CAPITOL COMPLEX MASTER PLAN

FINDINGS & RECOMMENDATIONS (F & R) NEEDS ASSESSMENT

POWER PLANT BUILDING, 1341 SHERMAN STREET (DENVER)

NOVEMBER 2014

RNL

FINDINGS & RECOMMENDATIONS (F&R) NEEDS ASSESSMENT

POWER PLANT BUILDING
1341 SHERMAN STREET (DENVER)

November 2014

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EXECUTIVE SUMMARY

The purpose of this report is to provide a Findings & Recommendations (F&R) Needs Assessment of the Power Plant Building at 1341 Sherman Street in Denver, Colorado. The report includes a description and evaluation of the existing conditions, recommendations, and cost estimates for the recommended work from the following focus areas: architecture (RNL), structural (Martin/Martin Consulting Engineers), civil (Martin/Martin Consulting Engineers), mechanical/electrical/plumbing (RMH Group), voice and data (Shen Milsom Wilke), security (Shen Milsom Wilke), historical (Anderson Hallas Architects), and cost estimating (CBRE, Inc.). The project team, led by RNL, reviewed existing building documentation, drawings, and audit reports provided by the Owner, and conducted a site visit to identify and document the observable existing conditions of the building and its code and life safety issues.

The Power Plant Building was placed on the Historic Register, with the adjacent Capitol Annex Building, on June 24, 1991 and contributes to the architectural history of both the City of Denver and the State of Colorado. All work on the property should follow the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs. In general the building is in fair condition. A fair condition rating refers to the fact that the Power Plant Building is usable but in serious need of repairs to address life safety and loss of use/reliability issues.

Although all recommendations presented in this report should be considered for implementation, the following are the top five priorities due to their impact on life safety (LS), loss of use/reliability (LOU), finishes (F), and overall energy efficiency:

1. Install a full fire alarm and detection system throughout. This recommendation encompasses life safety issues and is due to the lack of a full detection fire alarm system.

   High Level Cost Estimate: $32,101

2. Provide fall protection at roof. This recommendation encompasses life safety issues and is due to code issues and the fact that inadequate fall protection is provided at the roof.

   High Level Cost Estimate: $20,269

3. Replace all electrical panels and receptacles that are past their useful life. This recommendation encompasses life safety, loss of use/reliability, and overall energy efficiency issues and is due to the age of the panels and receptacles.

   High Level Cost Estimate: $898,703

4. Repair exterior walls and window leaks. This recommendation encompasses loss of use/reliability issues and is due to the age and condition of the windows and the cladding on the building and the overall deterioration of the mortar and sealant.

   High Level Cost Estimate: $665,694

5. Replace lighting. This recommendation encompasses loss of use/reliability issues and is due to the age and condition of the fixtures.

   High Level Cost Estimate: $187,710

If all recommendations in this report are implemented as a single project, including the top 5 priorities, the high level cost estimate is:

$4,598,921

If all recommendations in this report are implemented system by system as multiple projects, including the top 5 priorities (systems), the high level cost estimate is:

$4,970,686

1.0 OVERVIEW

1.0-A ARCHITECTURE OVERVIEW

The Power Plant Building was constructed in 1939 as a New Deal/Federal Emergency Administration of Public Works building project and is located in Denver's Capitol Hill Neighborhood on the west side of Sherman Street between 13th Avenue and 14th Avenue. The two-building complex, including the adjacent Capitol Annex Building to the north, was designed by E.J. Kirchof and G. Meredith Musick on behalf of a collaboration known as the Associated Architects for the State Capitol Annex. The design of this building is an example of Art Deco architecture and additionally exemplifies the style of architecture in Denver in the late 1930's. It was officially placed on the U.S. Register of National Historic Places with the Capitol Annex Building on June 24, 1991. The Capitol Annex Building and Power Plant Building are also a contributing part of the Denver Civic Center District which was added to the U.S. Register of National Historic Places on February 27, 1974.

The building's current and historic functions are to serve as a boiler plant for the Capitol Complex. The building also currently houses a division of the State Patrol. The Power Plant Building, a concrete and steel construction clad in white marble veneer with a dark grey, pink flecked granite base, is a two-story building, with a basement and sub-basement, and grosses 25,690 square feet of space.

The architectural assessment of the Power Plant Building at 1341 Sherman Street included reviews of the existing building documentation, drawings, and audit reports provided by the Owner, and a site visit to survey and document the existing conditions of the building and its code and life safety issues. During the site survey on September 24, 2013, building maintenance personnel provided building history and information on the layout, finishes, maintenance routines, systems, and the dates of repairs and upgrades. In general, the building is in fair condition. There are issues related to interior and exterior finish materials, building systems, code compliance, accessibility, and other items that require attention in the near term. One of the main concerns is related to the need to repair the exterior walls and window leaks. Another concern is the need for accessibility upgrades. These concerns encompass life safety and loss of use/reliability issues. These findings, along with recommendations for repairs, are detailed in the body of this report.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

1.0-B STRUCTURAL OVERVIEW

Martin/Martin conducted a building condition assessment on September 24, 2013 of the Power Plant located at 1341 Sherman Street in Denver, Colorado. The purpose of our condition assessment was to identify structural defects, damage and deterioration.

The Power Plant was constructed in 1939. The structural framing consists of concrete slabs supported by steel beams and columns encased in concrete. The foundation system is unknown and construction drawings were not available.

The structural framing that was readily observable is in good condition. Minor cracking was observed in the concrete members.

Several veneer tiles appeared to be inadequately secured to the framing which could represent additional structural movement and/or distress and presents a life safety hazard to pedestrians in the vicinity of the building. The displaced tiles and deteriorated mortar joints allow water to access the structural framing and cause additional distress.

Parapets along the roof edge were found to be of inadequate height. A fall protection system should be provided for access near exposed edges to meet current safety codes.

1.O-C CIVIL OVERVIEW

The Power Plant site is approximately one-quarter acre and is located at 1341 Sherman Street. The existing site consists of the building, fenced utility yard and street right-of-way including sidewalk and landscaping. The main building entrance is accessed from Sherman Street. The condition of the site surrounding the building is consistent with an estimated age of 70+ years.

The site exterior is generally in good condition. There are a few locations around the site with broken and cracked concrete in need of repair or replacement. Broken concrete in walking paths can cause a tripping hazard, which is a high safety concern. It was reported that the main chiller at the Power Plant supplies the Capitol Complex chiller loop and that the chiller loop is in need of upgrades. The main concern regarding the Power Plant site is the need to upgrade this utility due to its importance to the Complex.

1.0-D MECHANICAL, ELECTRICAL, AND PLUMBING OVERVIEW

The electrical and mechanical assessment of the Power Plant building at 1660 17th Ave. included review of the existing building documentation, drawings, and audit reports provided by the Owner. Also, a site survey for the facility was performed to observe the existing electrical equipment installation and assess code and building energy efficiency issues. During the site survey, information about the building history and on the electrical and mechanical systems conditions, maintenance routines, and installation dates.

The main concerns regarding the Power Plant building are related to the electrical system. The age of the electrical equipment in this building does not provide a reliable system. When equipment fails, the parts, if available, are difficult to find. If any of the feeders or distribution breakers to the 208V system fail, the down time for repair could take hours or even days. The 208/120V power distribution gear, transformer, conduit, and wire in this building are at the end of their useful life and need to be replaced. The fire alarm system is limited in this building, it is recommended to provide a full detection system. The lighting in this building is passed its useful life, some of the locations don't have enough light, and there are limited to no controls. The lighting system is recommended to be replaced.

It is recommended to review the rated walls in the building and ensure their rating is maintained by closing the openings in the wall with fire proof material. Provide EPO switch outside the mechanical room to be able to shut off the equipment during emergency.

Energy Conservation

To conserve energy in this building a lighting control system that provides automatic daylight dimming and occupancy sensor shutoff will provide energy savings. Also, following the most up-to-date energy codes regarding how much light is used (watts per square feet) will reduce the number of fixtures required for each space. Installing the highest efficiency motors and using variable frequency drives conserve energy for the mechanical equipment in this building.

The piping insulation is damaged/missing at certain places. Provide missing insulation or repair the damaged insulation in the building. This will reduce the losses and save heating and cooling energy costs.

1.0-E VOICE AND DATA OVERVIEW

The Voice and Data IT/Telecommunications Infrastructure assessment and findings report provides recommendations for the design and construction of the IT/Telecommunications Infrastructure required to support Voice/ Data and other technology systems within the Power Plant building. It is determined that much of the building's existing IT/Telecommunications infrastructure is not compliant with current industry standards and best practice installation methods. As well, the current infrastructure is such that it may not properly support many newer technology IP devices, which are now considered standard in the industry such as VoIP phones and PoE type security cameras. Existing Cat5e cabling has bandwidth limitations as compared to that of the more robust, industry standard Cat6/6A cable plant specifications. The complete IT systems infrastructure not only includes the cabling, but the cabling pathways and the spaces (or rooms) that support the network cabling. Technology spaces requiring to be properly outfitted in the building include the Main Distribution Facility (MDF) room, and distributed IDF rooms (minimum of one per floor). Backbone infrastructure shall include proper cabling pathways between MDF/IDF rooms, in order to support installation of both fiber and copper backbone cabling. Singlemode fiber optical cable, laser optimized multimode fiber optic cables, and Category 3 copper backbone cables should be installed from the MDF room to each IDF room to support the technology systems. Category 6 UTP cable shall be installed from the telecom outlets and IP field devices to termination hardware in the IDF rooms using the conduit and cable tray horizontal pathways. A proper grounding and bonding system must be provided in the MDF/IDF rooms. A proper grounding and bonding system will provide a uniform ground within the telecommunications rooms, to facilitate a safe and reliable operation of the communications and low-voltage equipment and systems. These recommendations may be used for IT/Telecom Infrastructure program development, space planning, and budgeting of these systems at a conceptual design level. Industry standard and best practice design methods must be applied, including BICSI and TIA/EIA design and construction guidelines. For renovation projects, any applicable State Office of Information Technology (OIT) design criteria documents should be must also be followed.

The following list prioritizes voice/data infrastructure upgrades required:

1. Necessary: Retrofit facility with proper MDF/IDF room distribution, which meets industry standard for telecommunications structured cabling system.

2. Necessary: Replace horizontal copper station cabling with Cat 6 network cabling.
3. Necessary: Replace vertical and network backbone cabling with appropriate copper and fiber optic cabling.
4. Necessary: Provide voice/data infrastructure to support wireless access points (WAPs), for wireless network coverage throughout facility.

1.0-F SECURITY SYSTEMS OVERVIEW

The security systems design guidelines outline electronic security systems infrastructure which will enhance security operations and provide a safe and secure environment for persons and assets within the Power Plant Building. The security systems should be planned and designed to allow the security personnel the operational flexibility to provide various levels of security based on the threat level at a given time. Security systems should be designed such that they may be monitored remotely from centralized security monitoring locations. Best practice security design methodology should be applied, including crime prevention through environmental design (CPTED), layered security, integrated design, and concentric circles of protection. Additionally it is recommended that the following document be used a guideline for developing specific security design criteria for renovations: ASIS Facilities Physical Security Measures, IESNA G-1-03 Guideline for Security Lighting, Unified Facilities Criteria UFC 4-010-01.

For renovation projects, applicable State construction standards and design guidelines must be followed. Electronic security systems to be considered for implementation or upgrade include access control, intrusion detection, duress alarm, intercom, video surveillance, and emergency call system. The access control system (ACS) will be an expansion of the existing campus wide system currently installed throughout other State buildings. The ACS shall also serve as the primary security management system for monitoring intrusion alarms. The video surveillance system (VSS) should be comprised of IP digital cameras integrated with the existing VSS. The State's existing wireless duress alarm system infrastructure should be expanded where needed to support new locations of wireless duress buttons.

Existing security systems in State facilities are generally controlled and monitored centrally from Colorado State Patrol's Central Command Center (CCC), located in Denver CO.

Within the building, new head-end security control equipment is to be located in IDF or technology rooms, as coordinated with State IT technical staff. Equipment may include ACS control panels, power supplies, duress alarm panels, network video recorders, and UPS units.

All critical electronic security equipment should be backed-up with emergency power circuits or UPS units. State security personnel and other authorized staff may remotely monitor access control events, system alarms, and security video through network connected client workstations.

For the Power Plant Building renovation work, requirements for security device additions/upgrades and specific security system functionality are to be coordinated with State security personnel during design and construction phases.

The following list prioritizes security system upgrades required:

1. Doors and Windows should be reinforced or replaced with security rated enhancements.
2. Necessary: Replace/Repair existing Hirsch Access Control card readers.
3. Necessary: Replace analog security cameras with IP PoE minimum 1.2MP cameras.
4. Necessary: Replace existing coaxial CCTV cabling with CAT 6 network cabling, required to support item 1 above.
5. Recommended: Install IP security camera within main entrance/lobby.

Consideration should be given in regards to the Installation and mounting details for any security related renovations. Due to the uniqueness of the buildings under consideration, design plans must be cognizant of maintaining the historical attributes of the buildings.

2.0 OVERALL BUILDING ASSESSMENT FINDINGS AND RECOMENDATIONS

2.1 ARCHITECTURE

2.1-A EXTERIOR BUILDING ENVELOPE/SITE

General

The Power Plant Building is a two-story tall building, with a full basement and sub-basement, supported by a concrete and steel structural frame. The structure is located to the south of the Capitol Annex Building and is connected to its south elevation at grade with a high iron fence set flush with both facades.

White marble veneer panels, above a foundation of flecked dark grey and pink granite, clad the north and east facades of the first story, wrapping around the building at the southeast corner and cladding a portion of the south facade. The top course of marble veneer, below the marble parapet coping, has a continuous frieze swag motif, repeated on the facade of the Capitol Annex Building. The remainder of the south facade, and the west (back) facade, consist of brick above a concrete foundation. The first story roof can be accessed by a metal ladder on the north side of the building from grade level and has a tall smokestack at the southwest corner.

There is a second story construction set back from the first story elevations and extending over the industrial atrium space at the Basement Floor. The second story facade is clad in glazed white terracotta tiles along the east (front) elevation and wrapping around onto a portion of the north and south facades. The remainder of the north and south facades consist of brick. The parapet coping along the roof of the second story construction consists of glazed white terracotta blocks. The windows at the second floor facade consist of single and tripartite windows with metal frames. The roof of the second floor construction contains the cooling tower and can be accessed by a metal ladder on the north side from the first-story roof.

A granite stairway leads to the main Sherman Street entrance on the north end of the east (front) side of building, paved in granite at the entrance landing. The historic bronze entrance door is framed with granite veneer panels. The granite stairway continues to a concrete sidewalk that extends to Sherman Street. There is an overhead rolling door leading to a garage

space on the south end of the east (front) side of the building. The window openings are plain and set back from the front face of the facade, with the marble veneer forming lintels and sills. The east (front) elevation of the building has a low granite wall surrounding a central light well, covered with a metal grate.

The building envelope is in fair condition overall. Various elements are showing the effects of deferred maintenance, others are simply damaged or worn out.

It was reported that the boiler area of the Power Plant Building is leased to Xcel Energy and is a part of their downtown steam loop.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

Front/East elevation of the Power Plant Building

Front/East Sherman Street Entrance

Front/East elevation, view from the southeast looking north towards the Capitol Annex Building

Side/North elevation of the Power Plant Building

Side/South elevation of the Power Plant Building

View of the Back/West alley between the Power Plant Building and the parking garage to the west

View of the ballasted grade-level roof over the basement of the Power Plant Building and adjacent to the Capitol Annex Building, looking east from the west side of the roof

Cladding

The marble veneer panels cladding the north, east, and a portion of the south facades of the building at the first story are in fair to poor condition. Several panels are no longer flush and appear to be pulling away from the building, creating a potential life-safety hazard for pedestrians below (see Fig. 2.1.A.1). Spalling of the marble was observed in a few locations

around the exterior of the building (see Fig. 2.1.A.2). The marble panels are generally soiled, which is to be expected after seventy-plus years. It was noted that the mortar between the joints of the marble veneer panels is generally deteriorating and leaving the building envelope vulnerable to water penetration (see Fig. 2.1.A.3 and Fig. 2.1.A.4). The granite panels along the foundation were observed to be in generally fair condition overall with wear-and-tear and deteriorating mortar between the joints noted (see Fig. 2.1.A.5 and Fig. 2.1.A.6). The granite parapet on the west side of the ballasted grade-level roof between the Power Plant Building and the Capitol Annex Building appears to have had new sealant applied recently (see Fig. 2.1.A.7). The sealant appears to have been applied poorly, with gaps noted along the length of the material.

The glazed white terracotta tiles along the east facade of the second story construction and wrapping around both sides to clad a portion of the north and south facades, are in fair condition overall with areas of spalling, cracking, and soiling observed during the site survey visit (see Fig. 2.1.A.8, Fig. 2.1.A.9, Fig. 2.1.A.10, and Fig. 2.1.A.11). It was noted that the mortar between the joints of the glazed white terracotta tiles is generally deteriorating and leaving the building envelope vulnerable to water penetration (see Fig. 2.1.A.12 and Fig. 2.1.A.13).

The brick along the south facade at the first story and along the north and south facades at the second story is in generally fair condition overall with soiling (see Fig. 2.1.A.14 and Fig. 2.1.A.15), damage (see Fig. 2.1.A.16 and Fig. 2.1.A.17), and deteriorating mortar observed (see Fig. 2.1.A.18). The concrete foundation along the south facade at the first story was observed to be cracking in several areas (see Fig. 2.1.A.19).

The marble coping blocks along the top of the first-story parapet are in fair condition overall with areas of spalling and deteriorating mortar noted (see Fig. 2.1.A.20 and Fig. 2.1.A.21). The coping blocks along the top of the second-story parapet are in fair to poor condition overall with spalling, deterioration of the glazed protective coating, and overall deterioration of the mortar noted (see Fig. 2.1.A.22).

It was reported that repairs to the exterior walls and retaining walls are on the Capitol Complex list of controlled maintenance projects that need to be addressed.

Fig. 2.1.A.1 Marble panels moving out of flush and creating a life-safety hazard for pedestrians below.

Fig. 2.1.A.2 A few areas of spalling and damage observed at the marble veneer panels.

Fig. 2.1.A.3 General deterioration of the mortar leaving the building envelope vulnerable to water penetration.

Fig. 2.1.A.4 General deterioration of the mortar leaving the building envelope vulnerable to water penetration.

Fig. 2.1.A.5 Wear-and-tear and scuff marks noted at the granite cladding along the foundation, especially on the south side of the building.

Fig. 2.1.A.6 Deteriorating mortar observed in the joints between the granite panels at the foundation.

Fig. 2.1.A.7 Sealant observed at the granite parapet on the west side of the ballasted grade-level roof between the Power Plant Building and the Capitol Annex Building does not match the historic character of the site and was applied poorly.

Fig. 2.1.A.8 Generally soiled and deteriorating glazed white terracotta tiles observed at the second story construction.

Fig. 2.1.A.9 Soiled and deteriorating glazed white terracotta observed at a window ledge.

Fig. 2.1.A.10 Unrepaired holes observed at the glazed white terracotta tiles and soiling due to the corrosion of a metal attachment on the wall.

Fig. 2.1.A.11 Cracked glazed white terracotta tiles observed at the southwest corner of the building.

Fig. 2.1.A.12 Typical instance of deteriorating mortar observed at the joints between the glazed white terracotta tiles.

Fig. 2.1.A.13 General deterioration of the mortar noted at the glazed white terracotta tiles surrounding windows.

Fig. 2.1.A.14 Generally soiled areas of brick observed around the building.

Fig. 2.1.A.15 Extensive soiling of the brick observed at the southwest corner of the building.

Fig. 2.1.A.16 Disconnected, loose wires and multiple unrepaired holes observed at the second story brick facade on the north side of the building.

Fig. 2.1.A.17 Areas of damaged brick observed during the site survey visit.

Fig. 2.1.A.18 General deterioration of the mortar at the brick walls around the exterior of the building.

Fig. 2.1.A.19 Widespread cracking of the concrete foundation observed on the south side of the building.

Fig. 2.1.A.20 Spalling and damaged marble coping blocks observed around the perimeter of the first story parapet.

Fig. 2.1.A.21 Mortar observed to be deteriorating, and missing entirely in areas, along the base of the marble coping blocks.

Fig. 2.1.A.22 Spalling, deterioration of the protective coating, and overall deterioration of the mortar noted at the coping blocks around the perimeter of the second story parapet.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Clean soiled/stained marble veneer panels and marble coping blocks around the exterior of the building using an approved method.
- Clean soiled/stained and scuffed granite panels along the foundation of the building using an approved method.
- Repair or replace any spalling, or otherwise damaged, marble panels and coping blocks around the exterior of the building, to match existing.
- Reset marble panels that are loosening and moving out of flush with the rest of the cladding. Examine the building system behind the marble panels and repair as necessary before replacing the panels.
- Tuck point the marble panels, marble coping blocks, and granite panels and blocks around the exterior of the building.
- Remove the poorly applied sealant at the granite parapet on the west side of the ballasted grade-level roof between the Power Plant Building and the Capitol Annex Building. Apply new sealant, or mortar, per historic designation guidelines. Any sealant, backup materials, and preformed joint fillers should be nonstaining. Petroleum-based organic adhesives should be avoided as they may stain the stone.
- Clean soiled/stained glazed white terracotta panels around the exterior of the building using an approved method.

- Repair or replace any spalling, cracked, or otherwise damaged glazed white terracotta tiles around the exterior of the building, to match existing.
- Tuck point the glazed white terracotta tile around the exterior of the building, including the tile surrounding window openings.
- Repair or replace any spalling, or otherwise damaged, masonry coping blocks around the perimeter of the second story parapet, to match existing. Replace any masonry coping blocks with deterioration of the protective coating, to match existing.
- Tuck point the masonry coping blocks around the perimeter of the second story parapet.
- Clean soiled/stained brick walls around the exterior of the building using an approved method.
- Repair or replace any damaged brick around the exterior of the building, to match existing. Repair any holes left in the walls around the exterior of the building to prevent water penetration and any further damage to the facades.
- Remove the disconnected, loose wires from the north side of the brick wall at the second story construction.
- Tuck point the brick around the exterior of the building.
- Repair or replace the cracked, or otherwise damaged, concrete foundation around the exterior of the building.
- Further investigation of the chimney is recommended in order to provide recommendations regarding its condition.

Glazing Systems and Doors

The windows appear to be single pane and original to the building. The metal frames were generally observed to have minor to moderate amounts of corrosion (see Fig. 2.1.A.23). A few windows were noted to have broken glass (see Fig. 2.1.A.24). A few of the second story windows were noted to have some type of residue along the top of the frame (see Fig. 2.1.A.25). The windows observed on the Sub-basement Floor are generally soiled (see Fig. 2.1.A.26).

There is a guardrail protecting the windows at the parking lot level on the south side of the building that is scuffed and corroding overall (see Fig. 2.1.A.27). It was reported that window leak repairs are on the Capitol Complex list of controlled maintenance projects that need to be addressed. It was also reported that the windows need to be reinforced for security reasons.

Fig. 2.1.A.23 Corroding metal window frame.

Fig. 2.1.A.24 Broken glass observed at a few windows around the exterior of the building.

Fig. 2.1.A.25 Residue observed along the top of a few windows around the second story.

Fig. 2.1.A.26 Generally soiled windows noted on the Sub-basement Floor.

Fig. 2.1.A.27 Scuffed and corroding guardrail protecting the windows at the parking lot level on the south side of the building.

The historic bronze entrance door located at the Sherman Street Entrance appears to be original to the building and in fair condition overall (see Fig. 2.1.A.28). The exterior door on the west end of the north side of the building, leading from the west exit stairway, was observed to be corroding and to have deteriorating paint (see Fig. 2.1.A.29). Corrosion was observed at the overhead rolling door leading to the First Floor garage area on the south end of the east side of the building (see Fig. 2.1.A.30). It was reported that the front entrance door needs to be reinforced for security reasons.

Fig. 2.1.A.28 Historic bronze entrance door at the Sherman Street Entrance.

Fig. 2.1.A.29 Exterior door on the west end of the north side of the building with corrosion and deteriorating paint.

Fig. 2.1.A.30 Corrosion observed at the overhead rolling door on the south end of the east side of the building.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- If possible, replace existing windows at the office areas with new energy efficient windows and frames in keeping with the historic status of the building.
- Repair or replace the corroding guardrail protecting the windows at the parking lot level on the south side of the building.
- Repair or replace the corroding door and frame to the west exit stairway on the west end of the north side of the building.
- Repair or replace the corroding overhead rolling door on the south end of the east side of the building.
- Reinforce the front entrance door and windows around the exterior of the building as required per security needs.

Roof

It was reported that the roof of the Power Plant Building is newer, although the exact age is unknown. There are three levels of roofing. The grade-level roof is located between the Power Plant Building and the Capitol Annex Building. The first story roof is above the First Floor of the building and wraps around the north, east, and south sides of the building. The second story roof is above the second story construction, set back from the first story elevations on the north, east, and south sides, and includes the cooling towers.

The grade-level roof is ballasted and appears to be in fair condition overall. It was noted that the drain covers appear to be corroding (see Fig. 2.1.A.31). There appears to be newer flashing along the granite parapet on the west side. It was noted that some of the sealant along the flashing is deteriorating and that the membrane above the flashing appears to be deteriorating overall (see Fig. 2.1.A.32). It was also noted that there are areas of newer sealant that appear to have been applied inconsistently along the top of the flashing, leaving gaps by which water could penetrate behind the system (see Fig. 2.1.A.7).

The roofing membrane on the first story roof appears to be deteriorating in spots, especially on the east side (see Fig. 2.1.A.33). The spots of deterioration appear to largely coincide with areas where water appears

to be collecting and standing. It was noted during the site survey visit that soil is collecting around the roof drains on the first story roof, with deterioration of the membrane observed in these areas (see Fig. 2.1.A.34 and Fig. 2.1.A.35). Debris was observed to be collecting in the corners of the roof and appears to include pieces of terracotta in a few areas (see Fig. 2.1.A.36, Fig. 2.1.A.37, and Fig. 2.1.A.38). There is a deteriorating membrane that was observed above the flashing along the sides of the parapets and walls at the first and second story roofs (see Fig. 2.1.A.39 and Fig. 2.1.A.40).

The first story roof is accessed by a fixed metal ladder without a cage on the west end of the north side of the building from the grade-level roof. The second story roof is accessed by a second fixed metal ladder without a cage found on the north side of the first story roof. It was noted that the ladders are corroding, especially the ladder leading up to the second story roof from the level of the first story roof (see Fig. 2.1.A.41).

Fig. 2.1.A.31 Corroding drain cover observed at the ballasted grade-level roof between the Power Plant Building and the Capitol Annex Building.

Fig. 2.1.A.32 Deteriorating sealant and a generally deteriorating membrane observed above the flashing along the granite parapet on the west side of the ballasted grade-level roof.

Fig. 2.1.A.33 Deterioration of the membrane observed at the first story roof.

Fig. 2.1.A.34 Soil observed to be collecting around the roof drains at the first story roof.

Fig. 2.1.A.35 Deterioration and bubbling of the roof membrane at areas where soil was observed to be collecting around the roof drains at the first story roof.

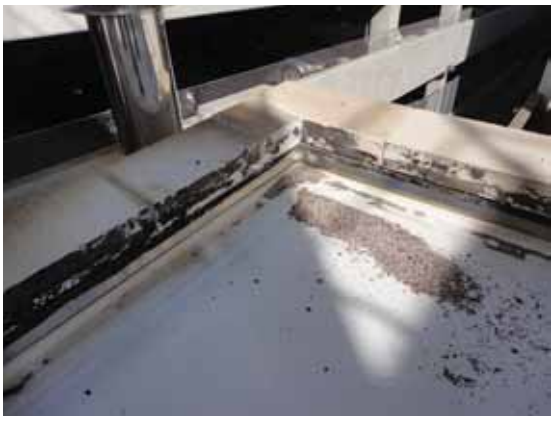


Fig. 2.1.A.36 Debris, including pieces of terracotta, collecting in the corners of the first story roof.

Fig. 2.1.A.37 Debris collecting in the corners of the first story roof.

Fig. 2.1.A.38 Debris collecting in areas of the second story roof.

Fig. 2.1.A.39 Deteriorating membrane observed around the perimeter of the parapets and walls of the first and second story roofs.

Fig. 2.1.A.40 Deteriorating membrane observed around the perimeter of the parapets and walls of the first and second story roofs.

Fig. 2.1.A.41 Corrosion observed at the metal ladder, without a cage, leading up to the second story roof.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- The age of the grade-level, first story, and second story roofs is unknown. Verify the age of the roofs and determine whether any warranty remains. The roofing appears to be in average condition overall and should be replaced in the next several years.
- Replace corroding, or otherwise deteriorating, roof drain covers at the ballasted grade-level roof.
- Repair or replace the deteriorating membrane, including any deteriorating sealant, above the flashing around the perimeter of the parapets and walls at the first and second story roofs. Provide new sealant at the flashing as necessary. Sealant, backup materials, and preformed joint fillers should be nonstaining. Petroleum-based organic adhesives should be avoided as they may stain the stone.
- Monitor the roofing membrane showing signs of deterioration, especially near the roof drains, and patch as necessary until the roof is replaced.
- Remove the soil collecting around the roof drains.
- Remove the debris collecting in areas of the first story and second story roof.
- Remove the corrosion from the metal roof access ladders and repaint to protect the metal from the elements. See 2.1-B Code Issues for further recommendations regarding the metal access ladders.

Entrance Canopy

There is evidence of water damage at marble cladding on the main Sherman Street Entrance canopy (see Fig. 2.1.A.42).

Fig. 2.1.A.42 Evidence of water damage at the Sherman Street Entrance canopy.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Determine the cause of the water damage at the Sherman Street Entrance canopy and repair as necessary.
- Clean and repair or replace the soiled and damaged marble cladding on the Sherman Street Entrance Canopy.

Site Elements

The granite cladding on the stairway at the Sherman Street Entrance was observed to be generally soiled (see Fig. 2.1.A.43) and damaged with cracking and spalling noted (see Fig. 2.1.A.44). It was also noted that the mortar is deteriorating, or missing entirely, from the joints between the granite blocks and at the concrete sidewalk along the base of the stairway (see Fig. 2.1.A.45).

The low granite wall surrounding the light well along the east (front) side of the building was observed to be deteriorating, with a block moving out of position (see Fig. 2.1.A.46). It was further noted that the mortar at the low granite wall is generally deteriorating and missing entirely from areas. It was reported that repairs to the exterior walls and retaining walls are on the Capitol Complex list of controlled maintenance projects that need to be addressed.

Fig. 2.1.A.43 Generally soiled granite cladding on the stairway at the Sherman Street Entrance.

Fig. 2.1.A.44 Cracked granite and missing mortar at the Sherman Street Entrance stairway.

Fig. 2.1.A.45 Deteriorating and missing mortar at the base of the Sherman Street Entrance stairway.

Fig. 2.1.A.46 A stone block moving out of position and missing mortar at the low granite wall surrounding the light well along the east side of the building.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Clean the granite at the Sherman Street Entrance stairway and at the low granite wall surrounding the light well along the east side of the building using an approved method.
- Repair or replace any spalled, cracking, or otherwise damaged granite at the Sherman Street Entrance stairway and at the low granite wall surrounding the light well along the east side of the building, to match existing.
- Reset any stone blocks moving out of position at the low granite wall surrounding the light well along the east side of the building.
- Remove the material between the joints of the stone blocks and cladding at the Sherman Street Entrance stairway and at the low granite wall surrounding the light well along the east side of the building and replace with new sealant or mortar. Sealant, backup materials, and preformed joint fillers should be nonstaining. Petroleum-based organic adhesives should be avoided as they may stain the stone.

2.1-B CODE ISSUES

Applicable Codes

The following approved building codes and standards adopted by State Buildings Programs (SBP) and other state agencies are identified as the minimum requirements to be applied to all state-owned buildings and physical facilities including capitol construction and controlled maintenance construction projects, as revised 7/2013.

The 2012 edition of the International Building Code (IBC)

(as adopted by the Colorado State Buildings Program as follows: Chapter 1 as amended, Chapters 2-35 and Appendices C and I)

The 2012 edition of the International Energy Conservation Code (IECC)

(as adopted by the Colorado State Buildings Program)

The National Fire Protection Association Standards (NFPA)

(as adopted by the Department of Public Safety/Division of Fire Safety as follows with editions shown in parentheses: NFPA-1 (2006), 11 (2005), 12 (2005), 12A (2004), 13 (2002), 13D (2002), 13R (2002), 14 (2003), 15 (2001), 16 (2003), 17 (2002), 17A (2002), 20 (2003), 22 (2003), 24 (2002), 25 (2002), 72 (2002), 409 (2004), 423 (2004), 750 (2003), and 2001 (2004))

The 2007 edition of ASME A17.1 Safety Code for Elevators and Escalators

(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2005 edition of ASME A17.3 Safety Code for Existing Elevators and Escalators

(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2003 edition of ICC/ANSI A117.1, Accessible and Usable Buildings and Facilities

(as adopted by the Colorado General Assembly as follows: CRS 9-5-101, as amended, for accessible housing)

Note: It is anticipated that compliance with the federal Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) and Colorado Revised Statutes Section 9-5-101 will be met by compliance with the 2012 International Building Code and ICC/ANSI A117.1. However, each project may have unique aspects that may require individual attention to these legislated mandates.

Building Construction Type

The building is 2 stories tall, has a basement and a sub-basement, and has a total floor area of 25,690 square feet. The Power Plant Building is a structure with multiple occupancies related to its uses.

The building's current and historic functions are to serve as a boiler plant for the Capitol Complex which is classified as Occupancy Group F1 (primary use as a moderate-hazard factory industrial Group F1 occupancy). If the functioning of the boiler plant includes the processing, generation, or storage of materials that constitute a physical or health hazard, the quantities should be verified with Section 307 of the IBC (2012) to determine whether a High Hazard Group H occupancy applies. The presence of hazardous materials in the Power Plant Building were observed in the industrial areas included in the site survey visit (see Fig. 2.1.B.1) and are most likely not considered an H occupancy. However, the extent to which hazardous materials are processed, generated, or stored within the building could not be confirmed. Compliance with International Building Code, International Fire Code, and any applicable Life Safety Code requirements for storage of hazardous materials should be verified regardless of any future renovation plans.

The building also currently provides office space for a division of the State Patrol which is classified as Occupancy Group B (primary use as a Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts). The garage area at the southeast corner of the First Floor is reportedly used by the State Patrol. This area was not included in the site survey visit and it is unknown how this space is used and whether any hazardous materials are present.

There is an alarm, that was observed during the site survey visit, on the south side of the overhead rolling door on the exterior of the building that is labeled as a tank overfill alarm.

A comprehensive review of the building's uses and resulting occupancies is recommended in order to accurately determine the specific code-requirements of the Power Plant Building.

It was reported that a code compliance analysis is on the Capitol Complex list of controlled maintenance projects that need to be addressed.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

Fig. 2.1.B.1 Hazardous materials observed during the site survey visit.

Egress Issues

Alterations, repairs, additions, and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the current provisions for alterations, repairs, additions and changes of occupancy or relocation. As an existing building, the Power Plant Building is exempt from current code requirements for new construction as long as minimal renovation is done. If the building undergoes extensive renovation, the following issues may need to be addressed per current code requirements, unless historic designation guidelines take precedence.

According to Table 1014.3 of the IBC (2012), the common path of egress travel for a building without an approved sprinkler system is 100 feet in a B-type occupancy and 75 feet in a F1-type occupancy when the occupant load is less than 30. The common path of egress travel for a building

without an approved sprinkler system in a B-type occupancy and in a F1-type occupancy is 75 feet when the occupant load is greater than 30. The plans provided by the Owner are dated June 29, 1997. It appears that the floor plans, as they exist now, are different from the 1997 plans, especially on the Basement Floor. It appears that the common paths of egress travel throughout the building, as it currently exists, may not comply with code requirements. The length of the longest common path of egress travel and the occupancy loads of each floor, per occupancy group area, should be verified as part of any future renovation plan.

According to Table 1016.2 of the IBC (2012), the exit access travel distance in a B-type occupancy with a sprinkler system is 300 feet and without a sprinkler system is 200 feet. According to Table 1016.2 of the IBC (2012), the exit access travel distance in a F1-type occupancy with a sprinkler system is 250 feet and without a sprinkler system is 200 feet. Since the floor plans provided by the Owner do not appear to match the existing layout, we were unable to confirm the approximate greatest distance of travel that exists from the most remote point on any of the Power Plant Building's floor plans to an exit stairway. Depending on the fire-resistance ratings of the interior exit stairways, the distance of travel through the stairways to a public way may be included in the greatest distance of travel calculation, especially if the building undergoes extensive renovation. The length of the greatest distance of travel and the occupancy loads of each floor, per occupancy group area, should be verified as part of any future renovation plan.

The fire rating of the doors to the interior exit stairways is unknown. According to Section 1022.2 of the IBC (2012), enclosures for interior exit stairways and ramps shall be constructed as fire barriers in accordance with Section 707. The interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Interior exit stairways and ramps shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. The Power Plant Building has 3 stories total, including the basement and sub-basement, and must therefore provide a fire-resistance rating of not less than 1 hour at the interior exit stairways. Further, according to Table 716.5 of the IBC (2012), where fire walls and fire barriers have a required fire-resistance rating of 1 hour, the minimum fire door and fire shutter assembly rating is 1 hour. We assume that the interior exit stairways meet the code requirements but were unable to confirm the fire-resistance ratings.

The exit sign above the door to the west stairway at the Basement Floor was observed to be unilluminated at the time of the site survey visit (see Fig. 2.1.B.2). According to Section 1011.3 of the IBC (2012), exit signs shall be internally or externally illuminated at all times.

There was a chain observed to be hanging down into the clear floor space near an emergency exit door (see Fig. 2.1.B.3). This chain presents a potential life safety hazard to occupants passing by.

Fig. 2.1.B.2 Unilluminated exit sign observed to the door of the west stairway at the Basement Floor.

Fig. 2.1.B.3 A chain observed to be hanging down into the clear floor space near an emergency exit.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Verify the fire-resistance ratings of occupancy separations and upgrade as necessary.
- Verify the fire-resistance ratings of the existing interior exit stairways and doors and upgrade as necessary.
- Verify the longest common path of egress travel, the greatest distance of travel, and the occupancy loads of each floor per occupancy group area and per current floor plan layouts.
- Repair or replace any exit signs or related power source components as necessary to ensure that all exit signs comply with code requirements.
- Provide illuminated exit signage per code requirements where not provided.
- Remove the chain hanging down into the clear floor space near the emergency exit as noted above.

Fire Suppression Systems

The Power Plant Building is not equipped with an automatic sprinkler system.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- If any amounts of hazardous materials exceed the exempt amounts outlined by the IBC (2012), within any area of the Power Plant Building, the extra material(s) should be removed. If the material(s) must remain, any areas classified as high-hazard occupancies by the IBC (2012) must be brought into compliance with code requirements.
- Consider installing an approved fully automatic sprinkler system in the

office areas throughout the building, especially if the office areas are to be renovated. Any sprinkler system installation should be sensitive to the historic status of the Power Plant Building.

Stairs and Ramps

There were issues noted with the interior exit stairways. Both the east stairway and the west stairway currently have railing systems on only one side of the stairs (see Fig. 2.1.B.4 and Fig. 2.1.B.5). According to Section 1009.15 of the IBC (2012) and Section 505.2 of ICC/ANSI A117.1 (2003), handrails shall be provided on both sides of stairs and ramps. The east stairway is potentially exempt from code requirements due to the building's historic status and due to the fact that the stairway is open to the entrance lobby and therefore likely contributes to the overall character of the space.

The west stairway was noted to have railings that are too low in height. The top of the railing above the stair nosing is approximately 30 inches (see Fig. 2.1.B.6). According to Section 1012.2 of the IBC (2012) and Section 505.4 of ICC/ANSI A117.1 (2003), handrail height, measured above stair tread nosing, or finish surface of ramp slope, shall be uniform, not less than 34 inches and not more than 38 inches. According to Section 1013.3 of the IBC (2012), required guards located along the open-side of walking surfaces shall not be less than 42 inches high, measured vertically from the adjacent walking surfaces and from the line connecting the leading edges of the tread nosings on stairs. The current railing systems also exceed guardrail opening limitations, easily allowing passage of a sphere 4 inches in diameter (see Fig. 2.1.B.4, Fig. 2.1.B.5, and Fig. 2.1.B.7). According to Section 1013.4 of the IBC (2012), required guardrails shall not have openings which allow passage of a sphere 4 inches in diameter.

It was noted that the guardrails around the cooling tower walkways on the second story roof (see Fig. 2.1.B.8) do not appear to be securely attached. The guardrails move easily, and excessively, when grasped by hand. According to Section 1013.2 of the IBC (2012), guards shall be adequate in strength and attachment in accordance with Section 1607.8.

It was noted that the ladder between the grade-level roof and the first story roof is anchored through a cracking and spalling marble coping block on the outside face of the wall on the west side of the ladder, creating a potential life safety hazard.

Fig. 2.1.B.4 Handrails currently exist on only one side of the stairs in the east stairway and the guardrail openings exceed 4 inches in diameter.

Fig. 2.1.B.5 Handrails currently exist on only one side of the stairs in the west stairway and the guardrail openings exceed 4 inches in diameter.

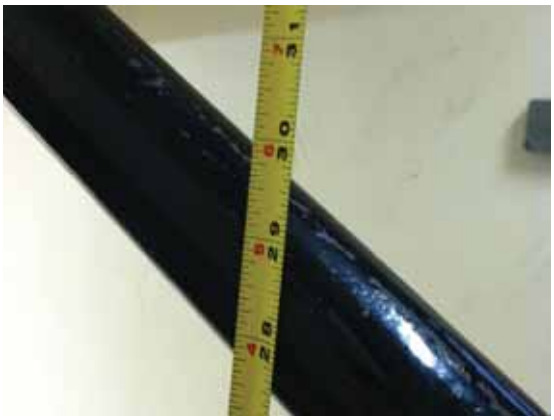


Fig. 2.1.B.6 The height to the top of the railings within the west interior exit stairway.

Fig. 2.1.B.7 The distance between the guardrail openings exceeds 4 inches in diameter along the edge of the east stairway in the entrance lobby on the First Floor.

Fig. 2.1.B.8 The guardrails around the cooling tower walkways at the roof of the second story construction do not appear to be securely attached.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Replace the existing stairway railing systems with new railing systems that comply with code requirements for handrail height, guardrail height, and spacing between guards, if allowed per historic designation guidelines.
- Install a new handrail system along the wall-side of each stair in order to comply with the code requirement that handrails shall be provided on both sides of stairs and ramps.

- Replace or rework the existing guardrail along the edge of the entrance lobby on the First Floor to comply with the code requirements, if allowed per historic designation guidelines.
- Determine the cause of the inadequately secured guardrails around the cooling tower walkways at the second story roof and repair or replace as necessary.
- Repair or replace the cracking and spalling marble coping block at the top of the ladder between the grade-level roof and the first story roof. Reattach the ladder to ensure a secure connection per code requirements.

Doors

The majority of the interior doors throughout the building are equipped with knob-style door handles (see Fig. 2.1.B.9) According to Section 309.4 of the 2003 edition of ICC/ANSI A117.1, the knob-style handles do not meet the requirement that: operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Section 309.4 further states that the force required to activate operable parts shall be 5.0 pounds (22.2 N) maximum. However, these knob-style handles may be exempt due to the building's historic status. Possible non-historic areas of the building, such as the office areas, industrial areas, and exit stairways, should be reviewed and considered for new lever-style door handles.

Fig. 2.1.B.9 Typical knob-style door handle found throughout the building.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Replace all knob-style handles on the interior doors with lever-style handles if allowed per historic designation guidelines.
- If historic designation guidelines prevent the replacement of knob-style handles on the interior doors with lever-style handles, determine if any areas are exempt and could receive accessible door handle upgrades.

Security

It is our understanding that the doors around the exterior of the building remain locked at all times. The Sherman Street Entrance is the main entry to the building and appears to be equipped with a key code entry pad and an intercom system (see Fig. 2.1.B.10). It was reported that the front entrance door and the windows need to be reinforced for security reasons. There is a security device that was noted on the wall in the entrance lobby on the First Floor (see Fig. 2.1.B.11). The overhead rolling door on the south end of the east (front) side of the building appears to be equipped with security devices (see Fig. 2.1.B.12). There is an alarm, labeled as a tank overfill alarm, on the wall to the south of the overhead rolling door.

Fig. 2.1.B.10 The Sherman Street Entrance is equipped with a key code entry pad and an intercom system.

Fig. 2.1.B.11 A security device observed on the wall in the entrance lobby on the First Floor.

Fig. 2.1.B.12 The overhead rolling door on the south end of the east (front) side of the building is equipped with a variety of devices.

2.1-C GENERAL ACCESSIBILITY ISSUES

The Power Plant Building does not provide an accessible means of entering or exiting the building. According to Section 3411.9.3 of the IBC (2012), at least one main entrance to an historic building shall be accessible. There were no accessible restrooms or locker rooms observed during the site survey visit. The drinking fountains observed throughout the building during the site survey visit do not comply with accessibility requirements (see Fig. 2.1.C.1 and Fig. 2.1.C.2). No Break Rooms were observed during the site survey visit.

It was reported that a code compliance analysis is on the Capitol Complex list of controlled maintenance projects that need to be addressed.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

Fig. 2.1.C.1 A non-accessible drinking fountain observed in the entrance lobby on the First Floor.

Fig. 2.1.C.2 A non-accessible drinking fountain observed on the Sub-basement Floor.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Provide at least one main entrance to the building that is accessible per code requirements.
- If possible, reconfigure restrooms to provide accessible restroom facilities in the Power Plant Building, including accessible space clearances, a minimum of one wheelchair accessible toilet compartment per restroom, and a minimum of one accessible lavatory, along with other accessibility requirements.
- If possible, replace all non-accessible drinking fountains on accessible routes with accessible drinking fountains.
- If possible, install accessible sinks in any Break Rooms throughout where not provided.

2.1-D ELEVATORS

It was reported that the age of the elevator cab and equipment is unknown.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Verify the age and condition of the elevator cab, electrical, and mechanical equipment to determine if any warranty is still in effect and to develop a timeline for upgrading the system.

2.1-E ENVIRONMENTAL

Based on the construction date of the building, it is possible that surfaces are painted with paint containing lead. It is also possible that asbestos is present in the building, especially considering the presence of asbestos in the Capitol Annex Building which was constructed in conjunction with the Power Plant Building.

Recommendations:

- Sampling for lead paint must be completed if any painted surfaces will be sanded.
- Thoroughly test the Power Plant Building for the presence of asbestos. Abate any asbestos found in the building.

2.1-F PLANNED AND ON-GOING PROJECTS

There are no known planned and on-going architectural projects for the building currently.

2.2 STRUCTURAL

2.2-A EXTERIOR BUILDING ENVELOPE

The building's exterior is showing signs of distress. Some of the veneer tiles are inadequately secured to the building's framing and are loose (Fig. 2.2.A.1). Additional damage may be present behind the panels due to water intrusion and is not readily observable. The condition of the panels also represents a life safety hazard to pedestrians and should be corrected in the near future.

Fig. 2.2.A.1

The connection of the ladder to the stone caps on the north side is not secure (Fig. 2.2.A.2). The stone cap has cracked at the connection, greatly reducing the capacity of the anchor.

Fig. 2.2.A.2

Recommendations:

- Remove the veneer panels that are inadequately attached and allow a structural engineer to observe the condition of the structural framing.
- Remove and replace the stone cap and properly anchor the ladder to the parapet for safe access to the roof.

Items noted above do not pose any structural loading issues based on the current use. Repairs are to maintain performance and reduce further deterioration.

2.2-B BUILDING INTERIOR

The overall condition of the structural framing that was readily observable was good. Minor cracking was observed near the entrance on level one and on the concrete framing at the sub-basement level. The cracks are not a structural concern at this time.

Recommendations:

- Monitor the cracks fro additional movement and deterioration.

Items noted above do not pose any structural loading issues based on the current use. Repairs are to maintain performance and reduce further deterioration.

2.2-C FALL PROTECTION

Inadequate parapet heights were observed adjacent to the loading dock and the upper roof levels (Fig. 2.2.C.1). Parapets should be at least 42

inches tall or fall protection provided for access near the exposed edges to meet current safety codes.


Fig. 2.2.C.1

The guardrails around the cooling towers are inadequately attached to the steel framing (Fig. 2.2.C.2). The posts are attached to a thin edge angle with very little weld. Excessive movement of the guardrails was observed with a minimal amount of lateral force.


Fig. 2.2.C.2

Recommendations:

- Design and install fall protection systems for safe access near exposed edges.
- Remove the existing guardrails and reattach to the steel beam below with an adequate connection.

2.2-D PLANNED AND ON-GOING PROJECTS

N/A

2.3 CIVIL

2.3-A EXTERIOR BUILDING ENVELOPE/SITE

General

The Power Plant site is located midblock of Sherman Street, between East 13th Avenue and East 14th Avenue with an address of 1341 Sherman Street in Denver, Colorado. The building is bordered by the State Capitol Annex to the north, a parking lot and the Centennial building to the south, a parking garage to the west and a multi-family residential complex to the east. The Power Plant site is approximately one-quarter acre. The existing site consists of the building, a fenced utility yard, and street right-of-way including sidewalk and landscaping. The main building entrance is accessed from Sherman Street (Fig. 2.3.A.1). The site is connected to the Capitol Annex via underground tunnels. The site surrounding the building is consistent with a building approximately 70+ years old.

NOTE: Descriptions of existing infrastructure contained herein are based on public utility information provided by the City and County of Denver. Unless noted otherwise, no detailed survey information was reviewed as part of this site analysis. Estimates of drainage patterns, site grades, and slopes are based upon visual observation or information provided by others, i.e. Google Earth, Denver GIS, etc.

Figure 2.3.A.1 – Power Plant Sherman Street Entrance

Grading and Drainage

The site slopes generally from east to west at grades ranging from 1-2%. The high point of the site is on the east side at the main entrance door. The

site slopes east towards Sherman Street at approximately 1%. Existing runoff is generally conveyed overland from the site towards Sherman Street. Runoff is collected by area drains within the utility yard (Fig. 2.3.A.2) and by street inlets at the intersections of E. 14th Avenue and Sherman Street and E. 13th Avenue and Sherman Street.

The Sherman Street entrance is accessed via steps (Fig. 2.3.A.3). There is also a gated entrance into the utility yard (Fig. 2.3.A.4). The building is set back from the public sidewalk and treelawn (Fig. 2.3.A.5). Landscaped areas are generally flat containing grass, established trees and bushes.

The foundation of the building appears to be stable. Building settlement was not observed.

Figure 2.3.A.2 – Area Drain in Utility Yard

Figure 2.3.A.3 – Sherman Street Entrance Steps

Figure 2.3.A.4 – Utility Yard Gated Entrance

Figure 2.3.A.5 Sherman Street ROW including Sidewalk and Treelawn, looking South

The site is located in the Denver Storm Drainage Master Plan Basin 4600-01 (Central Business District). This basin consists of 2.67 square miles and conveys the 2, 5, and 100 year storm event via both storm sewer and roadway conveyance. Runoff from the major basin is conveyed westerly to Cherry Creek, ultimately discharging to the South Platte River. Within this basin, storm sewer facilities typically are designed to convey the 5-year rainfall event at a minimum and it is assumed the same for this area of the City.

The effective Flood Insurance Rate Map (FIRM Map Number 0800460201G, effective date November 17, 2005) shows the property lies within Zone X, areas designated as outside of the 500-year floodplain. To our knowledge, there are no known existing flood control problems or drainage issues.

Utility Services

The building utility demands are unknown at this time. There are multiple utility lines located nearby within the public streets. There is a water main within E. 14th Avenue that is 8" in size. There is a 10" water main within Sherman Street and a 12" water main within E. 13th Avenue. The building service line appears to connect to the 10" main within Sherman Street. There are two fire hydrants near the site, one located at the intersection of E. 14th Avenue and Sherman Street and one at E. 13th Avenue and Sherman. There are no known water pressure problems at this time.

The building is served by a sanitary service line connecting to a 9" sanitary sewer main line within Sherman Street. This sewer is routed northerly at a 0.79% slope and connects to a 12" sanitary sewer main within East 14th Avenue. There are no known sanitary sewer capacity problems at this time.

The existing storm sewer within E. 14th Avenue is quite small at 12" in diameter. The line begins in an alleyway east of Sherman Street, collecting runoff from local drains. The line then turns west within E. 14th Avenue and collects the runoff from the inlet located at the southeast corner of Sherman Street and E. 14th Avenue. This storm sewer is part of the West 14th Ave Extension line that is planned to be upsized per the City and County of Denver Master Plan dated June 2009. The upsizing will provide 5-year capacity in the storm sewer. The line at Sherman Street is planned to be upsized to 18" but it is unknown when these improvements will be constructed.

There is also a 12" storm sewer line within E. 13th Avenue that is routed westerly. This line collects runoff from an inlet at the northeast corner of E. 13th Avenue and Sherman Street. This storm line is part of the West 13th Ave Extension line that is also planned to be revised per the City and County of Denver Master Plan. This line will route runoff through East 13th Avenue that is currently transmitted through Grant Street. Storm sewer in this line will be upsized to 60" storm sewer and up to 72" storm sewer west of Broadway and will relieve the Grant Street storm sewer system. Similar to the West 14th Ave Extension line, it is unknown when these improvements will be constructed. Runoff from both the E. 14th Avenue line and the E. 13th Avenue line is ultimately is discharged to Cherry Creek.

There is no storm sewer within Sherman Street. It is unknown where the area drains in the fenced utility yard connect to storm sewer. No daylight locations were observed. It is assumed this drainage is routed through the building and may drain to sanitary sewer.

Existing dry and regulated utilities (electric and telecommunications) are

assumed to be located in E. 14th Avenue (Fig. 2.3-7). It was reported that the boiler area is leased to Xcel and is part of their downtown steam loop. It was also reported that the main chiller supplies the Capitol Complex chiller loop and it is in need of upgrades.

Recommendations:

- Upgrade chiller loop.

Site Paving

The site paving is generally in good condition. A few locations of broken concrete and concrete cracking was observed. Repair or replace broken or cracked concrete.

Figure 2.3.A.6 Site Concrete Crack

Figure 2.3.A.7 Site Concrete Crack

Figure 2.3.A.8 Crack in Entrance Step, Recommended for Repair or Replacement

Recommendations:

- Cracks approximately 1/8" wide or smaller showing no differential movement can be sealed using an approved joint sealant. Cracks should be routed and cleaned per an approved industry method prior to sealing.
- Concrete panels showing numerous excessive cracking and/or differential movement should be replaced.
- Replacement shall be completed in full stone segments, i.e. to the nearest joint location. Repair the subgrade materials and place new curb & gutter or sidewalk. Replace backfill materials and repair/ replace any landscaping/paving disturbed during repair operations.

2.3-B CODE ISSUES

The site exterior was analyzed for general conformance with ADA; however a complete accessibility audit is not included in the scope of services. The site does not appear to comply with current standards since the entrance is accessed via stairs. At a minimum, a ramp entrance would need to be installed for the building to become ADA compliant.

Site slopes were analyzed by visual inspection and topography provided by the City and County of Denver for drainage and ingress and egress.

The landscaped areas surrounding the building are generally flat. Current geotechnical recommendations and standard practice for slopes away from the building are 10:1 for 10 feet and 2% in hardscape areas. The building does not appear to have these slopes but no severe impacts were noted. If new problems are observed, landscaped areas should be re-graded to provide slope away from the building and area drains should be installed.

Recommendations:

- Install a handicap ramp to the building entrance.
- Re-grade landscaped areas for current geotechnical recommendations for slopes away from the building.
- Install area drains where proper slopes away from the building cannot be met.

2.3-C PLANNED AND ON-GOING PROJECTS

There are no known site planned and on-going projects at this time.

2.4 MECHANICAL, ELECTRICAL, AND PLUMBING

2.4-A OVERVIEW OF EXISTING SYSTEMS

ELECTRICAL SYSTEMS

The Power plant building appears to have been built around 1920's. The medium voltage switch is located in the basement room next to the medium voltage transformer and the 480V main gear (see Fig. 2.4.A.1). Feeding the main gear is a 25+ year old 1500kVA transformer which feeds the 2500A, 480/277V main distribution panel. The basement has several 480/277V panelboards and 208/120V panelboards.

In the sub-basement there are panelboards and transformers feeding motor loads (see Fig. 2.4.A.2). On the first floor there are panelboards and transformers feeding office loads.

There is also another medium voltage switch that feeds the judicial building transformer (see Fig. 2.4.A.3). This switch appears to be less than 10 years old.

Fig. 2.4.A.1 – Medium voltage switchgear

Fig. 2.4.A.2 – Panelboard and transformer

Fig. 2.4.A.3 – New medium voltage switchgear serving judicial building

Recommendations:

- The main electrical switchgear sections that are 25+ years old should be tested to see if they are working properly. If they are not working properly, they will need to be replaced.
- All panelboards past their useful life should be replaced including the wire feeding the panelboard for the main source.
- This building needs an electrical renovation project. All electrical equipment that is 30+ years old should be replaced including the main gear, transformers, panelboards, switches, wire, receptacles, and lighting.

Lighting

The lighting fixtures are a combination of linear T8 fluorescent fixtures and historical fixtures in the mechanical rooms and office areas. Most of the fixtures are in poor shape and some have been damaged (see Fig. 2.4.A.4 and Fig. 2.4.A.5). Lighting is not uniform in the mechanical spaces. If task lights are used to work on the equipment, lower light levels are acceptable.

There are not many lighting controls in the spaces. Some of the light fixtures appear to be on all the time because the switches are not located near an exit door.

Most of the emergency lighting appears to be emergency ballast in the fixtures and exit signs are located throughout.

Some of the exterior lighting appears to be less than five years old (see Fig. 2.4.A.6).

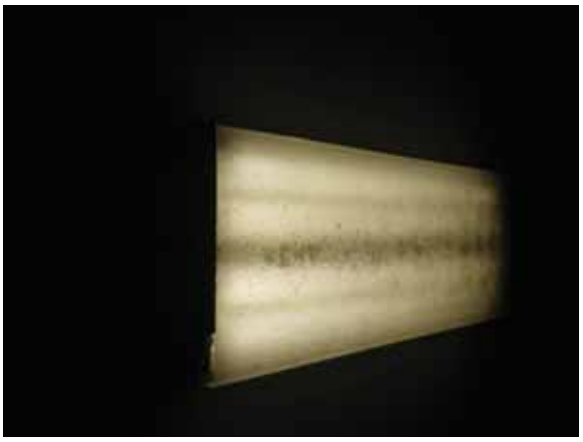


Fig. 2.4.A.4 – Fluorescent light fixture

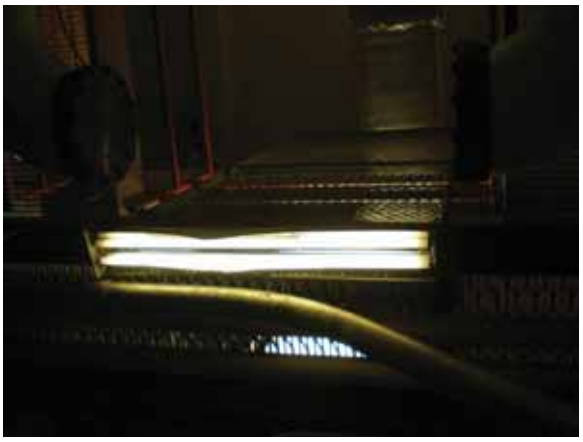


Fig. 2.4.A.5 – Damaged fluorescent light fixture

Fig. 2.4.A.6 – Exterior light fixture

Recommendations:

- Replace existing damaged lighting fixtures with new ones. Since this is a low priority building for lighting, T8 fixtures are the low-cost option. LED fixtures would help reduce maintenance cost but are initially expensive.
- More lighting fixtures are needed in the areas that are not uniform. The light fixtures for this space could be replaced with either new T8 fluorescent or LED fixtures. The advantage of the LED fixtures is their long life and low maintenance cost. LED fixtures are more robust than T8 fixtures and would survive the environment better. In the mechanical spaces, an average of five to ten foot candle levels is acceptable. In the office spaces, 30 foot candle levels are recommended.
- More lighting controls are required. Motion sensors are not recommended in mechanical spaces but in the office spaces, they would help decrease energy use.

Fire Alarm

The building does not appear to have a full detection fire alarm system.

Recommendations:

- A full detection fire alarm system should be installed to prevent a fire from spreading too far prior to being detected.
- A new fire alarm system with full detection and notification needs to be installed.

General Power

Receptacles in the office spaces appear to be in good condition but could be replaced in a major remodel. The receptacles in the basement and sub-basement spaces are in bad condition.

Recommendations:

- Replace all of the 25+ year old receptacles and wire from associated panelboards. This can be done over time as the spaces are renovated.

Emergency Power

The generator feeding some loads in this building is located to the west of the building. It also feeds the building next door. In this building it feeds a 225A, 208/120V panelboard. This panelboard feeds many command center receptacles, heaters, UPS system, and other loads for the Command center. All life safety equipment is backed up by battery.

MECHANICAL SYSTEMS

The power plant building houses a central chilled water plant that serves other buildings surrounding the central plant. The chiller plant consist of one 800 ton capacity York centrifugal chiller, one 650 ton capacity Trane absorption chiller, two Marley cooling towers located on the roof, two flat plate heat exchangers, each with 650 ton capacity, and a chilled water and condenser water pump. Also located within the chiller plant are two AERCO condensing boilers and hot water pumps. One DX roof top unit with electric heat, located on the roof near the cooling tower, serves the office areas on the first floor.

The absorption chiller is not in use due to high operational costs. Plans are underway to demolish the unit and install another centrifugal chiller. The chilled water distribution is a variable primary flow system. The water side economizer (flat plate heat exchanger) is used whenever the outside air temperature is 70 degrees F or below. The York chiller appears to be in good working condition. The pumps and cooling tower also appear to be in good working condition. Scaling was noticed on cooling tower fin material (see Fig. 2.4.A.8). Chilled water piping insulation is damaged at some locations which should be repaired (see Fig. 2.4.A.10).

The boilers are approximately three years old and appear to be in good working condition. Hot water distribution is a primary secondary variable flow system. The boiler plant provides heating hot water to another building.

The controls are Siemens direct digital controls. It was indicated that energy saving control strategies such as supply water temperature reset, variable flow, and free cooling from cooling tower are being implemented.

Most motors have VFDs which help with energy efficiency (see Fig 2.4.A.7).

The openings around the pipes passing through the fire rated walls are not sealed (see Fig. 2.4.A.9).

Fig. 2.4.A.7 – VFD for chilled water pump motor

Fig. 2.4.A.8 – Tower fill material

Fig. 2.4.A.9 – Openings around the pipes not sealed

Fig. 2.4.A.10 – Damaged insulation at pump fittings

Recommendations:

- There was a chemical odor in first floor lobby. Verify the ventilation and exhaust system for the building. Maintain mechanical areas at a slightly negative pressure than the office and lobby areas.
- The refrigerant leak detection system appears to be off. There was no horn and strobe connected to the system. Verify the operation of the leak detection system and ensure its operation is to code.
- There was no EPO switch for the mechanical room. Provide an EPO switch to turn off the equipment during an emergency event.
- Abandoned steam PRV's may be demolished and removed from mechanical room.
- There is no man cage provided for ladder for the roof. This is required per OSHA.
- There is scale on the tower fill material. Consult the manufacturer and ensure that scale deposits are removed. This will increase the efficiency of the tower. Generally, scale deposits can occur due to chemical content in the water; the water quality is not maintained as required. Also, scales and deposits can occur on the fill material if the tower is operated with a water flow less than the manufacturer's recommended minimum flow.
- Seal the openings around the pipes passing through rated walls.
- Provide insulation on the missing pipes.

2.4-B CODE ISSUES

ELECTRICAL CODE ISSUES

The main electrical gear has unsealed holes. It appears some conduit was removed and a knockout seal was never installed (see Fig. 2.4.B.1).

The drip pans above some of the electrical equipment appear to have holes around the conduit that will allow water to pass through into the electrical equipment (see Fig. 2.4.B.2). These holes are required to be sealed.

On the north exterior wall, an electrical device was removed but the conduit and wire is still in place (see Fig. 2.4.B.3). The wire needs to be completely removed back to the nearest junction box and the conduit needs to be sealed or removed. This condition is allowing water to get into the conduit and into the building.

The lightning protection wiring for one of the cooling towers is not connected on either end (see Fig. 2.4.B.4). This is not a violation of code; however, this wire should be removed or attached.

There are a number of holes in fire rated walls that are not sealed properly (see Fig. 2.4.B.5 and Fig. 2.4.B.6). There holes are required to be seal with a fire rated caulk.

The water fountain on the first floor does not appear to have a GFI type receptacle (see Fig. 2.4.B.7). Per the NEC, this is required. This applies to all receptacles within 6 ft. from an open water source.

Fig. 2.4.B.1 – Opening in electrical gear

Fig. 2.4.B.2 – Openings in drain pan

Fig. 2.4.B.3 – Abandoned conduit and wire

Fig. 2.4.B.4 – Lightning protection not connected

Fig. 2.4.B.5 – Openings in fire walls not sealed

Fig. 2.4.B.6 – Openings in fire walls not sealed

Fig. 2.4.B.7 – No GFI protection

Recommendations:

- Provide seals in all unsealed holes in the electrical gear.
- Provide drip pans that are properly sealed above electrical gear that has water above it.
- Remove abandon conduit and wire within the building back to its source.
- Fix any lightning protection that has been damaged or disconnected.
- Provide fire rated caulk in all openings through fire rated walls.
- Provide GFI receptacles for all locations within six feet of an open water source.

MECHANICAL CODE ISSUES

Refrigerant leak detector is not operational.

Ventilation for mechanical room is not provided.

Recommendations:

- Verify leak detector operation and ensure it works as per the code requirement. Also verify exhaust and makeup air fan operation.
- Provide minimum ventilation as per code for the mechanical room.

2.4-C PLANNED AND ON-GOING PROJECTS

Also the chiller loop and cooling towers have been identified as requiring replacement. No date has been established for this work at present.

2.5 VOICE AND DATA

2.5-A OVERVIEW OF EXISTING SYSTEMS

Findings

Note SMW was not scoped for this task, for this building or the remaining building assessments. SMW provided voice/data survey and assessment scope for the Capitol Annex Building (1375 Sherman Street) and the Centennial Building (1313 Sherman Street) only.

Recommendations:

The recommendations and guidelines within this section shall establish the Basis of Design for the IT Infrastructure portion of the renovation of the Power Plant building.

The building should be provisioned with the following pathways, spaces and cable media.

Telecommunications Rooms (i.e. Spaces)

1. Main Equipment Room (MDF) / Entrance Facility Room (EF)

- One consolidated Main Equipment Room (MDF) / Entrance Facility Room (EF) shall be installed within the building.
- This main MDF room will include both the Building Entrance Facility for supporting outside plant cabling and raceways and will be the main equipment room for installation of the low voltage and communications systems' (also referred to as the Technology systems) head end equipment.
- The MDF room shall be a minimum of 12' x 16' in size, capable of supporting the installation of one row of racks, with approximately six (6) equipment racks / cabinets.
- The MDF room shall be installed on the first floor of the building. Avoid the basement due to potential flooding.

2. Telecommunications Rooms (IDFs)

- A minimum of one (1) telecommunications room (i.e. IDF rooms) will

need to be installed on each floor and should be vertically stacked, floor-to-floor. Buildings with larger floor plates may require a 2nd IDF room on each floor, vertically stacked as a 2nd riser within the building.

- The IDF rooms shall be a minimum of 10' x 12' in size, capable of supporting the installation of one row of four (4) equipment racks.

3. Telecommunications Room Locations

- The TIA Standards requires one IDF room per floor and it shall be located as close as possible to the center of the area being served, preferably in the core area.
- Additional IDF rooms are required per floor when the floor area served exceeds 10,000 square feet or the horizontal distribution distance to the field device or telecom outlet exceeds 295 feet (or 90 meters).
- Telecommunications rooms should not share a common wall with an electrical room due to potential electromagnetic interference (EMI) issues. If it is imperative due to constraints to place both of these rooms adjacent, then a double wall with a 1 foot internal separation should be considered or the layout of the electrical room should preclude mounting of equipment on the common wall.

Telecommunications Pathways (i.e. Conduit/Raceways)

1. Backbone Pathways

- Telecommunications pathways will need to be installed from the MDF room to each IDF room within the building.
- Provide a minimum of three (3) 4-inch conduits from the MDF room to each IDF riser within the building.
- Provide a minimum of three (3) 4-inch conduit sleeves vertically between stacked IDF rooms.
- Provide a telecommunications pathway up to the roof of the building to support future satellite antennas.

2. Horizontal Pathways

- Telecommunications pathways will need to be installed from telecom outlets and IP field devices to the IDF room serving the floor.
- Provide cable tray on each floor within the accessible ceiling spaces

of the main corridors as the primary pathways from IDF rooms to telecommunications outlets and field devices.

- Cable tray shall be ladder type aluminum tray with a 9” rung spacing and a width of 18 inches in main corridors and 12 inches in secondary cable tray segments. Cable trays shall be 4 inches in depth.
- For facilities designated as historic buildings, alternate cable routing may require the use of surface mounted conduit and wireways, to comply with historic preservation codes. In these cases, the cable installation design must be coordinated with the State prior to construction.
- At the telecom outlet locations, provide 4” square back boxes that are 2-1/8” deep with a 1” conduit installed within the wall to the nearest accessible ceiling space, for routing cabling to cable tray.
- If outlets need to be surface mounted then provide 1” surface mounted raceway from the back box to the main telecom distribution pathways.

Telecommunications Cabling

1. Telecommunications Backbone Cables

- Furnish and install a 24-strand singlemode fiber cable and a 24-strand multimode fiber cable from the MDF room to each IDF room in the building. The multimode fiber cable will be OM4 50 micron laser optimized optical fiber.
- Install fiber optic cable in a 1-1/4” innerduct end to end.
- Furnish and install a 50-pair or 100-pair copper backbone cable from the MDF room to each IDF room in the building.

2. Telecommunications Horizontal Cabling

- Furnish and install a Category 6 unshielded, twisted pair (UTP) horizontal cable from telecom outlets and IP field devices to termination hardware in the IDF rooms.

3. Cabling within Single Occupancy Offices

- Provide a minimum of two telecommunications outlets, located on opposite walls, each with two data jacks. Install two Category 6 horizontal cables to each outlet from the IDF room serving the area.

4. Wireless Access Points (WAPs)

- For ceiling mounted WAPs, install two Category 6 horizontal cables to each WAP from the IDF room serving the area.
- Provide WAPs at 20 – 45 spacing or approximately at 25-foot centers on each floor, mounted in accessible ceilings.

2.5-B CODE ISSUES

Findings

It is our understanding there are currently no code issues in the building related to the existing voice/data IT/Telecommunications Infrastructure.

Recommendations:

For new renovation work, codes that would be applicable would include but may not be limited to:

- International Code Council (ICC)
- National Electrical Code (NEC)
- Telecommunications Industry Association (TIA)
- Electronic Industries Alliance (EIA)
- Institute of Electrical and Electronics Engineers (IEEE)
- American National Standards Institute (ANSI)
- Underwriters Laboratories (UL)
- State/Local Governing Authorities Having Jurisdiction

2.5-C PLANNED AND ON-GOING PROJECTS

It is our understanding there are no known planned and/or on-going IT/ Telecommunications Infrastructure projects for the Power Plant building currently.

2.6 SECURITY SYSTEMS

2.6-A OVERVIEW OF EXISTING SYSTEMS

Findings

Note: SMW not scoped for this task, did not provide survey work for Security.

It was reported that the doors and windows should be reinforced with security rated enhancements. It was also reported that Hirsch access control card readers need to be upgraded.

For general security findings, see 2.1-B Code Issues: Security.

Recommendations:

The security systems design guidelines outline electronic security systems infrastructure which would enhance security operations and provide a safe and secure environment for persons and assets within the Power Plant building. The purpose of this recommendations report is to provide a description of electronic security system parameters which would provide a safe and secure environment for all those persons and assets within the facilities. It is intended to provide valuable information to both technical and non-technical readers for ongoing coordination with security program requirements.

The security systems should be planned and designed to allow the security personnel the operational flexibility to provide various levels of security based on the threat level at a given time. The systems must further provide capability to deliver the highest quality technology today and in the future for system expansion and change. Security system design shall employ various security technologies. Integrated security systems must be capable to function independently if required, as well as be monitored and controlled from CSP Central Command Center.

Recommended electronic security systems to be considered for implementation and/or upgrade include access control, intrusion detection, duress alarm, intercom, video surveillance, and emergency call system. These applications make it possible for security personnel to view activity both inside and outside the facilities from a central monitoring location or a network-connected security workstation at another location, so they

can provide an appropriate response. Care shall be taken to ensure that interior and exterior common circulation areas accessible to both staff and public will be properly monitored. Electronic security control and monitoring applications shall be implemented as appropriate to provide a safe and secure environment to the facility as a whole. This report is not designed as a specification, but rather as an outline to provide information on recommended security systems technology and design criteria.

The following security design methodologies, criteria and guidelines should be considered and used in development of the security program and physical/electronic security design for the building:

- Industry Standard / Best Practice Design
- Crime Prevention through Environmental Design (CPTED)
- Layered Security / Concentric Circles of Protection
- Integrated Design – Physical/Electronic/Operational
- ASIS Facilities Physical Security Measures
- IESNA G-1-03 Guideline for Security Lighting
- Unified Facilities Criteria UFC 4-010-01
- State of Colorado Design Standards, as applicable

The access control system (ACS) will be an expansion of the existing campus wide system currently installed throughout other State buildings, and utilize similar ACS door controllers and peripheral equipment. New proximity type card readers shall operate with the existing proximity card credentials. Door devices are to wire through a consolidation junction box above door, and be routed to nearest IDF room where door controllers and power supplies are located. ACS door controllers installed in telecommunications IDF rooms will connect to the buildings LAN for communication with the ACS server. New security equipment to be located within IDF rooms must be coordinated with State IT technical staff. Each access controlled door should be equipped with card reader, electrified lock, door position switch, and request to-exit-motion device (or hardware integral request-to-exit switch). All doors described as a card reader controlled access door will be outfitted with the standard equipment listed, unless specifically defined elsewhere to vary from this configuration. It is recommended that for new controlled doors, magnetic locks and electronic strikes not be used. Electrified lever sets and panic hardware

should be equipped with request-to-exit switch in exit hardware. Specific door hardware requirements for each controlled door location are to be coordinated with the State. The ACS shall also serve as the primary security management system for monitoring intrusion alarms. Intrusion alarms such as door status and motion detection alarms are to be integrated with and monitored through the access control security management system. Alarm device additions and modifications shall be coordinated with State during the design phase. Security personnel shall be able to monitor security system alarm notification devices through network connected client workstations, where authorized.

The video surveillance system (VSS) will implement IP digital HD type cameras integrated with the existing VSS. Where analog head-end equipment is located, IP camera digital signals are to be decoded to analog video signal. This will allow for future migration from any older analog equipment to an IP based network video solution. IP security video shall be managed by the existing server/recorders, and new network video recorders are to be installed where required to support the addition of new cameras. It is recommended for renovation work that older technology analog camera be replaced with IP digital security camera, connected to the VSS via building LAN. Security cameras may be made up of both fixed field of view and pan-tilt-zoom (PTZ) type, and should be IP, minimum HD quality, and be Power-over-Ethernet (PoE) devices. Camera network cabling shall pull to nearest IDF room, providing connectivity to the building LAN. IP camera network cabling shall terminate to building PoE network switches. Security personnel shall be able to monitor the security video surveillance system through network connected client workstations, where authorized.

The State's existing wireless duress alarm system infrastructure should be expanded where needed to support new locations of wireless duress buttons. CSP Central Command Center monitors a wide network of wireless duress buttons at multiple, local State facilities in Denver. This is accomplished using wireless mesh coverage by use of repeaters located on the State facilities. Fixed point wireless duress buttons may be located at designated points within the building, for staff use in emergency situations. The duress system will utilize wireless duress buttons, which transmit RF signals to an infrastructure of wireless RF receivers and repeaters. System repeaters will be provided where necessary to boost the strength of the wireless signals. Duress alarms in the building are to incorporate this technology, and duress alarms within the complex will be monitored by the existing CSP head-end system.

An Intercom Communication System (ICS) should be implemented to

enhance security operations in the facility, for security personnel, staff and visitors. It is strongly recommended that an Intercom over IP (IoIP) Communications solution be used for this application. And IoIP system would provide superior audio quality utilizing the latest digital technology, and provide much greater flexibility for locating both master and sub-stations anywhere on the local area network via IP communications. Security personnel in CSP CCC would be provided with two-way audio communications to any remote building IP intercom sub-station.

Within the building, new head-end security control equipment is to be located in IDF or technology rooms, as coordinated with State IT technical staff. Equipment may include ACS control panels, power supplies, duress alarm panels, network video recorders, and UPS units. All critical electronic security equipment must be backed-up with emergency power circuits or UPS units. State security personnel and other authorized staff may remotely monitor access control events, system alarms, and security video through network connected client workstations. For building renovation work, requirements for security device additions/upgrades and specific security system functionality are to be coordinated with State security personnel during design and construction phases.

The security systems described above are generally controlled and monitored centrally, primarily from Colorado State Patrol's Central Command Center (CCC), located in Denver CO. The above listed security applications must be evaluated during renovation project schematic design phases to confirm applicability to the most current State electronic security systems standards. For any renovation work, security contractors should be pre-qualified prior to bidding, and will be required to work very closely with State security personnel during installation, commissioning and testing phases. All security installation work, construction standards, and operation requirements are to be closely coordinated with the State by the electronic security integrator.

Electronic security systems provided for the Power Plant building shall be an extension of existing State facility security system infrastructure, as described earlier in the report. It is generally recommended that the building be provided with electronic security applications and equipment as listed below:

Access controlled doors:

- Main entry

- Suite entries on each floor
- IDF rooms, recommended
- Sensitive spaces

Intrusion alarms:

- Access controlled doors
- Emergency egress only doors
- Perimeter doors

Intercom stations:

- Main entry, recommended
- Receiving dock door, recommended

Wireless duress alarms:

- Public interface counters
- Cash handling locations
- Loading docks

Video surveillance cameras:

- Perimeter entry/exit doors
- Entry lobby/reception
- Elevator lobbies
- Emergency exit doors
- Loading docks
- Building exteriors

Security system cabling should generally share cable routes with that of the building structured network cabling system. The network cabling paths and

riser locations generally provides the most direct route through a facility, and typically contain sufficient space for security cabling requirements. For facilities designated as historic buildings, alternate cable routing may require the use of surface mounted conduit and wireways, to comply with historic preservation codes. In these cases, the cable installation design must be coordinated with the State prior to construction. Data cabling required for IP security cameras should be provided and installed by the Telecommunications Contractor. This is the recommended design and construction method for provisioning of the IP camera network cabling to support the VSS cabling infrastructure. State IT construction standards for network and security cabling types and jacket color must be adhered to. Security cabling should never be exposed and should be contained in protective conduit wherever cable is accessible to vandalism, accidental damage, or where it traverses any unsecured space. Security cabling shall be plenum rated where required by codes.

The security conduit pathway system should be coordinated with the electrical distribution system in order to maintain separation from motors or transformers, separation between parallel runs of telecommunications and electrical cabling, and separation from fluorescent lights.

Basic Security Conduit requirements:

- All security cabling located in in-accessible spaces shall be installed in conduit.
- All exposed security system cabling and shall be installed in conduit.
- All security system conduits shall be minimum ¾" unless otherwise required.
- All penetrations of rated walls shall be fire-stopped in an approved manner to prevent the passage of flame, smoke, and gas.

Head-end security control equipment shall generally be located in Intermediate Distribution Frame (IDF) rooms, or other technology rooms. Security equipment locations within IDF rooms must be coordinated with State IT technical staff during design phase. This equipment may include access control panels, wireless duress equipment, power supplies, network video recorders, and UPS units. Specific requirements and locations within the rooms will be determined during the design phase. Security cabling within IDF rooms shall be piped to wire gutters and or security equipment panels. Within IDF rooms, it is anticipated a 4'x8' section of wall space shall be reserved for security equipment, and supplied with fire

treated plywood backboard. All security equipment in the room should be located away from potential sources of electro-mechanical interference (EMI) and water infiltration. Rack mounted security equipment may share space in telecommunication equipment racks, where appropriate, and as coordinated State IT personnel. One dedicated 120VAC 20A power circuit shall generally be required at each security wall board location and at each security equipment rack. In the event of loss of building power, all mission critical electronic security equipment requiring continuous 120VAC power shall be provided with back-up UPS units. All UPS units shall be stand-alone units dedicated for security, and shall be sized accordingly based on required run time.

2.6-B CODE ISSUES

Findings

It is our understanding there are currently no code issues in the building related to existing electronic security systems.

Recommendations:

For new renovation work, codes which would be applicable would include but may not be limited to:

- International Code Council (ICC)
- Americans with Disabilities Act (ADA)
- National Fire Alarm and Signaling Code (NFPA 72)
- National Fire Protection Association Life Safety Code (NFPA 101)
- National Electrical Code (NEC)
- Telecommunications Industry Association (TIA)
- Electronic Industries Alliance (EIA)
- American National Standards Institute (ANSI)

- Underwriters Laboratories (UL)
- City of Denver Access Control Code
- State/Local Governing Authorities Having Jurisdiction

2.6-C PLANNED AND ON-GOING PROJECTS

It is our understanding there are no known planned and/or on-going Security System projects for the Power Plant building currently.

3.0 FLOOR-BY-FLOOR ASSESSMENT FINDINGS AND RECOMMENDATIONS

3.0-A HISTORIC OVERVIEW

Introduction

The State Capitol Complex Power Plant Building, located at 1341 Sherman Street, is listed on the National Historic Register of Places (#5DV3844, NR 6/24/91) along with the Annex Building directly to the north. The building is also listed as a contributing resource in the Civic Center National Historic Landmark District (#5DV161, NHL 10/17/2012). The building was constructed in 1939 and continues to serve the original function of a boiler plant. Due to the historic value and importance of this resource, the following narrative provides a process for maintaining the historic character of the building, while allowing for an upgrade to the building as a whole and a framework for how to utilize valuable space within the building.

This narrative is broken into two basic sections:

- Character defining elements – those aspects of the building that make up the overall historic "impression" of the building.
- Treatment Zones – areas of the building that should be rehabilitated to their historic appearances.

The purpose of the narrative is to provide a guide for how to approach the redevelopment of the building at a master planning level. The understanding is that no major change of use is anticipated for this space. If the building is to be changed to a non-industrial use, a more in-depth investigation into the interior space should be conducted to determine how that change would impact the historic open spaces and fabric of the building.

Character Defining Elements

The character defining elements on the exterior of the Power Plant Building are height, size, materials, fenestration pattern and massing. These

elements all contribute to the overall impression of the building. On the main elevation, the sides of the Power Plant Building are stepped back in a manner that complements the massing of the Annex Building. Materials play an important role in defining the character of the building and the important materials on the exterior are the white marble, granite, terracotta, brick and concrete. The bronze and glass door at the main entrance is and the original steel windows contribute significantly to the overall composition of the elevations. Though this building is an industrial use within the Capitol Hill area, due to its design it fits in well with the surrounding buildings.

The important aspect of the interior of the building is the open nature of the majority of the space which should be maintained.

Treatment Zone 1 – Exterior Facade

Description:

The two story Power Plant Building with a basement and sub-basement below it faces east onto Sherman Street. At Sherman Street, the structure is set back from the public sidewalk grass is growing in this area and shrubbery is growing adjacent to the south elevation. The main entrance has a concrete sidewalk connecting it to the public sidewalk and a short set of granite steps that lead up to the door. The area to the north, between the Power Plant Building and the Annex, is a slightly raised area that covers the basement connection between the buildings. An iron fence set flush with the edges of the Annex and Power Plant spans the edges of the roof between the two buildings. An asphalt paved area is adjacent to the south elevation. A brick retaining wall that continues from the Annex Building extends across the west elevation.

The Power Plant Building is characterized by smooth marble cladding capped with Art Deco detailing at the parapet and a granite base at the first floor and terracotta cladding at the second floor.

The east, main, elevation has a smooth granite base below smooth marble cladding capped by scalloped detailing below the simple block parapet. This elevation is stepped slightly back on each end where doors are located. The building entrance is located at the north end of the elevation and the entry door is composed of bronze and glass and set in a bronze frame. The granite base and marble are curved at the edge where the stone opens back and transitions to a marble surround with light fixtures mounted in the soffit above the door. An overhead garage door is located at the south end of the elevation. Between the two doors, windows are spaced along the elevation and recessed from the face of the marble. The recessed second floor is clad in white terracotta that matches the size and rhythm of the marble cladding at the first floor. Instead of scallop detailing, the top level of terracotta has folded plate fluting.

The granite base and marble cladding capped with the scallop detailing wrap around the corner to the south elevation and continue for about the first third of the elevation. At that point, the granite base transitions to concrete, the marble cladding switches to brick and the scallop detailing is continued in terracotta blocks. The cladding on the second floor also transitions to brick from the terracotta in this same location though the terracotta parapet and cap with folded plate fluting continue across the whole elevation. Windows are recessed from the face of the building and louvered openings are spaced across the brick clad portion of the elevation. A tall metal smokestack rises from the southwest corner of the building.

The west elevation matches the west end of the south elevation with tan brick cladding capped with a scalloped concrete parapet at the first floor level and terracotta folded plate fluting at the second floor parapet. The southwest corner has terracotta quoining along it. Due to the alley along the west elevation, the basement wall is exposed and visible and it is also clad with tan brick. Horizontal terracotta spandrel panels at each floor level span between the large rectangular steel windows. At the north edge of this elevation, a red brick wall extends north and connects the basement levels of the Power Plant and Annex.

The north elevation has the same detailing as the east – granite base, smooth marble cladding with scalloped detailing below the simple cornice. Window openings are square punched openings with the windows set back

from the face of the stone.

The building has the original metal windows. At the first floor the majority of the windows on the south, east and north elevations are rectangular double hung metal windows. The first floor west elevation and all second floor elevations have metal industrial sash windows typically with wire glazing. The larger windows generally have an operable sash that opens horizontally on a center pivot and the smaller windows are casements.

The building retains the original form, massing and detailing of the 1939 design with very little change to the exterior facade. The stone veneer, although dirty, is in excellent condition with little or no damage to the stone itself.

Recommendations:

- The exterior facade remains in its original historic condition, has been relatively well-maintained over the years and is the most publicly viewed and recognizable portion of the building. The facade consists of historic fabric and the exterior character of the building has been maintained. Therefore, the exterior should be restored.
- In general the exterior facade is in good condition though dirt has accumulated on all of the elevations. The building should be cleaned with a cleaner that is appropriate for granite, marble, terracotta and brick. Some of the mortar is failing or has been improperly pointed in places and should be repointed with an appropriate mortar that matches the composition of the original. Stone that is cracked should be repaired or patched. Chips in the terracotta should also be repaired and any loose tiles should be resecured.
- The windows are generally in good condition, though there are a few cracked panes which should be replaced in kind. If storm windows are desired, removable storm windows should be installed on the interior of the openings with gaskets throughout and attached to the walls, not the windows frame.
- All work should be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties and NPS Preservation Briefs.

Zone 1 Exterior Facade: East elevation

Zone 1 Exterior Facade: Main entrance

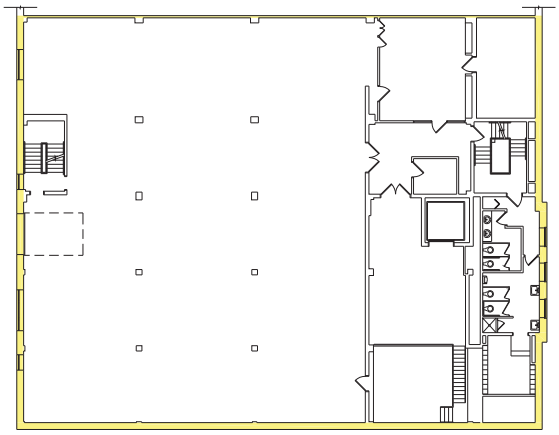
Zone 1 Exterior Facade: South elevation

Zone 1 Exterior Facade: Operable second floor metal windows

Zone 1 Exterior Facade: West elevation

Zone 1 Exterior Facade: Steel windows on the west elevation

Zone 1 Exterior Facade:
North and east elevations



1 BASEMENT ZONING PLAN
1/32" = 1'-0"

LEGEND

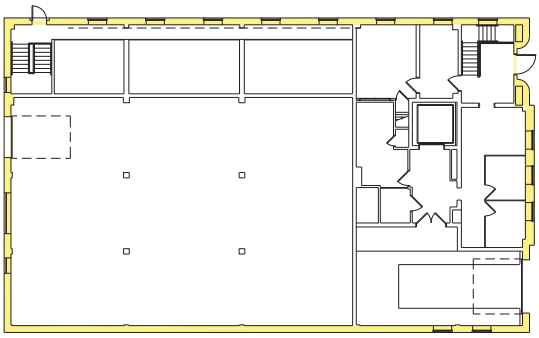
Exterior Facade

Project No.	2013490
Issue	ZONING PLAN
Date	02.17.2014
Drawn by	DCA
Checked by	DCA
Scale	1/32" = 1'-0"

Capitol Complex Master Plan
Power Plant Building
1341 Sherman Street, Denver, CO 80203

Anderson Hallas Architects, PC

Sheet No.
A1.0



1 FIRST FLOOR ZONING PLAN
1/32" = 1'-0"

LEGEND

Exterior Facade

Project No.	2013490
Issue	ZONING PLAN
Date	02.17.2014
Drawn by	DCA
Checked by	DCA
Scale	1/32" = 1'-0"

Capitol Complex Master Plan
Power Plant Building
1341 Sherman Street, Denver, CO 80203

Anderson Hallas Architects, PC

Sheet No.
A1.1

3.1 FINDINGS AND RECOMMENDATIONS

3.1-A CODE ISSUES

See 2.1-B Code Issues

3.1-B GENERAL ACCESSIBILITY ISSUES

See 2.1-C General Accessibility Issues

3.1-C ARCHITECTURAL FINISHES AND INTERIOR COMPONENTS

General Architecture Findings

The Power Plant Building is a rectangular building with office areas on the east side of the First Floor and Basement Floor. The east side of the First Floor houses a division of the State Patrol and includes a grade-level garage space on the southeast side of the building. There is an elevator that serves the building's three floors located roughly in the middle of the State Patrol First Floor office space. The Basement and Sub-basement Floors extend north, past the footprint of the First Floor, and connect to the Capitol Annex Building. The east side of the Basement Floor has office areas, the east stairway, and the restroom facilities for the building. The north side of the Basement Floor, to the west of the front office areas and east stairway, provides a three-story industrial atrium space that serves the building's power plant equipment. The Sub-basement Floor consists of equipment rooms, office areas, workshop space, and storage space. There is a stairway on the southeast side of the building between the Sub-basement and Basement Floors. There is a stairway at the northeast corner of the First Floor that leads to the Basement and Sub-basement Floors. There is an interior exit stairway on the northwest side of the building that leads from the Sub-basement and Basement Floors to the ballasted grade-level roof

between the Power Plant Building and the Capitol Annex Building.

It was reported that the boiler area of the Power Plant Building is leased to Xcel Energy and is a part of their downtown steam loop.

Note: As an historic property, the Power Plant Building should comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and the National Park Service (NPS) Preservation Briefs.

View of the three story industrial atrium space at the Basement Floor, looking east

Ceiling Finishes

The plaster ceiling in the entrance lobby on the First Floor is in generally fair condition overall with general wear-and-tear observed (see Fig. 3.1.C.1).

The offices that were included in the site survey visit had 2x4 acoustic ceiling tiles in generally fair to poor condition with areas of sagging, soiling, and deterioration observed (see Fig. 3.1.C.2).

The open ceilings throughout the industrial areas on the Basement and Sub-basement Floors consist of concrete, steel beams encased in concrete, and areas with exposed steel decking. Cracking and spalling of the concrete was noted at the ceilings and beams throughout (see Fig. 3.1.C.3, Fig. 3.1.C.4, and Fig. 3.1.C.5). There was a deteriorating ceiling access cover noted on the Sub-basement Floor (see Fig. 3.1.C.6). There were areas of exposed metal decks observed throughout the Sub-basement Floor that are partially coated with spray-on fire-proofing (see Fig. 3.1.C.7).

Fig. 3.1.C.1 Wear-and-tear observed at the plaster ceiling in the entrance lobby on the First Floor.

Fig. 3.1.C.2 Generally sagging, soiled, and deteriorating 2x4 acoustic ceiling tiles observed in the office areas included in the site survey visit.

Fig. 3.1.C.3 Cracking, spalling, and other damage of the concrete observed at the ceilings and beams throughout the industrial areas.

Fig. 3.1.C.4 Cracking, spalling, and other damage of the concrete observed at the ceilings and beams throughout the industrial areas.

Fig. 3.1.C.5 Cracking, spalling, and other damage of the concrete at the ceilings and beams on the Sub-basement Floor.

Fig. 3.1.C.6 Deteriorating ceiling access cover observed on the Sub-basement Floor.

Fig. 3.1.C.7 A few spots of exposed beams noted at the areas coated with spray-on fire-proofing throughout the Sub-basement Floor.

Wall Finishes

The plaster and gypsum board walls in the entrance lobby, east stairway, restrooms, and office areas included in the site survey visit are in fair condition overall with general wear-and-tear and soiling noted (see Fig. 3.1.C.8 and Fig. 3.1.C.9). The wainscoting material on the walls of the entrance lobby, east stairway, and Men's Restroom is in fair to poor condition overall with general wear-and-tear and soiling noted (see Fig. 3.1.C.10). The wallcovering on the east wall of the Women's Restroom was noted to be in fair condition overall with general wear-and-tear noted.

The walls throughout the industrial areas on the Basement and Sub-basement Floors consist of concrete, brick, and masonry block. Cracking, spalling, and deterioration were noted at areas of the walls throughout (see Fig. 3.1.C.11, Fig. 3.1.C.12, and Fig. 3.1.C.13). Soiling and water damage were noted at areas of the walls throughout (see Fig. 3.1.C.14 and Fig. 3.1.C.15).

Fig. 3.1.C.8 General wear-and-tear and cracking and spalling of the plaster wall noted in the west stairway.

Fig. 3.1.C.9 General wear-and-tear and soiling noted at the plaster and gypsum board walls throughout.

Fig. 3.1.C.10 General wear-and-tear and soiling noted at the wainscoting in the entrance lobby on the First Floor.

Fig. 3.1.C.11 Deterioration of the brick walls throughout the industrial areas observed during the site survey visit.

Fig. 3.1.C.12 Wear-and-tear and deterioration of the masonry block walls throughout the industrial areas observed during the site survey visit.

Fig. 3.1.C.13 Cracking of the concrete noted at areas of the walls throughout the industrial areas.

Fig. 3.1.C.14 Evidence of water damage observed at areas of the walls throughout the industrial areas.

Fig. 3.1.C.15 Soiling of the south wall due to a leaking pipe observed in the industrial atrium space on the Basement Floor.

Floor Finishes

The terrazzo flooring in the entrance lobby, the entrance hall of the State Patrol office area on the First Floor, and throughout the restrooms is in fair to poor condition overall with general wear-and-tear and soiling noted. There was a cracked portion of the terrazzo flooring observed in the entrance lobby on the First Floor (see Fig. 3.1.C.16). Damage of the terrazzo flooring was also noted in the Men's Restroom.

The carpet flooring observed in the office areas included in the site survey visit is in fair to poor condition overall with general wear-and-tear and soiling noted (see Fig. 3.1.C.17).

The floors throughout the industrial areas on the Basement and Sub-basement Floors consist of concrete in fair to poor condition overall with general wear-and-tear noted. Cracking, spalling, and other damage of the concrete flooring was observed in a number of locations, including the west stairway (see Fig. 3.1.C.18 and Fig. 3.1.C.19). The paint was generally observed to be wearing off of the concrete flooring throughout (see Fig. 3.1.C.20). Soiling and water damage were noted at areas of the concrete floors throughout (see Fig. 3.1.C.21). Standing water was observed at an area of the concrete flooring on the Sub-basement Floor (see Fig. 3.1.C.22). The west stairway was observed to have cracking concrete floors with deteriorating paint and to be generally soiled with dirt and debris, especially at the Sub-basement Floor (see Fig. 3.1.C.23).

Fig. 3.1.C.16 Cracked terrazzo flooring observed in the entrance lobby on the First Floor.

Fig. 3.1.C.17 Worn and soiled carpet observed during the site survey visit.

Fig. 3.1.C.18 Cracked and spalling concrete flooring with worn paint observed during the site survey visit.

Fig. 3.1.C.19 Cracked and spalling concrete flooring with evidence of corrosion.

Fig. 3.1.C.20 Typical condition of terrazzo flooring in restrooms noted throughout.

Fig. 3.1.C.21 Water damage and soiling due to corrosion observed at the concrete flooring.

Fig. 3.1.C.22 Standing water observed at an area of concrete flooring on the Sub-basement Floor.

Fig. 3.1.C.23 West stairway observed to be soiled, with dirt and debris covering the concrete floor and stairs, especially at the Sub-basement Floor.

Other

The doors were observed to have areas of minor damage and general wear-and-tear throughout (see Fig. 3.1.C.24).

Fig. 3.1.C.24 General wear-and-tear noted at the doors.

Recommendations:

- All restoration work should be in keeping with the historic status of the Power Plant Building. See 3.0-A Historic Overview.
- Repaint the ceiling in the entrance lobby on the First Floor and repaint the plaster and gypsum board walls and ceilings throughout, per historic designation guidelines.
- Replace the 2x4 acoustic ceilings throughout.
- Repair or replace any damaged concrete at the ceilings, beams, and walls throughout.
- Repair or replace any damaged or deteriorating walls throughout, including plaster, gypsum board, brick, and masonry block.
- Determine the cause of any water damage or soiling at the ceilings or walls throughout and repair as necessary.
- Repair or replace the deteriorating ceiling access cover at the Sub-basement Floor as noted above.
- Patch all fire-proofing as necessary.
- Clean and repair or replace any soiling or damage of the wainscoting material at the walls in the entrance lobby, east stairway, and Men's Restroom.

- Remove the worn and soiled wallcovering from the Women's Restroom. Replace with new wallcovering or paint to match the other bathroom walls.
- Clean and refinish the terrazzo flooring using an approved method.
- Repair or replace the cracked, or otherwise damaged, areas of terrazzo flooring, to match existing.
- Replace all carpet throughout.
- Repair or replace any damaged concrete floors throughout. Repaint areas of concrete floors with worn and deteriorating paint.
- Determine the cause of any water damage or soiling at the floors throughout and repair as necessary.
- Determine the cause of the standing water observed on the Sub-basement Floor and repair as necessary.
- Clean any areas collecting dirt and debris, including the west stairway.
- Refurbish all interior doors and door frames and replace all knob-style door handles if allowed per historic designation guidelines. If historic designation guidelines prevent the replacement of knob-style handles on the interior doors determine if any areas, such as non-historic office spaces or the industrial areas throughout the Basement and Sub-basement Floors, could receive accessible door handle upgrades.
- All restoration work should be in keeping with the historic status of the Power Plant Building.

3.1-D STRUCTURAL

No structural concerns were noted on the First Floor or on the Basement Floor. Minor cracking was observed in a concrete beam on the Sub-basement Floor. The cracking is not a structural concern at this time. See section 2.2 for structural observations and recommendations for all floors.

3.1-E VOICE AND DATA

Refer to Section 2.5-A for IT/Telecom Infrastructure general recommendations, as applicable to each floor.

3.1-F SECURITY SYSTEMS

Refer to Section 2.6-A for Security System general recommendations, as applicable to each floor.

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4.0 LEVELS OF RENOVATION NEEDED

Building: Power Plant Building, 1341 Sherman Street (Denver)

Priority	Main System	Sub System	Level of Renovation Needed		
			Minimal	Moderate	Extensive
1	Exterior Enclosure	Fall Protection (roof)			√
1	Exterior Enclosure	Walls			√
1	Exterior Enclosure	Sealant / Grout			√
1	Infrastructure	Lighting			√
1	Infrastructure	Fire Alarm			√
1	Infrastructure	Tele/Com			√
1	Interior	ADA-Restrooms			√
1	Interior	Finishes Ceiling			√
1	Interior	Doors			√
1	Infrastructure	Power		√	
1	Exterior Enclosure	Windows		√	
2	Code	Exit Stairways		√	
2	Exterior Enclosure	Doors		√	
2	Infrastructure	Security Access/IDS		√	
2	Infrastructure	Security Video		√	
2	Interior	Finishes - Flooring		√	
2	Interior	ADA-Door Levers		√	
2	Interior	Finishes - Wall		√	
3	Interior	ADA-Drinking Fountains	√		
3	Exterior Enclosure	Roof	√		
3	Infrastructure	HVAC	√		
3	Infrastructure	Fire Sprinkler	√		
3	Infrastructure	Structural Framing	√		
3	Site	Pavement	√		
	Code	Exits			
	Code	Dead End Corridors			
	Environmental	Asbestos	(testing recommended)		
	Exterior Enclosure	Penthouse			
	Exterior Enclosure	Signage			
	Infrastructure	Elevator(s)		(unknown)	
	Interior	ADA-Sinks (Break Room)			
	Site	Drainage			
	Site	Utilities			
	Site	Lighting			

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5.0 COST ESTIMATES

SUMMARY OF SUMMARIES

Item No.	Description	SF	Total	$/SF
1	1341 Sherman Power Plant	25,690	4,110,519	160.00
2	Contingency on Above		w/ Above	
	Subtotals:	**25,690**	**4,110,519**	**160**
3A	IT \ Teledata (Relocate Exstg Only)	2,494	100,163	40.16
3B	Move Management		See Add Alternate	
3C	Flex Space		Excluded	
3D	Public Art	25,690	47,578	1.85
4	Contingency on Above		Excluded	
	Equipment \ Art Subtotal:		**147,741**	**6**
	Base Price \ Equipment \ Art Subtotal:		**4,258,260**	**166**
5	Escalation - 6.75% per year		Excluded	
6	Contingency on Above		Excluded	
	Escalation Subtotal:		**Excluded**	
	Base Price \ Equipment \ Art \ EscalationSubtotal:		**4,258,260**	**166**
7	Design Fees at 8% per State of CO Direction		340,661	13.26
8	Contingency on Above		Excluded	
	Design Fee Subtotal:		**340,661**	**13.26**
	Base Price \ Equipment \ Art \ Design Fee Subtotal:		**4,598,921**	**179**

PROJECTED COST OF CONSTRUCTION IN 2014 DOLLARS	**4,598,921**	**179**

ADD-ALTERNATE				
9	Move Management	25,690	36,634	1.43
10	FF&E (FF&E SF & $25\SF Allowance per Architect)	2,494	62,350	25.00
11	Escalation - 6.75% per year		Excluded	
12	Contingency on Above		Excluded	
	Subtotals:		**98,984**	
	ADD-ALTERNATE SUBTOTAL:		**98,984**	**4**

SYSTEM BY SYSTEM SUMMARY

Item No.	Description	SF	Total	$/SF
1A	Full Replacement of Fire Alarm System	25,690	32,101	1.25
1B	Escalation		Excluded	
	System 1 Replace Fire Alarm Subtotal:		**32,101**	**1**
2A	Install Fall Protection	25,690	20,269	0.79
2B	Escalation		Excluded	
	System 2 New Fall Protection Subtotal:		**20,269**	**1**
3A	Replace All Panel Boards & Receptacles	25,690	898,703	34.98
3B	Escalation		Excluded	
	System 3 Replace Panels Subtotal:		**898,703**	**35**
4A	Repair Exterior Walls & Window Leaks	25,690	665,694	25.91
4B	Escalation		Excluded	
	System 4 Exterior Improvements Subtotal:		**665,694**	**26**
5A	Replace Lighting	25,690	187,710	7.31
5B	Escalation		Excluded	
	System 5 Replace Lighting Subtotal:		**187,710**	**7**
6A	Balance of Project Scope	25,690	2,650,268	103.16
6B	Escalation		Excluded	
	Balance of Project Scope Subtotal:		**2,650,268**	**103**
	System by System w/ Escalation Subtotal:		**4,454,746**	**173**
7	IT \ Teledata (Relocate Exstg Only)		100,163	3.90
8	Flex Space		Excluded	
9	Public Art		47,578	1.85
10	Contingency on Above		Excluded	
	Equipment \ Art Subtotal:		**147,741**	**6**
	Systems \ Equipment \ Art Subtotal:		**4,602,487**	**179**
11	Design Fees at 8% per State of CO Direction		368,199	14.33
12	Contingency on Above		Excluded	
	Design Fee Subtotal:		**368,199**	**14**
	Base Price \ Equipment & Art \ Design Fee Subtotal:		**4,970,686**	**193**

PROJECTED COST OF CONSTRUCTION IN 2014 DOLLARS	**4,970,686**	**193**

ADD ALTERNATE				
13	Move Management	25,690	36,634	1.43
14	FF&E (FF&E SF & $25\SF Allowance per Architect)	2,494	62,350	25.00
15	Escalation - 6.75% per year		Excluded	
16	Contingency on Above		Excluded	
	Move Management Subtotal:		**98,984**	
	Add Alternate Subtotal:		**98,984**	**4**

FF&E DETAILED ESTIMATE - BASE

Estimate By:	Kyle Hoiland
Date:	25-Apr-14
Reviewed By:	Chris Squadra
Date:	25-Apr-14

Total Cost: **$210,091**

	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	FF&E				
	Employee Workstations (1 employee:250 sf) Minor Repair to Existing Only	2,494	EA	25.00	62,350
	Small Conference Rooms (1 small room:2,500 sf)				w/ Above
	Large Conference Rooms				w/ Above
	SUBTOTAL FF&E				**62,350**

	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	IT\Teledata				
	AV / IT @ Large Conference Rooms	4	EA	6,053.57	24,214
	VOIP Telephone System	120	EA	324.09	38,806
	PC Workstations (relocate existing only; see below)				Excluded
	CAT 6E Data Cabling	120	EA	310.20	37,143
	State of CO Servers, Routers, Wireless Access and IT Equipment not listed above				Excluded
	SUBTOTAL IT\TELEDATA				**100,163**

	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	Flex Space				
	Flex Space for Multiple Moves and\or Tenant Holdover (per floor)				Excluded
	SUBTOTAL MOVE LEASED SPACE				**Excluded**

	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	Public Art				
	Art in Public Spaces Allowance at 1.0% of Construction Cost	1	LS	47,578.04	47,578
	SUBTOTAL PUBLIC ART				**47,578**

TOTAL COST -					**210,091**
					8

	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	Move Management				
	Moving Labor, Material, Equipment & Supervision (1 Moves)	103	EA	281.27	28,903
	Relocate PC Workstations (1 Moves)	103	EA	75.24	7,731
	SUBTOTAL MOVE MANAGEMENT				**36,634**

DETAILED ESTIMATE - SUMMARY

				25,690
Item No.	**Description**	**$/SF**	**Total**	**Total w/Burdens**
DIV 2	EXISTING CONDITIONS	9.28	238,523	334,146
DIV 3	CONCRETE	3.53	90,693	127,052
DIV 4	STONE & MASONRY	14.52	372,943	522,455
DIV 5	METALS	3.99	102,451	143,523
DIV 6	WOODS & PLASTICS	3.44	88,468	123,934
DIV 7	THERMAL PROTECTION	10.11	259,807	363,963
DIV 8	OPENINGS, DOORS, WINDOWS	3.80	97,648	136,795
DIV 9	FINISHES	33.56	862,247	1,207,920
DIV 10	SPECIALITIES		EXCLUDED	
DIV 11	EQUIPMENT		EXCLUDED	
DIV 12	FURNISHINGS		EXCLUDED	
DIV 13	SPECIAL CONSTRUCTION		EXCLUDED	
DIV 14	CONVEYING SYSTEMS		2,500	
DIV 21	FIRE SUPPRESSION	3.63	93,255	130,640
DIV 22	PLUMBING	2.34	60,000	84,054
DIV 23	HVAC	6.83	175,463	245,805
DIV 26	ELECTRICAL	15.78	405,438	567,977
DIV 27	COMMUNICATIONS	1.84	47,270	66,220
DIV 31	EARTHWORK		EXCLUDED	
DIV 32	EXTERIOR IMPROVEMENTS	1.46	37,500	52,534
DIV 33	UTILITIES		EXCLUDED	
DIV 34	TRANSPORTATION		EXCLUDED	
	Subtotal Direct Construction Costs	**114.22**	**2,934,204**	**4,110,519**
	Allowance for Historical / Memorial Markers		0	
	Direct Cost Subtotal with GFP	**114.22**	**2,934,204**	
	Material Testing	0.35%	10,270	
	Owner's Design & Preconstruction Contingency	10.00%	293,420	
	Owner's Construction Contingency (after NTP)	5.00%	146,710	
	Permits	1.90%	55,750	
	Total Direct Construction Costs	**133.92**	**3,440,354**	
	Standard General Conditions (GC's Onsite Overhead)		344,227	
	Subtotal NET Construction Cost	**147.32**	**3,784,581**	
	GC's Off-Site Overhead & Profit	4.60%	174,091	
	GC's General Liability Insurance	0.90%	34,061	
	Construction Cost w/o Bonds & Escalation	**155.42**	**3,992,733**	
	Builder's Risk Insurance	1.50%	59,891	
	Performance & Payment Bond	1.20%	47,913	
	Bid Bond	0.25%	9,982	
	Tap Fees		Excluded	
	Bidding Reserves		Excluded	
	Total Estimated Cost of Construction	**160.00**	**4,110,519**	

DETAILED ESTIMATE

Estimate By:	Kyle Hoiland
Date:	25-Apr-14
Reviewed By:	Chris Squadra
Date:	25-Apr-14

Building GSF: 25,690 **Total Cost:** $2,934,204

DIV 02	Description	Quantity	Unit	TOTALS Cost/Unit	TOTALS Total Cost
	EXISTING CONDITIONS / BUILDING DEMOLITION				
	Asbestos Abatement & Testing (Allowance)	1	LS	75,000.00	75,000
	Lead Paint Abatement & Testing (Allowance)	1	LS	75,000.00	75,000
	Demo Building Interior as needed	12,845	SF	2.00	25,690
	Demolition Disposal & Dumping Fees	2,379	CY	3.40	8,088
	High Pressure Wash @ Exterior Building	8,884	SF	1.40	12,437
	Remove Existing Caulking at Exterior Building Joints	4,854	LF	2.50	12,134
	Remove Dirt & Debris @ Roof (Allowance)	1	AL	7,500.00	7,500
	Scaffolding (erect & dismantle)	89	CSF	198.95	17,674
	Move Items / Furniture for Egress (Allowance)	1	AL	5,000.00	5,000
	SUBTOTAL EXISTING CONDITIONS/DEMOLITION				**238,523**

DIV 03	Description	Quantity	Unit	TOTALS Cost/Unit	TOTALS Total Cost
	CONCRETE / FOUNDATIONS				
	Foundation & Concrete Repair (Allowance)	1	AL	50,000.00	50,000
	Repair Concrete Cracking & Spalling @ Interior Slabs / Concrete Walls / Ceilings	8,478	SF	4.80	40,693
	SUBTOTAL FOUNDATIONS				**90,693**

DIV 04	Description	Quantity	Unit	TOTALS Cost/Unit	TOTALS Total Cost
	MASONRY				
	Exterior Cut Stone Repair & Replacement at Building, where necessary (Allowance)	5,952	SF	45.00	267,843
	Exterior Cut Stone Cleaning, Repair & Replacement at Site Walls & Stairs, where necessary (Allowance)	500	SF	45.00	22,500
	Exterior Brick Repair & Replacement, where necessary (Allowance)	2,932	SF	8.30	24,332
	Recaulk Exterior Cut Stone Masonry Panels	4,854	LF	5.00	24,268
	Historic Preservation Premium - Masonry	1	AL	34,000.00	34,000
	SUBTOTAL MASONRY				**372,943**

DIV 05	Description	Quantity	Unit	TOTALS Cost/Unit	TOTALS Total Cost
	METALS				
	Replace Metal Guardrails @ Windows	22	EA	1,200.00	26,651
	Replace Interior Stair Railings & Guardrails throughout (code compliance)	500	LF	128.20	64,100
	Fall Protection Systems (Allowance)	1	AL	10,000.00	10,000
	Reattach Ladder @ First Story Roof	1	LS	500.00	500
	Add Cage @ Ladder	1	LS	1,200.00	1,200
	SUBTOTAL METALS				**102,451**

DIV 06	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	WOODS				
	Rough Carpentry Wood Materials	25,690	SF	0.75	19,268
	Rough Carpentry Labor	400	HRS	48.00	19,200
	**Time & materials for miscellaneous building shoring, safety railings/barricades, blocking, substrate repairs*				
	Reconfigure Restrooms for Accessibility (Allowance)	1	AL	50,000.00	50,000
	SUBTOTAL WOODS				**88,468**

DIV 07	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	THERMAL & MOISTURE PROTECTION				
	Remove & Replace Roof System	10,276	SF	14.90	153,112
	Water Damage Repair @ Sherman St Entrance Canopy (Allowance)	1	AL	30,000.00	30,000
	Metal Fascia, Flashings, & Trims Repair (Allowance)	1	AL	15,000.00	15,000
	Roof Drains, Scuppers, Gutters & Downspouts Repairs (Allowance)	1	AL	25,000.00	25,000
	Insulation Repairs @ Impacted Areas	1	AL	10,000.00	10,000
	Miscellaneous Caulking & Sealants @ Interior	5,339	LF	5.00	26,694
	SUBTOTAL THERMAL				**259,807**

DIV 08	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	OPENINGS				
	Door Restoration Throughout (Allowance)	51	EA	500.00	25,500
	Replace Door, Hardware & Frame @ West Exit Stairway	1	AL	6,500.00	6,500
	Replace Knob-style Door Hardware w/ Lever Style	51	EA	375.00	19,268
	Replace OH Door & Operator @ East Side	1	AL	5,000.00	5,000
	Windows Replacement As Needed (Allowance)	800	SF	42.00	33,580
	Historic Preservation Premium - Doors & Windows	1	AL	7,800.00	7,800
	SUBTOTAL OPENINGS				**97,648**

DIV 09	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	INTERIOR FINISHES				
	Gyp Bd Wall Patching	46,242	SF	1.10	50,866
	Gyp Bd Ceiling Patching	6,423	SF	3.10	19,910
	ACT Ceiling Repair / Tile Replacement	19,268	SF	3.21	61,849
	Gyp Bd Detailing @ Int Soffits, Cols, etc.	1	LS	25,000.00	25,000
	Remove & Replace All Carpet	19,268	SF	3.88	74,758
	Clean/Repair Natural Stone/Tile Flooring	6,423	SF	20.00	128,450
	Repair/Replace VCT	428	SF	1.80	771
	Vinyl Base	18,323	LF	2.20	40,310
	Wall Coverings Repair / Replacement	15,260	SF	3.90	59,513
	Clean/Repair Natural Stone/Tile @ Walls	15,260	SF	12.40	189,222
	Paint Gyp Bd Walls & Ceilings w/2 Coats Latex	52,665	SF	0.60	31,599
	Miscellaneous Accent Painting Allowance	1	LS	25,000.00	25,000
	Upgrade Fire Resistance of Existing Walls, Stairs & Doors (Allowance)	1	AL	75,000.00	75,000
	Historic Preservation Premium - Finishes (Allowance)	1	AL	80,000.00	80,000

					862,247

DIV 10	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	SPECIALITIES				
	Movable Office Partitions System				Excluded
	New Bath Hardware				Excluded
	Fire Extinguishers (2 per floor)				Excluded
	Corner Guards				Excluded
	Code Required Signage				Excluded
	Wayfinding Signage				Excluded
	Access Ladders				Excluded
	SUBTOTAL SPECIALTIES				EXCLUDED

DIV 11	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	EQUIPMENT				
	Refrigerator				Excluded
	Gas Range				Excluded
	Dishwasher				Excluded
	Microwave				Excluded
	Food Disposal				Excluded
	Appliance Installation				Excluded
	Accordion Wall Partitions				Excluded
	Kitchen & Food Service Equipment				Excluded
	Other Office Equipment Not Listed				Excluded
	SUBTOTAL EQUIPMENT				EXCLUDED

DIV 12	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	FURNISHINGS				
	Entry Receptionist Desk Upgrade				Excluded
	Plastic Laminate Countertops Repairs				Excluded
	Solid Surface Countertops Repairs				Excluded
	Copy / Print / Mail Center Casework				Excluded
	Kitchen / Break Room Casework				Excluded
	Window Roller Blinds - no valances, installed				Excluded
	Display Cases				Excluded
	Marker Boards				Excluded
	Tackboards				Excluded
	Office Furnishings & Other Building FF & E				Excluded
	SUBTOTAL FURNISHINGS				EXCLUDED

DIV 13	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	SPECIAL CONSTRUCTION				
	Alternative Energy Systems				Excluded
	Alternative Fuel Vehicle Fueling Stations				Excluded
	SUBTOTAL SPECIAL CONSTRUCTION				EXCLUDED

DIV 14	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	CONVEYING SYSTEMS				

	Elevator Service Call - Verify Current Condition & Maintenance Plan	1	LS	2,500.00	2,500
	SUBTOTAL CONVEYING SYSTEMS				**2,500**

DIV 21	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	FIRE SUPPRESSION				
	Fire Sprinklers - Full Replacement	25,690	SF	3.63	93,255
	Backflow Prevention				Excluded
	FDC				Excluded
	Booster Pump (Allowance)				Excluded
	SUBTOTAL FIRE SUPPRESSION				**93,255**

DIV 22	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	PLUMBING				
	Demo Existing Plumbing				Excluded
	Plumbing Systems - Full Replacement				Excluded
	Provide ADA Fixtures, where necessary (Allowance)	24	EA	2,500.00	60,000
	Insulation @ Lavatory & Mechanical Piping				Excluded
	SUBTOTAL PLUMBING				**60,000**

DIV 23	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	HVAC				
	HVAC - Service & Investigate Work, Minor Repairs Only	25,690	SF	2.33	59,858
	HVAC - Ventilation, Makeup Air & Minor Repairs	25,690	SF	4.50	115,605
	Upgrade HVAC Controls				Excluded
	SUBTOTAL HVAC				**175,463**

DIV 26	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	ELECTRICAL				
	Demo Existing Electrical Outlets & Replace	25,690	SF	1.00	25,690
	Replace Panels	25,690	SF	6.21	159,535
	New Electrical Wiring & Conduit	25,690	SF	2.98	76,556
	Remove Light Fixtures throughout Building	25,690	SF	1.00	25,690
	Replace Light Fixtures w/ LED	25,690	SF	2.50	64,225
	Replace & Provide Lighted Exit Signs (Allowance)	24	EA	250.00	6,000
	Automated Lighting Controls/Sensors	25,690	SF	1.80	46,242
	Replace Emergency GenSet				Excluded
	UPS System				Excluded
	Solar Photovoltaic System				Excluded
	Wind Turbine System				Excluded
	Reattach Lightning Protection System	1	LS	1,500.00	1,500
	SUBTOTAL ELECTRICAL				**405,438**

DIV 27	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	DATA / COMMUNICATIONS				
	Fire Alarm System - Minor Upgrades & Relocation from Impacted Areas	25,690	SF	0.92	23,635
	Data & Communications Conduit - Full Replacement	25,690	SF	0.92	23,635
	Data & Communications Equipment				Excluded
	A/V Equipment				Excluded
	SUBTOTAL COMMUNICATIONS				47,270

DIV 032	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	SITE IMPROVEMENTS				
	Paving				
	Remove & Replace Existing Asphalt Road around Bldg				Excluded
	Concrete Replacement at Sidewalks	5,000	SF	6.50	32,500
	Concrete Sidewalks - Seal Cracks	1	LS	5,000.00	5,000
	New 6" x 18" F.R. Concrete Curb & Gutter				Excluded
	New 4" Sidewalk				w/ Above
	Landscape				
	Fine Grade Topsoil				Excluded
	Sod Repair				Excluded
	Irrigation Repair				Excluded
	SUBTOTAL SITE IMPROVEMENTS				37,500

DIV 33	Description	Quantity	Unit	TOTALS	
				Cost/Unit	Total Cost
	SITE CIVIL/MECHANICAL UTILITIES				
	Secondary Utilities to Building				
	2" Copper Water Line (Incl. Valves, Connections, Trenching w/ Bedding)				Excluded
	6" Sewer Service				Excluded
	Gas Line Trenching				Excluded
	Electrical Service				Excluded
	Phone & Data Service Trenching				Excluded
	SUBTOTAL SITE CIVIL/MECHANICAL UTILITES				EXCLUDED

TOTAL COST -					2,934,204
					114

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