AREAS

8-INCH S.E. PIPE EXITING TO INLET AT BACK OF WASHINGTON AVENUE DROP INLET
Structural Engineering Assessment
Dear Scott:

The following includes an assessment of the existing facility based on review of the existing structural drawings, calculations and site visit on October 15, 2018:

- The building appears to be in good condition structurally.
  - No settlement was observed; and
  - No cracks in exterior walls.

- The building was constructed per the 1991 UBC. Based upon the 2018 IBC, the current seismic factor would be 1.9 x higher than the original design code.
  - Future expansions would require separation joints between old and new expansions;

- Elevator addition and/or modification.
  - Changing the lateral system in any form may require upgrading all braces, columns, footings and drag/chord systems. Therefore, removing or changing the lateral system is not recommended
  - The current elevator pit is 5’ deep. If new elevators can fit into the existing opening and with the current clearances, replacement should not be complicated;
  - The framing around the existing openings cannot be easily modified. There are adjacent mechanical openings next to the elevator openings.
  - If a portion of the atrium is filled in for a new elevator, the existing floor beams, columns and foundations may need to be reinforced.

- The existing roof was designed for a live load of 20 psf (reducible), not adequate for occupant loading.

Should you have any questions do not hesitate to contact this office.

Sincerely,

John A. Martin & Associates of Nevada

Greg Clapp, S.E.
Principal
Mechanical, Plumbing and Electrical Engineering Assessment
# Grant Sawyer Office Building
555 E. Washington Ave, Las Vegas
Initial Findings Report

**NV5 Project No. 018.0745.00**

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### Prepared for:

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### Prepared by:

**NV5**
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### Issue Date:
January 2, 2019

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<th>Issue Date</th>
<th>Prepared By</th>
<th>Reviewed By</th>
<th>Remarks</th>
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<td>Alex Jankovic, Rob Jones, Gary McClure, Bill Sittman</td>
<td>KGA</td>
<td>Draft</td>
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<td>1/02/2019</td>
<td>Alex Jankovic, JJ Wisdom</td>
<td>KGA</td>
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EXECUTIVE SUMMARY

NV5 Consulting Engineers and Bombard Mechanical Contractors have performed the field investigation at the Grant Sawyer Office Building to verify the existing conditions of mechanical HVAC systems, Plumbing systems and Electrical systems.

This report is a summary of initial investigations during our filed visits on the following dates:

- October 11, 2018
- October 12, 2018
- October 13, 2018
- October 15, 2018
- October 17, 2018
- October 23, 2018
- December 6, 2018

When pursuing this investigation, we had in mind the three RRR = Repair, Remodel, Replace and the 20 years fix of the MEP systems as our final goal.

Based on our initial findings we are making the assessments towards the following conclusions:

1. Mechanical Systems and Ductwork
2. Server, Data Rooms Cooling
3. Hydronic Piping Exteriors
4. Hydronic Piping Interiors
5. Hydronic Piping - Wall Penetrations
6. CHS/CHR Piping Wall Thickness
7. Plumbing Systems - Waste & Vent Exteriors
8. Plumbing Systems - Waste & Vent Interiors
9. Plumbing Systems - Roof, Storm Drainage
10. Plumbing Systems - Domestic Booster Pumps
11. Plumbing Systems - Domestic Hot Water Distribution
12. Fire Pump Room
13. Life Safety – Smoke Removal Systems
14. Electrical Systems
15. Fire Alarm System

* All exposed & lined ductwork to be removed & replaced.
* Complete replacement
* All hydronic piping to be removed & replaced
* To be verified and replaced
* All hydronic piping to be removed & replaced.
* To be replaced or epoxy lined (CIPP)
* 100% replacement of underground with PVC
* Not compromised, all clogged sections to be cleaned.
* To be replaced
* No action required
* To be replaced with electric-drive fire pumps
* To be replaced in compliance with 2018 IBC
* Good conditions

As a look ahead in our next phase of this task we will make the final assessments and recommendations for the repair, remodel or replacements of MEP systems, based on the ASHRAE Life Expectancy Chart for HVAC equipment and components.
1. MECHANICAL SYSTEMS & DUCTWORK

- Verify the integrity of medium pressure ductwork for all systems.
- Verify the status of exterior ductwork on roof. Suggest the mitigation.
- There are 8 Air Handling Systems.
  Based on the TAB results, dated July 2011 the capacities are as follows:
  - AH-1: 23,700 CFM @ 3.0" ESP (7.0" TSP)
  - AH-2: 26,900 CFM @ 3.0" ESP (7.0" TSP)
  - AH-3: 30,000 CFM @ 3.0" ESP (7.0" TSP)
  - AH-4: 23,300 CFM @ 3.0" ESP (7.0" TSP)
  - AH-5: 33,800 CFM @ 3.0" ESP (7.0" TSP)
  - AH-6: 29,400 CFM @ 3.0" ESP (7.0" TSP)
  - AH-7: 32,200 CFM @ 3.0" ESP (7.0" TSP)
  - AH-8: 27,200 CFM @ 3.0" ESP (7.0" TSP)
- Verify all vertical shafts for SA, RA ductwork leaks etc.
- Verify main horizontal SA, RA duct routing on each floor and status.
- Verify the return air path and transfer openings on all floors.
- Possible Re-Zoning of HVAC systems
- AHU Replacement – scheduled improvements.
- Central Plant and DDC control system – recently renovated.
- Mechanical Updates: VAV terminal units – New Alerton Controls + hose kits & isolation valves.

Conclusion: All exposed and lined medium pressure ductwork to be replaced. Exterior ductwork on roof shows the signs of corrosion and may have been compromised during the initial operation with evaporative cooling sections. Per field investigation on Level 5, multiple segments of ductwork have friable fiberglass material in the airstream as part of the original acoustical treatment of ductwork. Level 5 ductwork shall be completely removed and replaced with new ductwork. Interior medium pressure ductwork compromised with openings & flex duct connections for additional cooling of server rooms shall be repaired by disconnecting of flex ductwork and properly sealing the system.

2. SERVER/ DATA ROOMS COOLING

- Identify the compromised medium pressure ductwork with holes intended to cool the server, data, TR rooms.
- Identify all server/ TR rooms and current cooling problems.
- Verify the possible routing of the new CHW/CHR risers to serve the Data/TR rooms throughout the facility.
- Future Cooling system with CHW fan-coil units + DX back-up split systems where mandated.
- DX units dumping the heat into plenum.

Conclusion: Server/Data rooms cooling system shall be completely disconnected from the medium pressure ductwork. A dedicated chilled water - cooling system will be provided for server/data rooms utilizing the cooling only fan-coil units with emergency DX cooling units as a back-up where required. The new chilled water risers will be installed from chiller room down to the first floor to serve these cooling only fan-coil units. The existing plate/frame heat exchanger will be upsized to be capable of providing the cooling for all fan-coil units during the water economizer mode of operation.

- **Server, Data Rooms Cooling**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Room Description</th>
<th>Cooling Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Gaming Server Room (300 SF)</td>
<td>3 tons</td>
</tr>
<tr>
<td></td>
<td>EITS South Wing (100 SF)</td>
<td>1.5 tons</td>
</tr>
<tr>
<td></td>
<td>South-East (150F)</td>
<td>1.5 tons</td>
</tr>
<tr>
<td>2nd</td>
<td>Gaming West Server (92 SF)</td>
<td>3.5 tons</td>
</tr>
<tr>
<td></td>
<td>Gamin Salon Viewing Room (122 SF)</td>
<td>2 tons</td>
</tr>
<tr>
<td>3rd</td>
<td>AG Server Room (150 SF)</td>
<td>3.5 tons</td>
</tr>
<tr>
<td>4th</td>
<td>LCB Server Room (150SF)</td>
<td>2.5 tons</td>
</tr>
<tr>
<td></td>
<td>LCB AV/TR room</td>
<td>3.5 tons</td>
</tr>
<tr>
<td>5th</td>
<td>Secretary of State Server Room (15 SF)</td>
<td>1 ton</td>
</tr>
<tr>
<td></td>
<td>Criminal Investigation Server (60 SF)</td>
<td>1 ton</td>
</tr>
<tr>
<td>6th</td>
<td>EITS Servers (150 SF)</td>
<td>3 tons</td>
</tr>
</tbody>
</table>

Total Cooling Capacity = 26 tons (312 MBH)

Proposed solution: Add a dedicate 3” CHS/CHR riser to serve the server/data rooms on all floors. New cooling only fan-coil units will be selected with DX back-up cooling where required.
3. HYDRONIC PIPING – EXTERIORS
   - Chilled Water piping – external corrosion due to gap w/insulation. Verify all mains on all floors and identify
     the sections of corroded piping.
   - Verify the status of insulation throughout.
   - Heating hot water piping – failing gasketed joints. Identify the issues and original piping material and joints
     used.
   - It was discovered that all 2” and smaller hot water piping was installed utilizing the galvanized piping. This
     has to be corrected throughout.

Conclusions: Chilled water hydronic piping shows considerable exterior corrosion at the multiple fittings, take-
offs and elbows, due to incorrect insulation type and compromised vapor barrier or damaged service jacket.
To mitigate this issue, complete chilled water piping system shall be replaced and 100% of the insulation shall
be replaced with rigid polyisocyanurate insulation with correct vapor barrier and provision of dams at each pipe
fitting to prevent any condensation. The heating hot water hydronic piping shall be completely removed and replaced with new piping per current
standards.

4. HYDRONIC PIPING – INTERIORS
   - Chilled water interior investigation to determine the status of the hydronic piping interior. It was
determined that the interior of chilled water piping was not compromised.
   - Insert the camera in the chilled water line through strainer at section near AH-8.

Conclusions: Based on the findings of the condition of the piping exterior above Item 3, the whole hydronic piping system
shall be replaced.

5. HYDRONIC PIPING – THROUGH THE WALL PENETRATIONS
   - Investigation of the hydronic piping through-the-wall penetrations and applied insulation.

Conclusions: Based on our initial findings through-the-wall penetrations are compromised, indicating the
missing insulation and presence of exterior corrosion.

6. HYDRONIC PIPING – WALL THICKNESS MEASUREMENTS
   - Thorough investigation of hydronic piping wall thickness in various locations throughout the facility.

Conclusions: The ultrasonic wall thickness measurements of chilled water piping
indicate that the wall thickness is not compromised.

7. PLUMBING SYSTEMS – WASTE & VENT EXTERIORS
   - Cast Iron waste piping above ground - verify the status of risers.
   - Grease Interceptor problems. Replace the Grease Interceptor.
   - First floor waste line slopes and need to replace the whole underground waste lines.
   - Site waste lines routing to future lift station? Sketch from SPWD.
   - Civil engineer proposed to run the waste deeper at the building? Approx. 4 ft can be gained.
   - Verify the invert elevations for exiting waste lines.

Conclusions: Complete above ground waste & vent piping to be replaced or epoxy lined utilizing the “NU Flow”
non-pressurized epoxy linin (CIPP) – the cured in-place pipe restoration process.

8. PLUMBING SYSTEMS – WASTE & VENT INTERIORS
   - Investigate the status of waste & vent interior, throughout the facility.
   - Cast iron waste piping underground routing – camera scoping.
   - Cast iron vent piping status. Identify the compromised vent lines.
   - Kitchen area grease waste piping issues.

Conclusions: Complete underground cast iron piping to be removed and replaced with
PVC properly sloped system with 2% slope.

9. PLUMBING SYSTEMS – ROOF, STORM DRAINS
   - Investigate the status of existing roof /overflow drains. Investigate the status of storm water piping risers.
   - Verify the status of storm water lift station at back of house in dock area.

Conclusions: Not compromised but needs to be further investigated for possible clogged sections of roof drains
and overflow drains.

10. PLUMBING SYSTEMS – DOMESTIC BOOSTER PUMPS
    - Investigate the status of domestic booster pumps.

Conclusion: The booster pump set shall be replaced, since at the end of its useful life per ASHRAE life expectancy
table.

11. PLUMBING SYSTEMS – COLD & HOT WATER DISTRIBUTION
    - There is no RPBP – reduced pressure backflow preventer at the property. There will be a need to install a
        new RPBP.
    - Domestic cold water – street pressure.
    - Kitchen area domestic hot water piping issues.
Conclusion: Not compromised - in good working condition.

12. **FIRE PROTECTION – FIRE PUMP ROOM**
   - Investigate the status of fire pumps. This is a part of the separate study by NV5 Fire Protection department.
   - Conclusion: The fire pumps shall be replaced with electrically driven fire pumps per 2018 IBC.

13. **LIFE SAFETY – SMOKE REMOVAL SYSTEMS**
   - Life Safety Systems modified from 1991 UBC to 2012 IBC.
   - Conclusion: Life Safety System shall be upgraded per 2018 IBC, UMC codes.

### Equipment/Materials Life Expectancy

<table>
<thead>
<tr>
<th>Critical Item</th>
<th>Description</th>
<th>HVAC Equipment</th>
<th>Age</th>
<th>ASME/UL Life Expectancy</th>
<th>Life Remaining</th>
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</thead>
<tbody>
<tr>
<td><strong>Air Handling Units</strong></td>
<td>AH-1 to AH-8 236,000 cfm</td>
<td>VAV To be replaced</td>
<td>23</td>
<td>30</td>
<td>+7</td>
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<tr>
<td><strong>Hydronic Chilled Water Piping</strong></td>
<td>Sch 40 Black steel</td>
<td>To be replaced</td>
<td>23</td>
<td>30-50</td>
<td>7-27</td>
</tr>
<tr>
<td><strong>Hydronic Heating Hot Water Piping</strong></td>
<td>Sch 40 Black steel</td>
<td>To be replaced</td>
<td>23</td>
<td>30-50</td>
<td>7-27</td>
</tr>
<tr>
<td><strong>MP Ductwork</strong></td>
<td>Exposed on roof Level 5</td>
<td>Sheetmetal with internal lining Complete replacement</td>
<td>23</td>
<td>40+</td>
<td>17+</td>
</tr>
<tr>
<td><strong>Waste &amp; Vent piping</strong></td>
<td>Risers above ground Cast Iron Clogged vents</td>
<td>Indoor</td>
<td>23</td>
<td>50</td>
<td>27</td>
</tr>
<tr>
<td><strong>Waste &amp; Vent Piping</strong></td>
<td>Horizontal below grade Cast Iron Complete replacement with PVC</td>
<td>Underground</td>
<td>23</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Domestic CW, HW Piping</strong></td>
<td>Copper Good</td>
<td>Interior</td>
<td>23</td>
<td>40-50</td>
<td>17-27</td>
</tr>
<tr>
<td><strong>Domestic Booster Pumps</strong></td>
<td>Base mounted Duplex</td>
<td>To be replaced</td>
<td>Pump room</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td><strong>Fire Pumps</strong></td>
<td>Diesel pumps</td>
<td>To be replaced with electrically driven fire pumps</td>
<td>Fire pump room</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td><strong>Smoke Removal System</strong></td>
<td>To be updated to 2018 IBC</td>
<td></td>
<td>23</td>
<td>25</td>
<td>+2</td>
</tr>
</tbody>
</table>
14. ELECTRICAL

Electrical distribution was reviewed against the as-built drawings furnished. Generally, the installation matches the as-built drawings with a few exceptions.

1. Minor branch circuiting updates noted in panelboard directories as circuits were added for receptacles, copiers, small rack mounted UPS units, etc.
2. The equipment name labels for unit-substations ‘USW’ and ‘USR’ are swapped. These labels should be corrected to match the as-built drawings.
3. The equipment rating and main device on unit-substation ‘USE’ was specified to be 1000A, but actual equipment installed is rated 1200A. We do not see any issue with this discrepancy.
4. We observed the nameplate ratings on four distribution boards that do not match the plans. We suspect during the original installation; these four boards were inadvertently mixed-up as they are all single section distribution board sections and look identical. The under-rated equipment should be addressed as soon as possible as they are not protected with the appropriate over-current device per NEC.
   a. Distribution board ‘EDP2’ is connected to a 600A feeder and specified to be rated 600A. The actual equipment installed is rated 250A.
   b. Distribution board ‘EDP3’ is connected to a 600A feeder and specified to be rated 600A. The actual equipment installed is rated 250A.
   c. Distribution board ‘EH3’ is connected to a 100A feeder and specified to be rated 100A. The actual equipment installed is rated 600A.
   d. Distribution board ‘DPH1’ is connected to a 200A feeder and specified to be rated 225A. The actual equipment installed is rated 600A.
5. When the central plant on Level 6 was upgraded, the third chiller was eliminated. This circuit breaker is currently locked out. We suggest confirming the conductors have been properly pulled back to a junction box and capped.
6. Review of the panelboard directories for emergency branch panels indicate loads have been added that are not compliant with code. Only those loads as identified in NEC 700 are permitted.

Electrical Capacity

There are (3) three unit-substations providing step-down of the medium voltage utility service to 277/480V, 3-phase, 4-wire for building distribution. The ratings of this equipment are as follows:

- Unit-substation ‘USW’ (mislabeled USR) = 1,500 kVA 12.47kV-277/480V, 3-phase, 4-wire
- Unit-substation ‘USE’ = 750 kVA 12.47kV-277/480V, 3-phase, 4-wire
- Unit-substation ‘USR’ (mislabeled USW) = 2,500 kVA 12.47kV-277/480V, 3-phase, 4-wire

We observed the following instantaneous loads on each unit-substation at the time of our site visit. We walked the building between 4pm to 8pm on October 15, 2018. These loads appear to be much less than the building NVE service capacity from a medium voltage service. We would like to request utility bills for a 12-month period.

- Unit-substation ‘USW’ (mislabeled USR) = 168 kVA
- Unit-substation ‘USE’ = 91 kVA
Due to the extremely low utilization of the unit-substation capacity, we observed the voltage readings to be slightly high, but less than 5% over-voltage.

**Unit-substation ‘USR’ (mislabeled USW)** = 158 kVA

**Unit-substation ‘USW’ (mislabeled USR)** = 287/500 V

**Unit-substation ‘USE’** = 291/506 V

**Unit-substation ‘USR’ (mislabeled USW)** = 286/497 V

**Condition**

**Distribution Equipment**

Generally, the electrical distribution equipment is in good condition and appears original to the building. Switchboards, panelboards, transformers and other electrical distribution equipment do not have an expected lifespan. If the equipment is kept clean and regular testing/maintenance performed the equipment can generally last through the life of the building.

The bolted pressure switches (or Pringle Switches) utilized for the main device at the unit-substations can be problematic. They are basically a spring assisted knife switch. If these devices do not receive regular maintenance, they may fail to open or close. NETA recommends annual visual/mechanical inspections and testing performed every (3) three years.

Generator was completely rebuilt and reinstalled in 2015. It appears to be well maintained based on dates observed on the batteries and oil filters. A well-maintained standby generator can be expected to last 10,000 to 30,000 hours of use. We would request the generator and ATS testing reports in order to determine the approximate generator runtime to date.

**Lighting**

Lighting appears to be original to the building. General overhead lighting sources are fluorescent. We recommend consideration of LED replacement fixtures to update the lighting in the building for both energy savings and visual quality.

---

### APPENDIX

**A. Mechanical System and Ductwork Photos**

- Level 5 Interior Ductwork

**B. Servers, Data Rooms Cooling Photos**

**C. Hydronic Piping, Interior Photos**

**D. Hydronic Piping, Exterior Photos**

**E. Hydronic Piping, Wall Penetration Photos**

**F. Plumbing Systems, Waste and Vent, Exterior Photos**

**G. Plumbing Systems, Waste and Vent, Interior Photos**

**H. Plumbing Systems - Hot Water Distribution Photos**

**I. Plumbing Systems - Domestic Booster Pumps Photos**

**J. Plumbing Systems - Fire Pump Room Photos**

**K. Plumbing Systems - Roof Drain Photos**

**L. Electrical Systems**

**M. Chilled Water Piping - Wall thickness Measurements Table**

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**15. FIRE ALARM SYSTEM**

- Fire alarm system review was not part of NV5 scope for this effort.

Conclusion: Based on required code upgrades and the estimated age of the existing fire alarm system, the fire alarm system shall be replaced in its entirety.
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>HVAC Ductwork on Roof</td>
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<tr>
<td>2</td>
<td>HVAC Ductwork</td>
</tr>
<tr>
<td>3</td>
<td>Loose Tape</td>
</tr>
<tr>
<td>4</td>
<td>HVAC Flexible Ductwork</td>
</tr>
<tr>
<td>5</td>
<td>HVAC Ductwork</td>
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<tr>
<td>6</td>
<td>HVAC Ductwork</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1 - HVAC Ductwork</td>
<td>2 - HVAC Ductwork</td>
</tr>
</tbody>
</table>
LEVEL 5 - HVAC DUCTWORK

1 - Duct Reducing Fitting with Mastic Sealant
2 - Duct Reducing Fitting with Mastic Sealant
3 - Duct Reducing - Exposed Fiberglass and Poor Insulation
4 - Exposed Fiberglass
5 - Duct Section
1 - Duct section - Segments not aligned
2 - Branch Fitting Penetration - Rust and Exposed Insulation
3 - Straight Duct Section
4 - Duct section
<table>
<thead>
<tr>
<th></th>
<th>Exposed Fiberglass - Missing Inner core</th>
<th>Duct Sections - Branch Penetration - Exposed Insulation</th>
<th>Duct Section - Fitting Penetration - Exposed Fiberglass</th>
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<tbody>
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</table>
B. Servers/Data Rooms Cooling

1. Server Room Equipment
2. Server Room HVAC Equipment
3. Server Room Equipment
4. Server Room Equipment
5. Server Room Equipment
6. Server Room Equipment
<table>
<thead>
<tr>
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<tr>
<td>1</td>
<td>Server Room Equipment</td>
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<tr>
<td>2</td>
<td>Server Room - HVAC Equipment &amp; Ductwork</td>
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</tbody>
</table>
C. Hydronic Piping - Interiors

1 - Hydronic Piping - Interior Condition

2 - Hydronic Piping - Interior Condition

3 - Hydronic Piping - Interior Condition

4 - Hydronic Piping - Interior Condition

5 - Hydronic Piping - Camera Insertion Point

6 - Hydronic Piping - Camera Insertion Point
### D. Hydronic Piping - Exteriors

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Hydronic Piping - Exterior Corrosion &amp; Insulation</td>
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<tr>
<td>2</td>
<td>Hydronic Piping - Exterior Corrosion &amp; Insulation</td>
</tr>
<tr>
<td>3</td>
<td>Hydronic Piping - Heating Hot Water</td>
</tr>
<tr>
<td>4</td>
<td>Hydronic Piping - Exterior Corrosion &amp; Insulation</td>
</tr>
<tr>
<td>5</td>
<td>Hydronic Piping - Exterior Corrosion &amp; Insulation</td>
</tr>
<tr>
<td>6</td>
<td>Hydronic Piping - Exterior Condition &amp; Insulation</td>
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## E. Hydronic Piping - Wall Penetrations

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<th>Description</th>
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</thead>
<tbody>
<tr>
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<td>Hydronic Piping - Floor Penetration</td>
</tr>
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<td>2</td>
<td>Hydronic Piping - Floor Penetration</td>
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<tr>
<td>3</td>
<td>Hydronic Piping - Floor Penetration</td>
</tr>
<tr>
<td>4</td>
<td>Hydronic Piping - Floor Penetration</td>
</tr>
<tr>
<td>5</td>
<td>Hydronic Piping - Wall Penetration</td>
</tr>
<tr>
<td>6</td>
<td>Hydronic Piping - Wall Penetration</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Hydronic Piping - Wall Penetration</td>
<td>Hydronic Piping - Wall Penetration</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Hydronic Piping - Wall Penetration</td>
<td>Hydronic Piping - Wall Penetration</td>
</tr>
</tbody>
</table>
F. Plumbing Systems - Waste and Vent - Exteriors

1 - Plumbing Systems - Waste and Vent
2 - Plumbing Systems - Waste and Vent
3 - Plumbing Systems - Waste and Vent
4 - Plumbing Systems - Waste and Vent
G. Plumbing Systems - Waste and Vent - Interiors

1 - Plumbing Systems - Waste and Vent - Interiors
2 - Plumbing Systems - Waste and Vent - Interiors
3 - Plumbing Systems - Waste and Vent - Interiors

4 - Plumbing Systems - Water Pressure Flushed Debris
5 - Plumbing Systems - Collapsed Cast Iron
6 - Plumbing Systems - Waste and Vent - Interiors
<table>
<thead>
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<td>Image</td>
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<tr>
<td><img src="image1.jpg" alt="Image" /></td>
<td>1 - Plumbing Systems - Water Heaters</td>
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<tr>
<td><img src="image2.jpg" alt="Image" /></td>
<td>2 - Plumbing Systems - Tempering Station</td>
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<tr>
<td><img src="image3.jpg" alt="Image" /></td>
<td>3 - Plumbing Systems - Tempering Station</td>
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<tr>
<td><img src="image4.jpg" alt="Image" /></td>
<td>4 - Plumbing Systems - Tempering Station</td>
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<tr>
<td><img src="image5.jpg" alt="Image" /></td>
<td>5 - Plumbing Systems - Tempering Station</td>
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<tr>
<td><img src="image6.jpg" alt="Image" /></td>
<td>6 - Plumbing Systems - Gas Meter</td>
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**H. Plumbing Systems - Hot Water Distribution**
I. Plumbing Systems - Domestic Booster Pumps

1 - Plumbing Systems - Domestic Booster Pump
2 - Plumbing Systems - Domestic Booster Pump
3 - Plumbing Systems - Domestic Booster Pump
4 - Plumbing Systems - Domestic Booster Pump
5 - Plumbing Systems - Storm Water Sump Pumps
J. Plumbing Systems - Fire Pump Room
### K. Plumbing Systems - Roof Drains

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>Primary Roof Drain NE</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Overflow Roof Drain NE</td>
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</tbody>
</table>
L. Electrical Systems

1 - Meters located at north end of building near loading dock. NVE meter is on the right. The PV system REC meter is on the left.

2 - Main service switchgear 'MVS1' 600A, 12.47KV, 3-phase, 3-wire.

3 - PV system inverter located in same room as main service switchgear. Inverter is tied into service at 480V Unit-substation 'USW'.

4 - Unit-substation 'USW' located on west half of Level 1. (1500kVA) Equipment is mis-labeled as 'USR'.

5 - Electrical room on west half of Level 1 adjacent to Cafe. Electrical rooms should not be used for storage.

6 - Unit-substation 'USE' located on east half of Level 1. (750kVA)
1 - Generator. 800kW, 277/480V, 3-phase, 4-wire with 500 gallon sub-base fuel tank.

2 - Generator distribution panel not indicated on single line diagrams. 1200A, 277/480V, 3-phase, 4-wire.

3 - Ceiling space above a typical office. Conduit and cable installation is mostly in neat condition.

4 - Hole observed in rated wall of emergency electrical room on level 2.

5 - Receptacles in wet locations exposed to sky are left open. Suggest replacing with "while-in-use" covers.

6 - Unit-substation 'USR' located on Level 6. (2500kVA) Equipment is mis-labeled as 'USW'.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td>String of VRLA batteries located in the Level 6 electrical room.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Emergency dist. boards ‘EDP2’ (left) and ‘EDP3’ (center) are installed with incorrect rating. 250A equipment connected to 600A feeders.</td>
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## M. Chilled Water Piping - Wall Thickness Measurements

<table>
<thead>
<tr>
<th>Test Point</th>
<th>Field Measurement</th>
<th>Pipe Size</th>
<th>Schedule 40 Wall Thickness</th>
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<td>CHS</td>
<td>CHR</td>
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<td>5.5</td>
<td>5.4</td>
<td>3”</td>
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<td>6.4</td>
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<td>5”</td>
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<td>5.6</td>
<td>4”</td>
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<td>4”</td>
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<tr>
<td>15</td>
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<td>5.1</td>
<td>3”</td>
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</table>
Elevator Assessment
January 02, 2019

Brian Herley
Partner, Architect
KGA ARCHITECTURE
3017 West Diablo Drive, Suite 300
Las Vegas, Nevada 89146

Reference: GRANT SAWYER STATE OFFICE BUILDING - Property Condition Assessment

Dear Brian:

On October 15, 2018 HKA Elevator Consulting, Inc. made a site visit to the Grant Sawyer State Office Building at 555 E Washington Ave located in Las Vegas, NV. The building is 224,000 gross square feet in size and located just north of downtown Las Vegas. The purpose of our visit was to survey four (2) passenger elevators and one (1) service elevator for modernization, repair or replacement. The survey was to determine the existing elevator equipment condition, building and hoistway construction and determine the work by others criteria for the elevator modernization specifications. The following is the result of our survey. The existing transportation equipment was manufactured and installed by Montgomery Elevator Company in 1995.

ELEVATOR OPTIONS:

A. Repair major components.

GRANT SAWYER ELEVATOR INVENTORY:

<table>
<thead>
<tr>
<th>Elevator</th>
<th>Use</th>
<th>Capacity</th>
<th>Speed</th>
<th>Machine Type</th>
<th>Floors Served</th>
<th>Openings</th>
<th>Door Type</th>
<th>Door Opn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Passenger</td>
<td>3500</td>
<td>350</td>
<td>OH DC Gerated</td>
<td>1,2,3,4,5,6</td>
<td>Front</td>
<td>C/O</td>
<td>3–6’</td>
</tr>
<tr>
<td>2</td>
<td>Passenger</td>
<td>3500</td>
<td>350</td>
<td>OH DC Gerated</td>
<td>1,2,3,4,5,6</td>
<td>Front</td>
<td>C/O</td>
<td>3–6’</td>
</tr>
<tr>
<td>3</td>
<td>Passenger</td>
<td>3500</td>
<td>350</td>
<td>OH DC Gerated</td>
<td>1,2,3,4,5,6</td>
<td>Front</td>
<td>C/O</td>
<td>3–6’</td>
</tr>
<tr>
<td>4</td>
<td>Passenger</td>
<td>3500</td>
<td>350</td>
<td>OH DC Gerated</td>
<td>1,2,3,4,5,6,7</td>
<td>Front &amp; Rear</td>
<td>C/O</td>
<td>3–6’</td>
</tr>
<tr>
<td>Serv. 5</td>
<td>Service</td>
<td>4000</td>
<td>350</td>
<td>OH DC Gerated</td>
<td>1,2,3,4,5,6</td>
<td>Front</td>
<td>S/I</td>
<td>3–6’</td>
</tr>
</tbody>
</table>

EXECUTIVE SUMMARY OF CONDITIONS:

The existing elevator equipment was manufactured and installed by Montgomery Elevator Company in 1995. The elevator equipment is original to the building and has not been modernized. The current service provider is Old Elevator Company.

We found the annual and five year code required tests are all overdue. The date of the last inspection was 2016 for the passenger elevators and 2012 for the service elevator. In our opinion, all elevators should be written up and re-tagged if corrections are not implemented. The last five year full load test was performed in 2012. These tests and inspections should be completed immediately.

The machines are Montgomery geared DC traction model 200E, oped 1.1. The passenger cars have a 30HP DC motor and the service car has a 40HP DC motor. The machines are in fair to poor condition and are now obsolete. Replacement parts are becoming very hard to procure. We noted the hoist ropes are severely roughing and sized and are in need of replacement as they do not meet current codes. The elevators were all running approximately 10% less than contract speed.

The controllers are Montgomery solid state Ultron model controllers. The controllers and drives are in poor condition and are now obsolete. Replacement parts cannot be obtained. Elevator #2 has been shut down for 2 years due to the need for a new drive unit.

MAJOR REPAIRS* within 30–120 days:

- Replace hoist ropes, equalizer, tension, rope lubricators, replace missing clips – 5 elevators
- Replace or repair drive unit – #2
- Perform annual inspections, annual and full 5 year safety tests – 5 elevators
- Test buffers and safety circuits – all 5 elevators
- Adjust door closing pressure to be within code (30 ft. lbs.) – 5 elevators
- Perform complete tear down of brakes including cores and linings – 5 elevators
- Replace machine seal – #5
- Drain, flush and refill machine gear oil, seal leaks – 5 elevators
- Replace controller fan – service elevator
- Perform hoistway clean down including car tops and pits – 5 elevators
- Remove trash, debris, building materials from machine rooms
- Install fire extinguisher – passenger machine room
- Replace car fans – #1 and 3

*Check your service contract as some or all of these repairs may be covered under your existing maintenance agreement.

We estimate these repairs would cost approximately $200K.

These estimates do not include any work that will be required to be performed by other contractors to upgrade existing hoistways, machine rooms and electrical work for compliance with code. For the new elevator scenario, this does include the cost to build the new core and only includes four (4) passenger elevators. The service elevator would remain in place and be fully modernized. The old core will need to be removed as well.

AREAS OF CONCERNS:

1. Inspections and tests required are all overdue.
2. The major equipment components are obsolete.
3. Extensive repairs are immediately necessary.

Please review this information and give me a call to discuss these items prior to developing the rough draft of the modernization specification. Should you have any questions regarding the above, please do not hesitate to call.

Sincerely,

HKA Elevator Consulting, Inc.

Jeff Grusham
Director, National Business Development
Grant Sawyer State Office Building: Elevators #1-5

Service car worm and gear DC machine with DC motor.

Typical passenger worm and gear DC machine with DC motor.

Ropes showing wear. Ropes debris.
Typical chain pulley roller assembly.

Typical counterweights: These would be retained and reused.

Counterweight roller guides.

Pit Area
Car panel in good condition.

Car panel is ADA compliant and in good condition.

Cab interior in good condition.
Cab interiors in good condition.

Existing service cab interior.

New vandal resistant fixtures meeting ADA will be installed.

Hall lanterns can be retained. LED lighting clusters can be added.
In car lobbies.

Lobby Stations

Elevator lobby station in Fire Control Room.

Smoke & Heat Detectors

There are smoke detectors but there are no heat detectors.

Machine Room Electrical

Existing main line disconnect switches.
Shunt Trip Devices & Sprinklers

Car light 100V disconnect switches will be required in machine rooms.

Machine room outlets will need to be converted to GFI outlets, one per wall.

Shunt trips in the machine rooms will be required due to sprinklers.

There are sump pumps in the pits.

Machine Room Doors / Stairs
This ladder will require a variance to be reused for a modernization.

All machine room doors meet code.

All machine room doors meet code.

Machine Room Ventilation
AC is in room.

Machine Room Fire Extinguishers

#6

ABC fire extinguisher is present in the machine room.

#1-4

There is no fire extinguisher in this room.

Lobby Smoke Protection

The lobbies have smoke control doors.

Pit Access / Platforms

Pits are accessible via pit ladder, will need to be modified to meet new codes.
Miscellaneous Items

#1-4

Fire year CAT 5 full load test performed in March 2011.

May 2015 was the last annual inspection.

END OF REPORT
End of Volume Two