

**EXISTING FACILITY ASSESSMENT**  
**City of Summit Fire Headquarters**



Prepared by:

**LeMay Erickson Willcox Architects**  
11250 Roger Bacon Drive, Unit No. 16  
Reston, Virginia 20190

**Brinjac Engineering**  
114 North Second Street  
Harrisburg, PA 17101-1401

September 30, 2014



**EXISTING FACILITY ASSESSMENT**  
City of Summit Fire Headquarters

**TABLE OF CONTENTS**

- I. INTRODUCTION AND OVERVIEW
- II. GENERAL INFORMATION
- III. EXISTING SITE CONDITIONS
- IV. EXISTING BUILDING CONDITIONS
- V. EVALUATIONS
- VI. CONCLUSIONS
- VII. REFERENCE DRAWINGS
- VIII. ATTACHMENTS



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

### I. INTRODUCTION AND OVERVIEW

**Purpose.** LeMay Erickson Willcox Architects (LEWA), under contract with the City of Summit, conducted an Existing Facility Assessment (EFA) for the City of Summit Fire Headquarters building located at 396 Broad Street in Summit, NJ. The Existing Facility Assessment was completed by a multi-disciplinary team conducting visual inspections of the existing building, systems, and equipment; review of existing building drawings, and interviews with Fire Department staff.

LEWA Principal Architect, Christopher Kehde, AIA, LEED AP and consulting retired Battalion Chief Dave Hartman, visited the City of Summit and the Fire Headquarters facility and observed operations over a 20-hour period on August 5th and 6th, 2014. The visit included a guided tour of the existing Fire Headquarters building and property with Fire Department officers, an overnight stay at the facility to observe a full-day cycle of firefighter operations, and a tour of the City with Fire Department staff to understand the Fire Department responsibilities and response procedures. On August 27, 2014, LEWA's engineering team from Brinjac Engineering visited the Fire Headquarters building to assess the existing mechanical, plumbing, and electrical systems.

This report documents the findings of the Existing Facility Assessment and evaluates the existing City of Summit Fire Headquarters building relative to current architectural design standards for comparable fire and rescue facilities. Issues of building code compliance are based on comparison to building codes as adopted by the State of New Jersey, including but not limited to IBC 2009 and ANSI A117.1-2003. The conclusions in this report are based on the depth of experience of the LeMay Erickson Willcox Architects (LEWA) Team in the design of similar facilities.

**Organization and Content.** This report reviews the Fire Headquarters building in a general sequence from outside to inside in this order: overall site; general building and envelope; rooms and spaces; and mechanical, plumbing and electrical systems. The report places emphasis on existing conditions that were observed to negatively impact Fire Department operations.

**Limitations.** The scope of this survey was limited to visual observation of the general conditions of the building and site. No physical testing was performed; no existing finishes were removed; no hazardous material assessments are included; and no structural assessments are included in this report.

LeMay Erickson Willcox Architects and its consulting engineers performed services in a manner consistent with that level of care and skill ordinarily exercised by members of the architectural profession currently practicing in the same locality under similar conditions. No other representation, express or implied, and no warranty or guarantee is included or intended in this report.



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

## II. GENERAL INFORMATION

Summit Fire Department (SFD) is 122 years old and currently employs 37 career staff and 20 volunteer staff to provide fire suppression, fire prevention, public fire safety education, rescue, 9-1-1 telecommunications, and emergency medical services at the first responder level for the City of Summit, NJ. SFD serves a diverse community of more than 24,000 residents and received approximately 2,500 calls to service in 2013.

The firefighters currently operate on a rotating schedule of 24-hour shifts with four groups referred to as Platoons A, B, C, and D. Each Platoon will typically have 7 career firefighters on duty for each shift.



The 16,298 s.f., two-story Fire Headquarters building is located at 396 Broad Street in Summit, NJ, and is less than 0.25 miles to the City's Historic District and Commuter Rail Station. The Fire Headquarters site is bordered by Broad Street to the north and Cedar Street to the west. To the south, the Fire Headquarters building is immediately adjacent to a small office building, and a city parking lot is located on the property to the west. A triangle shaped church property abuts a small portion of the Fire Headquarters property to the southwest. (Reference Image 1)

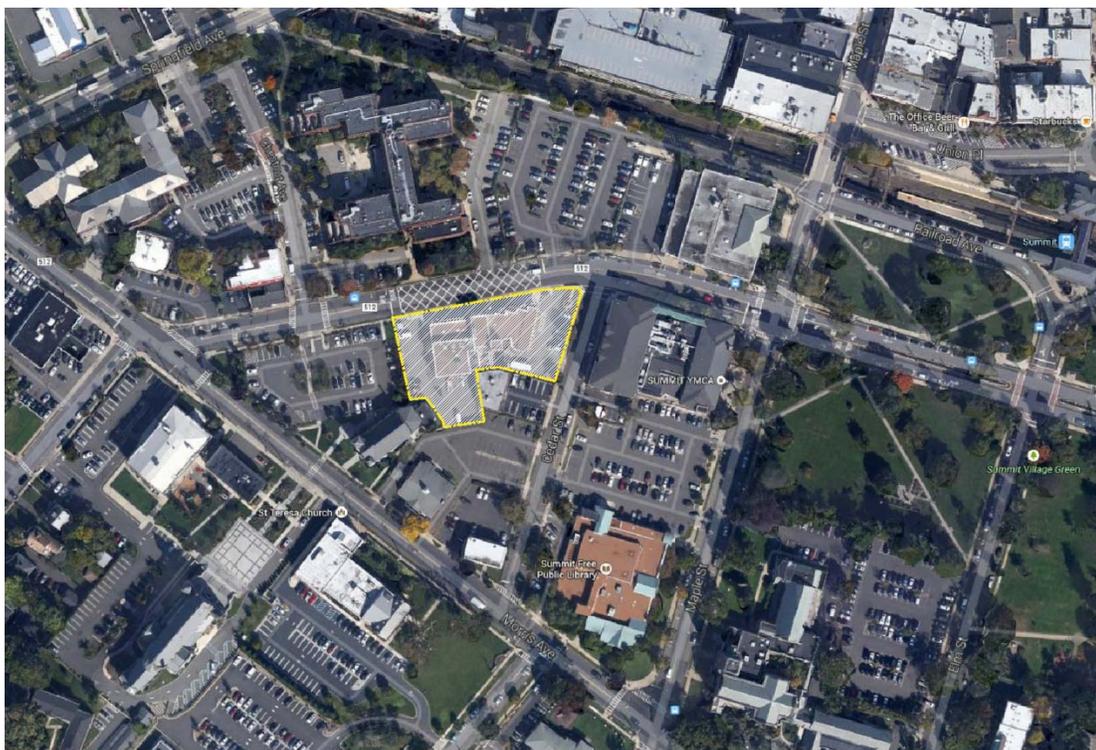


Image 1: Aerial Photo of Fire Headquarters Site



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

The center 2-story portion of the existing Fire Headquarters building dates back to 1902 when a small Public Works building was converted into a single-bay fire station. In 1948, four back-in apparatus bays were added in a saw-tooth arrangement adjacent to the east side of the single-bay station, and in 1968, a 2-story addition was constructed to the west of the original single-bay adding three more back-in bays, one drive-thru bay, and an expanded second story. In 1996, an exterior courtyard area was enclosed and interior office spaces were renovated. (*Reference Images 2 and 3*)

The building construction and exterior envelope vary throughout the building as is to be expected in a structure built in phases spanning 90 years. The exterior for all phases of construction uses a red face brick for aesthetic consistency, but the exterior wall construction varies from solid masonry with no insulation to brick and CMU cavity walls. Only the small 1996 courtyard addition utilizes an exterior wall system comparable to current building practices and current standards for insulation and energy efficiency.

The first floor of the Fire Headquarters building includes eight Apparatus Bays, equipment storage, administrative offices, and the City's Emergency Dispatch office. The second floor includes a combined living/dining room, a small kitchen, two communal bunk rooms, lockers, one shower, toilets, and a training room. The building circulation includes three sets of stairs. There is no elevator in the building and the hose tower serves as the primary circulation stairs.

The Fire Headquarters building serves as the only fire station in the City of Summit, and the Fire Department has coordinated a "Mutual Aid Cover" plan with fire departments in adjacent towns such as Milburn to provide supplemental emergency response.



# EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters



Image 2: First Floor Plan by Year Constructed

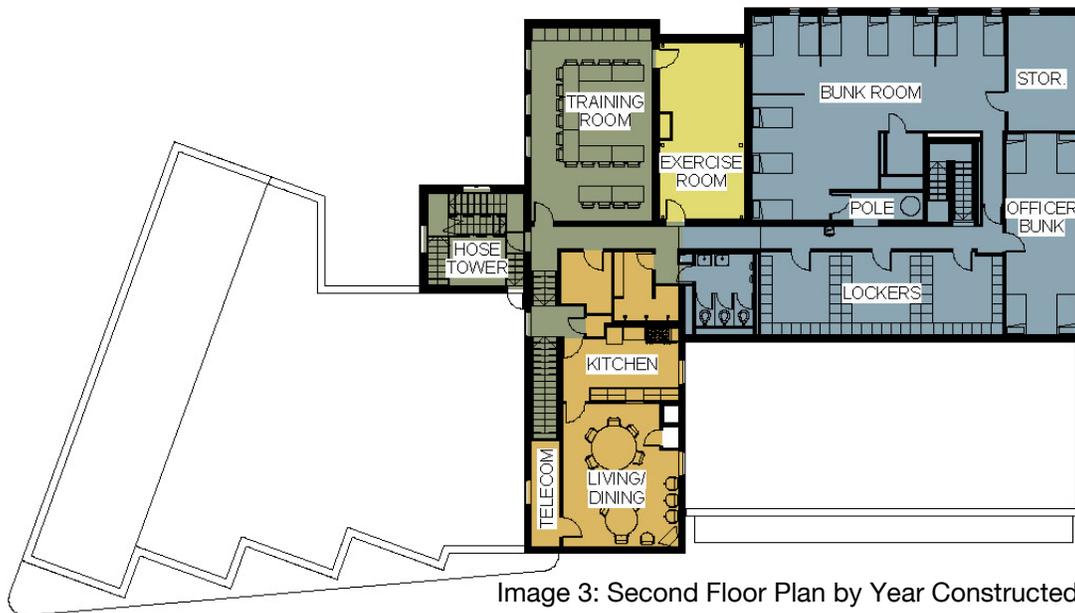


Image 3: Second Floor Plan by Year Constructed



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

### III. EXISTING SITE CONDITIONS

#### A. General

**Lot Size.** The existing Fire Headquarters property is approximately 0.75 acres. This is notably small for a fire department headquarters station with eight (8) apparatus bays and a fueling station. (*Reference Image 1*)

**Station Location.** The Fire Headquarters site is centrally located within the City limits, and the site is on the major City thoroughfare of Broad Street which provides access to the City's Historic District and to the other primary roadways such as Morris Avenue and Springfield Avenue. (*Reference Image 2*)

**Accessibility.** The sidewalk in front of the Fire Headquarters building serves as pedestrian access to and past the building as well as the Apparatus Bay drive-way Apron. While this widened sidewalk does provide an accessible path to the building entrance, the building entrance is located with Apparatus Bay doors to the right and left, and the pedestrian path is highly compromised and at times completely blocked by the emergency vehicle use of the aprons on a daily basis. (*Reference Image 4*)

The front entrance is the only accessible entrance to the building. The Administrative Office entrance is located at the rear of the building, and there is a 9" step at the entrance door. This condition is unsafe; is not accessible; and is not compliant with current building codes. Two additional exterior doors are located in the rear courtyard that is accessed via steps from the Cedar Street parking lot. No handicap accessible parking spaces are provided on site.



Image 4: Main Building Entrance



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

### B. Emergency Vehicle Access and Circulation

**Apparatus Bay Apron.** The Apron on a fire station site refers to the exterior concrete drive-way directly in front of the Apparatus Bay doors. The Apron is typically 50' to 60' in length to allow the emergency response vehicles to park outside of the Apparatus Bays without obstructing pedestrian or vehicular traffic. Programmatic functions on the Apron include: required daily morning emergency vehicle inspections to ensure that the vehicles, gear, equipment, and supplies are prepared for emergency response departure; general vehicle cleaning and washing; minor maintenance checks; aerial ladder extension checks; and training with the equipment carried on the vehicles.

The Apron at the Fire Headquarters building is only 20' to 24' wide, and as a result, the Fire Department must pull out and park the vehicles approximately 10' to 12' into Broad Street in order to complete the critical programmatic functions described above. The morning vehicle inspections typically occur from 8:00am-10:00am each day. During this time the pedestrian sidewalk is completely blocked and vehicular traffic must maneuver around the parked emergency vehicles through a narrowed bidirectional roadway. While on-site, the LEWA Team observed multiple pedestrians, including a woman with a baby in a stroller, forced to cross Broad Street at an unmarked location due to the sidewalk being blocked by the emergency vehicles. This condition is unsafe for pedestrians and vehicles on Broad Street and leaves the emergency response vehicles exposed to damage. (Reference Images 4 and 5)



Image 5: Apparatus Bay Apron

**Emergency Vehicle Turning Radius.** Large emergency response vehicles such as fire engines, rescue trucks, and aerial ladder trucks have a large turning radius due to the length of the vehicles. As these vehicles depart from an Apparatus Bay, they must travel straight ahead perpendicular to the building until the rear bumper clears the Apparatus Bay door, and only then can they begin to turn along this large turning radius. In a condition with a 50'-60' Apron, the Apron provides the distance for the vehicle to exit the Apparatus Bay and then begin to turn as it enters the roadway. At the Fire Headquarters building, the Apron is short and the vehicles must pull out straight into the roadway before beginning to turn. The LEWA Team were present during several emergency response departures and observed that the responding fire engine's turning radius requires the vehicle to travel into the oncoming lane of traffic on the far side of the street.



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

It is important to note that the Fire Department's aerial ladder truck was off-site for maintenance during the visit. This vehicle is significantly longer than the fire engine's that were observed and requires an even larger turning radius.

**Traffic Signalization.** The portion of Broad Street immediately in front of the Fire Headquarters building is painted with a diagonal cross-hatch pattern, and pole mounted traffic signals are provided at each end of the marked area to control traffic during emergency responses. On multiple occasions, the LEWA Team observed vehicles failing to yield during an emergency response, and on one specific occasion, an SUV proceeded through the marked area and swerved around the responding fire engine. (*Reference Image 6*)



Image 6: Traffic Signalization

- C. Parking.** There are 34 striped parking spaces on site. No handicap accessible parking spaces are designated, and no visitor spaces are designated. The number of parking spaces appears to be adequate for the firefighters and staff, but there is a need for additional parking to support the educational trailer, the inspection trailer, and visitor parking. The fire protection staff noted that they are currently using the inspection trailer to carry mobile decontamination supplies due to limited space. These are very different functions and should have separate dedicated trailers.

#### **D. Driving Surfaces and Paving Conditions**

**Apron.** Due to the weight of large emergency vehicles and the extreme pressures generated by the turning of their wheels, Aprons and primary driving surfaces around fire station are typically 8"-12" of reinforced concrete, as asphalt is prone to depressions and deep rutting under the heavy loads. The sidewalk/apron in front of the Fire Headquarters building is concrete, but it does not appear to be adequately designed to withstand the weight of the vehicles. The Fire Department noted that sections of the sidewalk-Apron have been heaving and have required replacement. It is possible that this concrete has been designed based on standard sidewalk or vehicle loads, but additional testing would be required to assess the concrete design.

**Parking Areas.** The emergency response vehicles travel through the east end parking area to access the fuel station. This parking area is paved with asphalt with the exception of the concrete surface at the underground fuel tanks. Cracks are visible in the asphalt, but no major depressions were observed. The concrete curb cut at the parking lot entrance from Cedar Street is cracking, and tire marks to the right and left of the curb cut suggest that the width is undersized for the required turning radius of the large vehicles.



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

The west end parking area is paved with asphalt. Cracks are visible in the asphalt, but no major depressions were observed. The Fire Department noted that the long straight away on this end of the building is used for parking the aerial ladder truck during the regular ladder testing and inspections. As noted above areas that are primary driving surfaces for the heavy emergency vehicles are typically reinforced concrete for durability.

**Cross Slopes.** At the front Apron, the east end parking lot entrances, and the west end parking lot, the driving surfaces are not level and there is a visible cross slope. Repeated travel through this type of cross slope and uneven driving surfaces can place unusual stresses on the vehicles and their axels resulting in costly maintenance issues and in apparatus being out of service for extended periods of time. The Fire Department noted that the aerial ladder truck was off-site for axel repairs during the LEWA Team field visit, and had been out of service for more than 6 weeks.

**E. Site Lighting.** The exterior site lighting is minimal, and the parking lot lighting levels appeared low relative to security requirements for a 24-hour operation such as a fire station. Building mounted exterior light fixtures provide minimal but adequate lighting at the building entrances. It is important to note that during night time emergency response events, fire stations are often left with little or no staff in the building, and appropriate site lighting is important for security of the building, parked vehicles, and the entire site.

**F. Landscaping.** CPTED (Crime Prevention Through Environmental Design) standards recommend landscaping that does not create concealed spaces or visual obstructions. This is often achieved by incorporating low growth plantings and trees with branches and foliage 6' above the ground. The Fire Headquarters site has minimal landscaping as the majority of the site is occupied by the building or by paved surfaces. The east edge of the property along Cedar Street has a line of low bushes with two trees that help soften the edge of the parking lot. At the west side parking area, there is a narrow landscape strip along the exterior building wall. This strip includes bushes and trees that touch the exterior wall and create concealed spaces and visual obstructions.

There is a small memorial garden area at the corner of Broad Street and Cedar Street. The memorial incorporates a ring of low bushes around a historic bell. The memorial and surrounding lawn provide a pleasant corner green-space on an otherwise impervious site. (Reference Image 7)



Image 7: Memorial Garden

**G. Fuel Station.** An existing City fuel station is located in the east end parking lot at the Fire Headquarters building. The fuel station includes a 6,000 gallon diesel tank and dispenser, and a 4,000 gallon gasoline tank and dispenser. This fuel station is available for use by both the Fire



Image 8: Fuel Station



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

Department and other City vehicles. Circulation to the fuel station is through the east end parking lot which requires sharp turns on the asphalt surface. (Reference Image 8)

The LEWA Team observed a sign posted on the building over the fuel station stating that “Environmental Investigation / Clean-up in Progress at This Site”. The sign has a posted date of 5/31/2012. The LEWA Team has requested additional information regarding the environmental investigation from the posted point of contact, but no information has been received as of the preparation of this report. (Reference Image 9)



Image 9: Environmental Investigation Sign

- H. Training Features.** As fire stations are typically 24/7/365 (24-hours per day/7 days per week / 365 days per year) operations, many fire departments have recognized the value and importance of integrating training opportunities into their fire station facilities. This allows the fire department staff to incorporate training into their daily on-site activities rather than requiring firefighter personnel and emergency vehicles to travel off-site for training.

At the Fire Headquarters building, the City of Summit Fire Department has incorporated some training opportunities into the facility. At the rear courtyard, the Department has constructed a small wood frame training prop structure with a roof ventilation prop and multiple confined space scenarios. The training scenarios are limited due to the size, scale, and location of the prop, but the prop represents great initiative on the part of the fire department to train and better serve the community. The LEWA Team noted that prop was a wood frame structure and appeared to be non-sprinklered. The prop is in close proximity to the building on the adjacent property as well as to the Fire Headquarters building. (Reference Image 10)



Image 10: Training Prop

The existing Hose Tower has also been modified to incorporate training opportunities. Two windows have been enlarged on the courtyard side of the hose tower to support window and ladder training. The training scenarios are limited due to the location and the use of the hose tower as the primary circulation and egress for the building. (Reference Images 11)



Image 11: Hose Tower



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

- I. Outdoor Amenities.** Because fire stations are continuously operational buildings, many departments incorporate a small patio or outdoor space for the personnel. At the Fire Headquarters building, the only outdoor space available to the personnel is the fully paved rear courtyard which also hosts the training prop and the emergency generator. The Fire Department has made the best of the minimal courtyard space by providing a table, a residential gas grill, and a basketball hoop installed on the hose tower. (Reference Images 12 and 13)



Image 12: Gas Grill and Outdoor Courtyard

- J. Trash Removal.** There are no trash or recycling dumpsters on site. For a fire station of this size, a trash dumpster is often provided on site. When provided the trash removal path must be coordinated with vehicle and pedestrian circulation on-site.



Image 13: Outdoor Courtyard and Emergency Generator



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

### IV. EXISTING BUILDING CONDITIONS

#### A. General.

**Life Safety Code.** The LEWA Team did not complete a detailed or comprehensive building code review of the existing building as it is understood that the building was constructed in phases from 1902 to 1996 and that each phase was designed and built in accordance with the applicable code requirements at the time of construction. The following comments are therefore focused on key code compliance observations that are most relevant to life safety and/or operational issues.

There are three stairs in the Fire Headquarters building. The Hose Tower stair is central in the building and serves as a primary circulation stair. The Hose Tower is also used to hang and dry fire-hoses; for training exercises; and to house several pieces of outdoor equipment such as a gasoline powered snow-blower. This multi-function use for a primary stair is typically not allowed as the other functions could potentially compromise the use of the stair as an egress path in an emergency. Also, the open stair and railings do not meet the design and safety requirements of the current building code. (*Reference Image 14*)

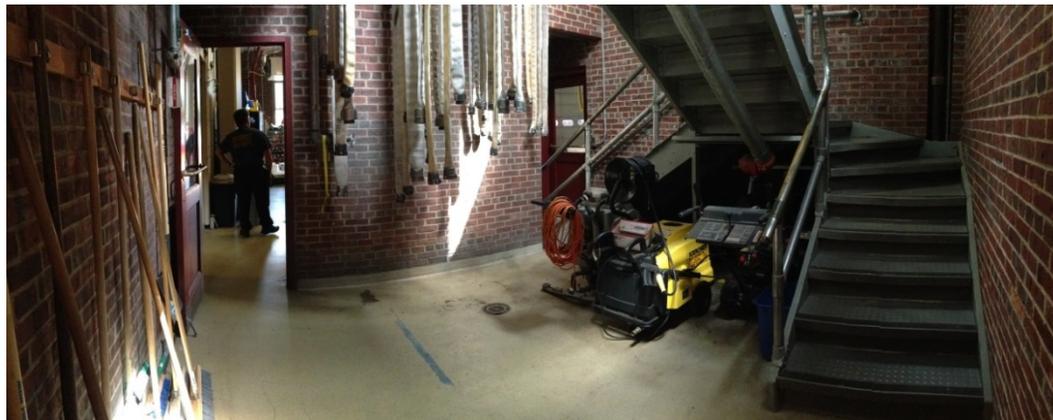


Image 14: Hose Tower

The Hose Tower stair is the only stair in the building with an exterior door. The other two stairs connect the second floor level to the Apparatus Bays, and both stairs require returning to the center of the building to reach an exterior door. This is counter to the intent of having at least two separate paths of egress in the event that one path is blocked. At Stair #1, near the Kitchen, there is a door at a mid-stair landing that is not large enough to provide adequate space on both sides of the door. It appears that the door was added to provide separation from the Apparatus Bays as there is no door at the top or bottom of the stairs, but the resulting condition is awkward and potentially unsafe. The LEWA Team heard from personnel that this stair is rarely used. Stair #2, nearest the Dormitories, only has handrails on one side. This is not compliant with current codes and is especially unsafe as this is the most direct emergency response path for firefighters sleeping in the dormitories. (*Reference Image 15*)



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

The exits from the Apparatus Bays are all located at the center of the building. As noted above, this is counter to the intent of having at least two separate paths of egress in the event that one path is blocked. This is especially significant because of the vehicle storage function of the space and the presence of other combustible materials in the space.

There are many doors in the building that do not provide adequate landing on both sides of the door as required by the current code. One of these conditions occurs at the door to the Administrative Office Suite at the rear of the building where there is a 9" step on the exterior side of the door. This hidden step creates an unsafe condition for someone passing through the door, and this condition is not compliant with current code requirements.

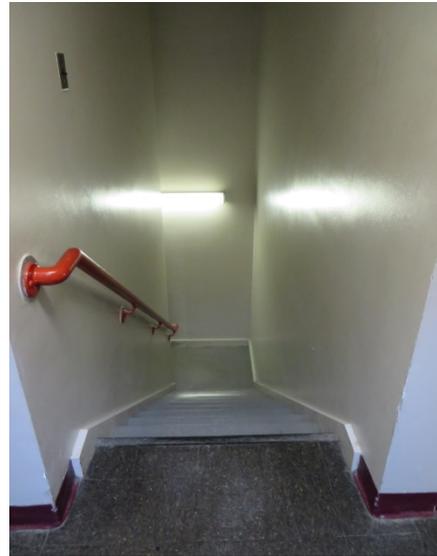


Image 15: Stair #2

**Accessibility.** The LEWA Team did not complete a detailed or comprehensive accessibility code review of the existing building as it is understood that the building was constructed in phases from 1902 to 1996 and that each phase was designed and built in accordance with the applicable accessibility requirements at the time of construction. The following comments are therefore focused on key the accessibility observations that are most relevant to public access and operational issues.

The Broad Street Lobby entrance is at grade and provides the only accessible entrance into the building. From the Lobby, there is a path to the Apparatus Bays and to the Administrative Office Suite. There is no elevator and no accessible path to the second floor of the building where the Living spaces and the Training/EOC Room are located. Fire Department staff referenced a recent situation where a firefighter with an injured leg was given desk assignments during his 6-month recovery, and he needed to work in the Training Room on the second floor as this room has the only general use computers. The firefighter therefore needed to ascend and descend the stairs daily to execute the assigned tasks.

There is one male and one female restroom in the Administrative Office Suite. The female restroom has grab bars and meets the current ANSI wheelchair turnaround requirements. The male restroom includes grab bars mounted on the toilet partitions, but the circulation and dimensional clearances do not meet the current ANSI requirements. The upstairs toilets and shower stall are not accessible.

**Gender Equality.** The Fire Headquarters building has one female restroom in the Administrative Office Suite, no female restroom facilities on the second level, and no female showers. There are also no separate female dormitory accommodations. This condition is not compliant with current building and plumbing code requirements and is not reflective of the increased role that women are playing in modern fire and rescue services. While the ratio of male to female firefighters nationwide remains heavily



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

weighted towards males, the number of female firefighters is increasing, and it is important that public buildings, including fire stations, provide appropriate facilities that ensure equal opportunities for males and females that are currently not available.

The Summit Fire Department currently has two female staff members that work in the 9-1-1 Dispatch Center in the Fire Headquarters, and one of those females also serves as a volunteer firefighter for the City of Summit. As the Summit Fire Department selects career firefighters from the volunteer personnel, it is possible that the Fire Department could be in a position to hire their first female career firefighter in the near future, and there is an immediate need to provide appropriate female facilities.

The Fire Headquarters building also serves as the City of Summit's Emergency Operations Center (EOC). This function brings key City leaders and staff to the Fire Headquarters building during City emergency situations, and depending on the nature of the event, may require 24/7 EOC operations for extended periods of time. This scenario generates additional need for gender balanced facilities.

**Contaminant Control.** In fire station design, control and mitigation of contaminants is critical to the health and safety of the personnel that live and work in the facility. During fire and rescue response operations, emergency personnel, their gear, and their vehicles can be exposed to a wide variety of contaminants such as smoke, ash, chemicals, and bodily fluids. In a fire station, the term "Hot Zone" refers to those areas such as the Apparatus Bays and Bay support spaces that are commonly exposed to contaminated materials. The term "Cold Zone" refers to areas such as offices and living spaces that should not be exposed to contamination under normal operations. (*Reference Images 19 and 20*)

The Decontamination Room is a cleaning room that is typically located adjacent to the Apparatus Bays for cleaning gear or equipment after a response event. This room often includes a long stainless steel wash sink and may include an emergency eye wash and shower. The Fire Headquarters building has a Decontamination Room at the rear of the Apparatus Bays. The contaminant control aspect of this room is potentially compromised by a second door that connects to the Administrative Office men's restroom. (*Reference Image 25*)

PPE (Personal Protective Equipment) refers to the protective gear worn by fire and rescue personnel. Cleaning and storage of this equipment is critical to the health of the building occupants and to the longevity of this very expensive equipment. The PPE gear is best stored in wire mesh lockers in a closed space (to protect against UV light exposure) adjacent to the Apparatus Bays, with an HVAC system specially designed to assist in drying wet gear and ventilating the space to exhaust the smoke and other

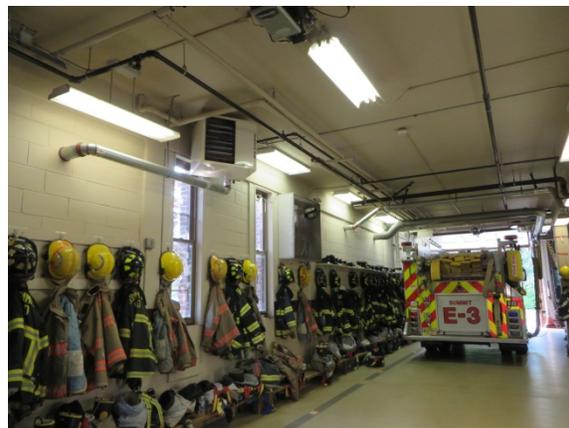


Image 16: PPE Storage



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

chemical off-gassing that may continue for hours after an emergency event. At the Fire Headquarters building, the majority of the PPE gear is stored on open air hooks and shelves along the walls in the Apparatus Bays. This exposes the gear to exhaust, water and/or melting ice from the vehicles, and the Apparatus bay is exposed to the off-gassing from the gear. There are no lockers providing separation of the gear to allow ventilation and drying. The officer's gear is stored in a small niche under the stair connecting to the Apparatus Bay. This space is very small with no ventilation. (Reference Images 16 and 17)

Exhaust extraction systems serve to remove vehicle exhaust contaminants from spaces like Apparatus Bays. The Fire Headquarters building utilizes a direct capture system that connects directly to the vehicle exhaust pipes. When used correctly, this system can be very effective in minimizing personnel exposure to the vehicle exhaust inside the building. (Reference Images 16 and 18)

NFPA 1500 - Standard on Fire Department Occupational Safety and Health Program and NFPA 1581 - Standard on Fire Department Infection Control Program are documents prepared by National Fire Protection Association that provide standards for fire department protocols, procedures, and facility requirements associated with contaminant control and with the general health and well-being of fire department personnel.

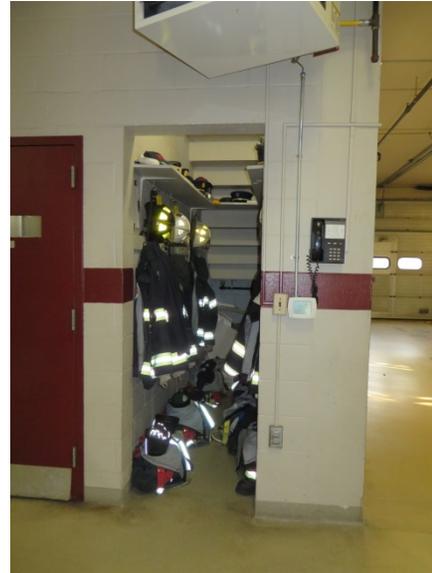


Image 17 Officer's PPE Storage



Image 18: Vehicle Exhaust System



# EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters



Image 19: First Floor Plan with Hot and Cold Zones

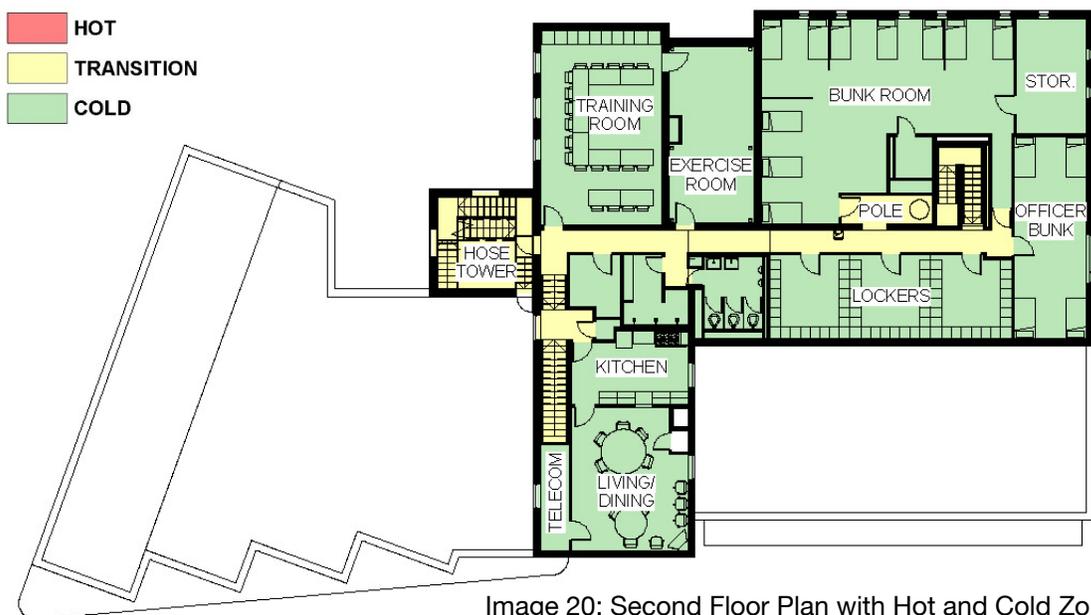


Image 20: Second Floor Plan with Hot and Cold Zones



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

**On-site Training.** As referenced above, many fire departments have recognized the value and importance of integrating training opportunities into their fire station facilities, as this allows the fire department personnel to incorporate training into their daily on-site activities rather than requiring firefighter personnel and emergency vehicles to travel off-site for training. The Hose Tower is utilized for various interior and exterior training drills.

**Storage.** Throughout the Fire Headquarters building, the LEWA Team observed a significant shortage of storage space. In the Apparatus Bays, an interior storage mezzanine has been installed to help store and organize tools and equipment, but storage remains insufficient and equipment and supplies are stacked and piled throughout the Bays exposing them to contaminants. As noted previously, there is no dedicated PPE storage room, and PPE gear is stored on the walls of the Apparatus Bay. The floor mats used to protect the bay floor from wheel chains in the winter months are stored in the rear courtyard exposed to weather and sunlight.

A vending machine, ice machine, and refrigerator are currently located along the wall near Bay 5. As the cooling systems for these items use air from the surrounding space, these items should be located outside of the Hot Zone. This is especially important for the ice machine which is generating a direct consumable in the form of ice.

The Fire Department has an inflatable boat for water rescue events, but there is no space to store the boat in an inflated condition. It is therefore stored in a bag in Bay 8. In an emergency response situation, the boat would have to be inflated and prepared for use causing a delay in deployment and response.

The two fire prevention officers share one office, and their materials and documents are stored in multiple locations throughout the building due to lack of storage space. On the second floor, the end of the staff dormitory has been closed off to serve as a secured document storage room.

**Building Envelope.** The construction of the exterior envelope, including the exterior walls and roof, varies throughout the building as is to be expected in a structure built in phases spanning over 90 years. The exterior for all phases of construction uses a red face brick for aesthetic consistency, but the exterior wall construction varies considerably. Based on construction drawings provided by the Fire Department for the additions in 1948, 1968, and 1996, the building envelope consists of the following:

1996: 16" (nominal) wide masonry cavity wall; with 4" (nom) brick, 2" (nom.) airspace, 2" rigid insulation, and 8" (nom.) CMU. The roof shows as 2" rigid insulation on metal deck.

1968: 14" wide masonry cavity wall; with 4" (nom.) brick, 2" of poured cavity insulation (no airspace), and 8" (nom.) CMU. The roof shows as 2" rigid insulation on metal deck or concrete.

1948: 12" solid masonry walls; with 4" (nom.), 8" (nom.) CMU, and no insulation. The roof shows as rigid insulation on concrete.



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

1902: No drawings are available, but visual inspection suggests that the construction is the same as or similar to the 1948 construction: 12" solid masonry walls; with 4" (nom.), 8" (nom.) CMU, and no insulation.

Only the small 1996 courtyard addition utilizes an exterior wall system comparable to current building practices and current standards for insulation R-value and energy efficiency, and none of the phases show a roof system approaching current requirements for insulation R-value and energy efficiency.

The LEWA Team observed that the low-slope roof shows signs of insufficient roof slope and ponding of water on the roof membrane. This can shorten the life-span of the roof membrane and result in water infiltration. (Reference Image 21)



Image 21: Ponding on Low Slope Roof

**Emergency Response Path:** In fire station design, the interior emergency response path refers to the circulation path in the building that each responding firefighter must follow to reach the Apparatus Bay and vehicles. The path to the vehicles should be simple, direct and safe to support the fast and safe departure of the responding vehicles.

In the Fire Headquarters building, the Apparatus Bays occupy the majority of the first floor. Circulation in the bays is along the rear of the vehicles. The Administrative Office Suite is also on the first floor and has a corridor and door leading directly to the rear of the Bays. It was noted that there is a step down to the Apparatus Bay floor after passing through the door from the Office Suite. Fire Department staff referenced at least one occasion where this step resulted in a fall and minor injury.

The emergency response path options from the second floor include three stairs and a sliding pole. The Hose Tower stair is central in the building and serves as the primary response stair from the Kitchen, Living Area, and Training Room. Stair #2, nearest the Dormitories, is the most direct emergency response stair for firefighters sleeping in the Dormitories. The firefighters indicated that the sliding pole and Stair #1 are rarely used. As noted in the Life Safety Code section above, none of the three stairs are compliant with current stair design requirements.

**Station Alerting.** Station alerting refers to the audio and visual systems in a fire station that alert the fire and rescue personal that there is an emergency call requiring attention. Station alerting systems can vary greatly. Older systems used ringing bells and/or verbal messages over a PA (public address) system. Newer fire stations are often incorporating alerting systems that are connected to a centralized computer that distributes and broadcasts information throughout the building through voice messages, TV/monitor interrupt messaging, LED message boards, tones, and/or lights as appropriate for each space in the building. One of the innovations in this type of system is the use of light and audio settings that can be used at night to wake sleeping firefighters in a manner that is equally quick relative to emergency response time while



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

being safer for the firefighter's heart stress and long-term health. The Fire Headquarters building currently uses a speaker-intercom system for station alerting, but Fire Department staff expressed an interest in upgrading to a "smart station" system.

**Building Security.** After September 11, 2001, security of all public and governmental buildings, including fire stations, changed significantly. Access control systems and video monitoring have become more common in fire stations, and the concepts of CPTED (Crime Prevention Through Environmental Design) are often applied to site layouts and landscaping. At the Fire Headquarters building, the Fire Department has recently installed door access controls with card readers at the exterior doors and at secure access points from the Apparatus Bays to the other interior spaces. Access controls in fire stations are especially important because the station may be left without any staff during an emergency response, and the Bay doors can remain open up to a minute after the emergency vehicles exit the station. Access controls at the exterior doors and the interior secure perimeter mitigate the security risks of an intruder entering the building while the firefighters are away from the building.

**Sustainable Design.** The Fire Headquarters building was designed and constructed in phases spanning from 1902 to 1996, before sustainable design became a national focus and an industry standard. Skylights over the Locker Rooms provide daylighting into those spaces, and some rooms have motion sensor light switches. No other sustainable design elements were observed. The exterior envelope is below current ASHRAE R-value levels for energy efficiency. There are no water conserving plumbing fixtures. As referenced in the Brinjac MEP Systems Assessment report, the "split system DX equipment and packaged rooftop DX equipment is in general the least efficient cooling solution available".

## B. Room-by-Room Reviews

**Lobby/Vestibule.** The small front entrance Lobby serves as a secure Vestibule where visitors can check in and then wait to be accompanied into the building. The space is small with an American flag and no seating. The 9-1-1 Dispatch Center is located in the adjacent room with large interior windows viewing the Lobby and the front entrance doors, and the staff in the Dispatch Center currently monitor the front entrance. Fire Department staff noted that the 9-1-1 Dispatch Center is being relocated to another building, and the Fire Department will need to develop a new protocol for monitoring and managing the front entrance.

**Administrative Office Suite.** The suite of administrative offices includes a 2-person reception and administrative assistant workstation, the Fire Chief's Office, the Deputy Fire Chief's Office, a 2-person Fire Prevention staff office, a shared Battalion Chiefs Lieutenants Office, a Conference Room, and male and female toilets. The administrative offices were part of the 1996 interior renovation work, and materials stored in the corridor and in the Conference Room indicate that there is not sufficient storage available. As previously noted, a portion of the second floor Bunk Room has been turned into a secure Storage Room for the administrative offices on the first floor. Also, a small first floor Kitchenette room is no longer usable as it has become a storage closet.



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

**Apparatus Bays.** The Fire Headquarters building has eight Apparatus Bays. The Bays are numbered from west to east, and the primary response vehicles are parked in Bays 1 to 4. Reserve vehicles are parked in Bays 5 to 7, and an antique Chemical Engine is kept in Bay 8. Bays 2 to 8 are back-in only. Bay 1 is longer and has drive-thru capability for the aerial ladder truck. As noted above, PPE (Personal Protective Equipment) gear is stored on the walls of the Bays exposing the Bays to off-gassing from the gear and exposing the gear to the conditions of the Bays. PPE gear is best stored in a well-ventilated, temperature and humidity controlled room that is immediately adjacent to the Apparatus Bays and is closed protected against UV light exposure. (Reference Image 22)



Image 22: Apparatus Bay Clearance Problems

The clear height in the Bays is notably low. At one location, the LEWA Team observed that a water spray nozzle on top of one fire engineer was inches from the piping running across the ceiling. Preferably, the clear height should be 18' or more to allow the fire engine cab to be tilted forward and opened inside the Bays. (Reference Image 23)



Image 23: Apparatus Bay Clearance Problems

The Bay doors are small relative to current design standards and to the dimensions of the current vehicles. The doors in Bays 1-4 are 12' 2" wide and 11' 2" high. The doors in Bays 5-7 are 12' 0" wide and 11' 3" high, and the door in Bay 8 is 13' 2" wide and 13' 0" high. Current Apparatus Bay doors are often 14' 0" high and 14' 0" wide. Fire Department staff noted that the Apparatus Bay door height restricts the Fire Department's options when purchasing new apparatus as only select manufacturers make vehicles that will fit through the current Bay doors. The current aerial ladder truck has modified axels to help lower the overall truck height to allow it to fit into the Bays. The Bay door size has also caused problems with visiting or Mutual Aid vehicle from other fire stations which are too tall for the Bay doors. There are visible marks in the brick above Bay 1 where a vehicle from another station attempted to back in to the Bays. (Reference Image 24)

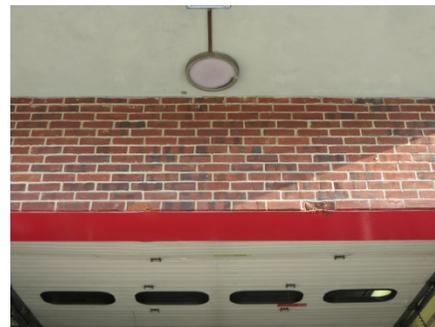


Image 24: Apparatus Bay Door Clearance Problems

As noted previously, insufficient storage is a significant issue throughout the Fire Headquarters building, and the storage issues are visible in the Bays. All wall surfaces



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

are used for storage; a storage mezzanine has been constructed in Bay 8; and materials and equipment are stored in any available areas in the Bays. The LEWA Team observed that the SCBA tanks are stacked in Bay 8, and the SCBA masks are stored in a base cabinet in Bay 4. These items are critical equipment for emergency response, and should be stored together in a clean, protected environment.

The Apparatus Bays utilize a direct capture vehicle exhaust extraction system to capture and discharge vehicle exhaust. When installed and used correctly, this is a very good system for minimizing interior exposure to vehicle exhaust.

Appropriate Apparatus Bay floor drains are important to remove water and/or contaminants in the Bays. Returning vehicles may be wet or may have accumulated snow or ice during a response; Engine oil or other liquids may drip from the vehicles; or fire engines may discharge water from their storage tanks. The Bay floors should slope to the floor drains, and it is preferable to use linear trench drains centered in the Bays and extending for nearly the full length of the Bays. Trench drains should then be Apparatus Bays in the Fire Headquarters building have one small circular or square drain per Bay in a relatively flat floor.

**Decontamination Room.** The Decontamination Room is located at the rear of the Apparatus Bays, and includes a long stainless steel wash sink, an emergency eye wash station, and standard shower. A bio-hazard trash receptacle is located in the room, and there is no closed storage. The contaminant control aspect of this room is compromised by a second door that connects to the Administrative Office men's restroom. *(Reference Image 25)*



Image 25: Decontamination Room

**Laundry.** The Fire Headquarters building has one small Laundry room located at the rear of Bay 8. This laundry Room has one commercial washer and one commercial dryer. These are used to wash the firefighter PPE gear. No layout space or organized storage is provided. PPE gear is hanging on pipes in the room and is piled on miscellaneous items stored in the room. Many fire stations will have an additional Laundry room in the Cold Zone for washing clothes, uniforms, towels, etc.

**Hose Tower.** As noted previously, the Hose Tower is central in the building and serves as a primary circulation stair. The Hose Tower is also used to hang and dry fire-hoses; for training exercises; and to house several pieces of outdoor equipment such as a snow-blower. The stair and railings do not meet the design and safety requirements of the current building code. *(Reference Image 14)*



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

**Training/EOC Room.** There is one Training Room in the Fire Headquarters building. This has table set up in a “U” shape around a smart board with video projection. Two additional flat panel monitors are mounted to the right and left of the smart board. A side table has three computer work stations that can be used for training purposes and can be connected to the smart board system. The current furniture configuration seats 15 at the “U” shape table and 4 at the side table.



Image 26: Training Room

The Training Room also serves as the City of Summit’s Emergency Operations Center (EOC). This function brings key City leaders and staff to the Fire Headquarters building during City emergency situations, and depending on the nature of the event, may require 24/7 EOC operations for extended periods of time. Fire Department staff indicated that there are 20 people on the City’s EOC Team, and that there may be up to 30 people in the Training Room during EOC operations. (*Reference Image 26*)

**Living Spaces.** As Fire Stations are 24/7/365 operations, they often include residential accommodations in addition to the office and firefighting operations spaces. In the Fire Headquarters building, these Living Spaces are on the second floor and include: a combined Living/Dining Room, a small Kitchen, one 10-person Bunk Room for firefighters, one 4-person Bunk Room for officers, one male-only Restroom, a Shower Room, Lockers, and an Exercise Room. There is no accessible path to the second floor or to the Living Spaces, and no accessible plumbing fixtures or accommodations are provided. As mentioned previously there are also no accommodations for female staff that may soon become part of the department.



Image 27: Dining/Living Area

The Living/Dining Room serves as the only communal living space for the firefighters to gather while on duty. This room includes a round dining table for meals and a flat panel TV. The space is small relative to the combined Dining Room and Living Room functions, and there is not sufficient space in the room to define a Living Room seating group area. (*Reference Image 27*)

The Kitchen is adjacent to the Living/Dining Room and includes one residential refrigerator, a 6-burner commercial stove, and two microwaves. The Kitchen is small with minimal counter space and storage space. In fire stations such as this with rotating shift schedules, it is common to have dedicated refrigerators and dedicated pantry storage space for each shift. (*Reference Image 28*)



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

There are two Bunk Rooms, or dormitories, in the Fire Headquarters building. The majority of the firefighter personnel sleep in the large 10-person Bunk Room, and the officers on duty sleep in a separate 4-person Bunk Room. Large, open bunk rooms such as these are common in older fire stations, but current station design trends are shifting towards smaller Bunk Rooms for 1, 2 or 4 people. The smaller rooms minimize noise disturbances to sleeping firefighters and can allow flexibility for gender accommodations. The rooms can also be individually managed for station alerting such that only designated rooms receive alerts and other rooms can remain undisturbed. (Reference Image 29)

The second floor Restroom includes 3 toilets, 2 urinals, and 2 sinks. There is no counter space, and as previously noted there are no handicap accessible provisions. The Shower Room is adjacent to the restroom, but is accessed through a separate door. Personnel moving from the showers to the restroom must pass through the public corridor to get there. The shower room consists of a changing area with a bench and relatively small communal shower with 3 shower heads. Comments from firefighters in the station indicated that the shower room is used as a single person shower due to its small size and lack of privacy. None of the plumbing facilities in the Restroom and Shower Room use low-flow water conserving fixtures.



Image 28: Kitchen



Image 29: Main Bunk Room

The Lockers in the Fire Headquarters building are organized in three “U” shaped Locker Bays that are each accessed directly from the corridor. Large skylights over the locker bays provide bright, natural light in the spaces. The lockers are raised on open cell CMU blocks and wire mesh is installed between the locker and the ceiling. It appears as though this was intended to support air flow and ventilation, but it also created areas that are very difficult to clean.

Fire Department staff noted that the Summit YMCA donated their lightly used exercise equipment to the Fire Department after recent replacements, and as a result, the Fire Department has a surplus of exercise equipment in good working order. The majority of the equipment is located in the Exercise Room, but several pieces of equipment are currently located in the two Bunk Rooms due to lack of space. In the Exercise Room, the exercise equipment is tightly arranged to include as many pieces of equipment as possible, and in doing so, clearances around the equipment are compromised, presenting safety concerns. The LEWA Team also noted that there are no interior windows providing views to the Exercise Room from the adjacent corridor. Such



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

windows are often provided for safety in case as the risk of someone being injured or requiring emergency assistance is higher in the Exercise Room than in other areas of the station.

**Storage Room.** As previously noted, the second floor Storage Room was created by closing off one end of the firefighter Bunk Room. This storage room is used primarily for administrative documents due to the lack of storage in the Administrative Office Suite on the first floor. The storage capacity in the room is maximized by using a hand-crank compact shelving system.

**Telecom/IT Room.** The Telecom/IT Room is located in a closet in the Living/Dining Room. The room is small and the newest server rack blocks access to the equipment and panels on the rear wall. It appears that the systems and equipment have been added to over an extended period of time and that the size of the room is no longer adequate. A window unit air conditioner has been installed to provide cooling in this uninsulated east facing room. The LEWA Team noted signs of water infiltration around the window in the room and observed a temporary gutter pan and drain tube that had been installed at the window head. Fire Department staff confirmed that the exterior wall and window have experienced leaks in the past. With the significant role that telecommunications and IT serve in modern emergency response operations, a Telecom/IT Room must provide a secure, dry, and temperature controlled environment with appropriate room for equipment access and ventilation. *(Reference Image 30)*



Image 30: Telecom/IT Room

- C. Mechanical, Electrical, and Plumbing Systems.** Brinjac Engineering is serving as the mechanical, electrical, and plumbing systems engineers for the LEWA Team. Brinjac visited the Fire Headquarters building and prepared a Mechanical/Electrical Systems Assessment Report, which is included as an attachment to this document.



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

### V. EVALUATIONS.

- A. Site Evaluation Summary.** The following ratings quantify the existing site conditions on a scale of 0-2; the rating given is in comparison to the standards which would be imposed on the site should the station be designed today.

Rating Scale: 2 – Good; 1 – Adequate; 0 – Poor

SITE ELEMENT	RATING
Lot Size	0
Station Location	2
Accessibility	0
Vehicle Circulation – Apron	0
Vehicle Circulation – Turning	0
Vehicle Circulation - Visibility	1
Vehicle Circulation - Safety	0
Vehicle Circulation – Exterior Vehicle Checks	0
Parking	1
Paving Conditions	0
Lighting	1
Landscaping	1
Fuel Station	1
Training Features	0
Outdoor Amenities	0
Trash dumpster	0
Possible Point Total: 32	
<b>Total Score:</b>	<b>7</b>
<b>Rating:</b>	<b>22%</b>

The above score of 22% indicates that the existing site conditions for the Fire Headquarters building are well below current station site design standards.



## EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

**B. Building Evaluation Summary.** The following ratings quantify the existing building conditions on a scale of 0-2; the rating given is in comparison to the standards which would be imposed on the building should the station be designed today.

Rating Scale: 2 – Good; 1 – Adequate; 0 – Poor

BUILDING ELEMENT	RATING
General	
Life Safety Codes	0
Accessibility	0
Gender Equality	0
Contaminant Control	0
On-site Training	0
Storage	0
Building Envelope	0
Station Alerting	0
Emergency Response Path	0
Security	1
Room-by-Room	
Lobby	0
Administrative Offices	1
Apparatus Bays	0
Storage	0
Decontamination	0
Hose Tower	0
Training Room / EOC	1
Living/Dining Room	1
Kitchen	0
Bunk Rooms	0
Showers	0
Toilets	0
Lockers	1
Physical Training Room	0
Telecom/Data Room	0
Mechanical Systems	1
Plumbing Systems	0
Electrical Systems	0
Telecom/Data Systems.	1
Possible Point Total: 58	
<b>Total Score:</b>	<b>7</b>
<b>Rating:</b>	<b>12%</b>



## EXISTING FACILITY ASSESSMENT

### City of Summit Fire Headquarters

The above score of 12% indicates that the current building conditions for the Fire Headquarters building are well below current station design standards.

## VI. CONCLUSION

The Existing Facility Assessment evaluated the City of Summit Fire Headquarters relative to current architectural design standards for comparable fire and rescue facilities, and as represented throughout this report and in the Evaluation Summaries, the LEWA Team found the City of Summit Fire Headquarters facilities to be below current standards in most categories.

### Executive Summary:

- The Fire Headquarters site has significant issues regarding safety of pedestrians, drivers, and Fire Department personnel along Broad Street, and the site circulation and cross slopes of the site grading are likely contributing to the maintenance issues for the emergency apparatus.
- Building codes are updated on a regular basis to represent the most current understanding of best practices regarding life safety and occupant well-being in the built environment, and the Fire Headquarters building does not meet current building code standards for emergency egress, gender equality, handicap accessibility, or energy efficiency.
- The Fire Headquarters building was designed and constructed in phases spanning from 1902 to 1996, before sustainable design became a national focus and a design standard. The building envelope, HVAC systems, lighting, and plumbing fixtures are not compliant with current sustainable design standards.
- Throughout the Fire Headquarters building, gear and equipment storage needs are exceeding the available space.
- Fire and rescue services and facilities have changed significantly over time, and the Apparatus Bays and Aprons do not meet current fire station design standards. The Apparatus Bay doors are small relative to current standards and limit the selection and use of emergency vehicles; the PPE gear is stored on the walls of the Bays exposing the Bays to off-gassing and exposing the gear to moisture, contaminants from vehicles, and damage; the Apparatus Bay interior height is low and does not allow the emergency vehicle cab to be opened with the vehicle in the Bays; and the front Apron is not long enough to allow the emergency vehicles to pull out of the Bays without encroaching into Broad Street.

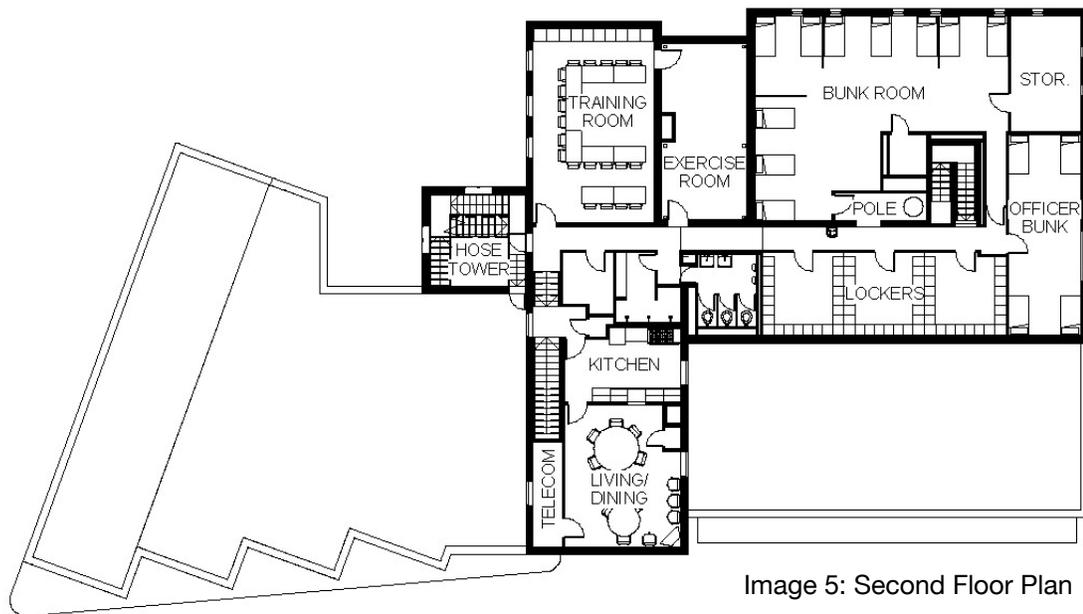
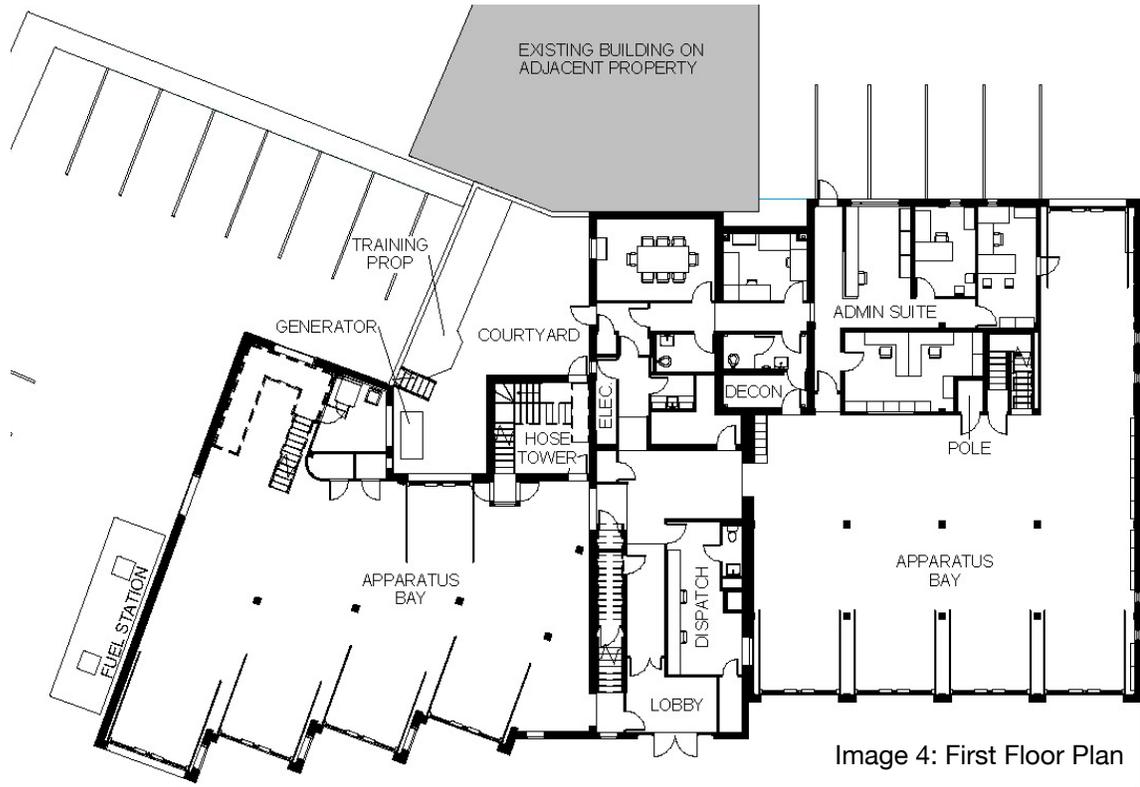
The Summit Fire Department's stated mission is "To provide the highest level of fire protection and emergency service to the public". The Fire Department is to be commended for providing the highest level of service possible given the age and condition of the existing Fire Headquarters facility, but the findings of this report demonstrate that the Fire Headquarters facility is limiting the Fire Department's ability to provide these services at the highest level relative to standards for comparable fire and rescue facilities. Based on the extent of the issues and deficiencies identified, construction of a new Fire Headquarters facility is recommended as the most cost effective means to provide the Fire Department with a facility that supports the fast and safe delivery of emergency response services, meets design standards for sustainability, accessibility, and durability, and provides a qualitative environment for the personnel that will live and work in the facility.



# EXISTING FACILITY ASSESSMENT

City of Summit Fire Headquarters

## VII. REFERENCE DRAWINGS





## **EXISTING FACILITY ASSESSMENT**

City of Summit Fire Headquarters

### **VIII. ATTACHMENTS**

- A. City of Summit Fire Headquarters Mechanical/Electrical Systems Assessment Report – September 2014**

**City of Summit Fire Headquarters**  
**Mechanical/Electrical Systems Assessment Report**

**September 2014**



## HVAC Systems Assessment

### History

The original building was constructed in 1901 and has undergone a series of additions and renovations in 1948, 1968, and 1996 with additional HVAC system renovations completed in 2010.

The building originally utilized a steam boiler feeding steam radiation throughout the building. Cooling was by means of natural ventilation (operable windows). The 1948 addition added a snow melt system and additional radiation. The 1968 renovation & addition added air conditioning via packaged roof top equipment with ducted air distribution as well as steam ceiling mounted unit heaters in the truck bays. Toilet room exhaust and a hot water heating system with heat exchanger and distribution pumps were also added in 1968. The 1996 renovation and addition continued the concept of adding rooftop air conditioning equipment while still utilizing the steam boiler to heat the building via both steam and hot water radiators & convectors.

### Current Systems

More recently, the boiler and steam heating system began to have multiple failures. To maintain and repair it was proving too costly for the fire department. So, per a 2010 design, the mechanical system was generally replaced in early 2011. The steam boiler and all of the hot water and steam terminal equipment were left abandoned in place. So there are numerous steam radiators, steam unit heaters and hot water convectors throughout the building abandoned and in varying states of disrepair.



*Abandoned Steam Radiator*

The new HVAC system utilizes packaged rooftop air conditioning equipment with integral gas fired heating sections to condition most of the building.

RTU-1: 10 tons cooling capacity, 168,000 BTU/h heating capacity serves the Dormitory areas.

RTU-2: 2.5 tons cooling capacity, 69,000 BTU/h heating capacity serves office spaces on the 1<sup>st</sup> floor.

RTU-3: 3 tons cooling capacity, 73,600 BTU/h heating capacity serves the 2<sup>nd</sup> floor Training Room.

AC-1: A split system with condensing unit on roof and indoor unit above the first floor ceiling is a 3 ton system serving the Chief's office, the Deputy Chief's office and the adjacent administrative area.



*Packaged Rooftop Units and Condensing Unit on Roof*

The Apparatus Engine bays utilize gas-fired unit heaters. The east and west Apparatus bays each have an exhaust fan and duct main with a flexible tail-pipe arm for each Engine.

The Dispatch Room utilizes a split system heat pump with 1.5 tons cooling capacity and 18,000 BTU/h heating capacity. The indoor unit is ceiling mounted, while the condensing unit is located on the low roof above the west Apparatus bay. Outside (ventilation) air is ducted to the unit.

The Recreation Area utilizes a split system Mitsubishi unit with condensing unit located on the low roof above the west Apparatus bay and indoor unit wall mounted. Additionally a small window type air conditioning unit provides cooling to the storage room on the east side of the recreation room.



*Window AC Unit in Storage Room*

The Decontamination Room and 1<sup>st</sup> floor Janitor Closet utilize a wall-mounted exhaust fan.

The (2) toilet rooms on the 2<sup>nd</sup> floor each utilize a ceiling mounted exhaust fan ducted to a hood on the roof.

The locker rooms utilize a separate multi-speed roof-mounted exhaust fan.

The kitchen hood utilizes a dedicated grease exhaust type fan located on the roof.  
All cooling and heating temperature control takes place with local thermostats.

## Assessment

Due to issues of first cost, maintainability and expediency, the HVAC systems have been modified over time from an elegant steam heating system with radiation and natural ventilation to a least cost solution that provides functional cooling and heating to the spaces. The abandoned hydronic/steam heating equipment is exposed throughout the building and is unsightly. The abandoned steam and hydronic equipment in the basement appears to utilize insulation with ACM.

The roof top equipment is fairly new (2011) and thus in generally good condition. The rooftop units installed in 1996 lasted for 15 years – typical for this type of equipment, and what can be expected for the current equipment due to its exposure to the weather. The indoor unit serving the Chiefs’ offices is in a difficult location for maintenance and has already had condensate leakage issues that have stained the ceiling tiles.

The cooling equipment in the recreation area does not provide positive ventilation (outside air) to the space. While the operable windows do meet code for this requirement, it is impractical to count on the use of these windows during the summer and winter months for ventilation. Certain indoor spaces – entryways and stair-towers – are not cooled or ventilated.

Split system DX equipment and packaged rooftop DX equipment is in general the least efficient cooling solution available. Newer fire houses are moving toward more sustainable building systems with dedicated outdoor air systems (DOAS) and radiant heating and cooling solutions.

## **Plumbing Systems Assessment**

All plumbing utilities enter the building off of Broad Street.

The domestic water service is estimated at 1-1/4". Water pressure to the building (as in most of the city) is good. The insulation on much of the domestic water service is in need of repair/replacement.

Domestic hot water is produced by a Lochinvar 50 gallon gas-fired water heater located in the basement. The water heater is in fair condition. There is no recirculation loop, so fixtures on the 2<sup>nd</sup> floor of the building often do not see hot water before at least 30 seconds.

The gas service to the building splits into (2) main services upon entering the basement. One line feeds the basement equipment, while the other rises through the building to serve the kitchen and rooftop units.

Sanitary drainage leaves the building after passing through an oil interceptor in the basement. The sanitary main is estimated at 4".

Roof drains feed interior rain leaders. The storm drain lines to the municipal storm main in Broad Street were not visible.

Plumbing fixtures are aged and in fair condition.

## Fire Protection Systems Assessment

The building is fully sprinkled with a relatively new dedicated 4" fire service that enters the building in the east Apparatus Room. No fire pump is required.



*Building Fire Service*

## **Electrical Systems Assessment**

### Electrical Service

The existing Electrical Service enters the basement of the original building; circa 1948. The building underwent renovations/upgrades in 1968 and 1996. The service enters through a crawl space to the self-contained utility meter in the boiler room area. The service voltage is 208/120V, 3 phase 4 wire. From the utility meter, a wire trough feeds three service disconnects. This is allowed under the 6 service tap rule in the National Electric Code (NEC). One disconnect is fused at 70A and serves an unknown load. This disconnect is by Federal Pacific (no longer in business) and appears to be in working order. A second disconnect is provided with a 150A circuit breaker and appears to feed the buildings primary distribution panel via a 200A Onan Automatic Transfer Switch (ATS). The secondary of the ATS lugs are double tapped and a 100A fused disconnect is fed which is associated with a recent upgrade circa 1996 and is in good condition. This serves a panel installed in the second floor exercise area.

The wiring associated with the main service equipment is 1/0 AWG and appears to be in good condition. This wire size would be suitable for a 150A service. The insulation does not appear to be deteriorating and appears to have been upgraded during the most recent upgrade in 1996.

A 50KW Cummins Onan Diesel Engine Driven generator with a subbase fuel tank is located outside in a weatherproof enclosure to supply emergency power during a power outage. Based on the wiring configuration, the generator can feed power to the main distribution panel in the basement and the 100A fused disconnect for the exercise area panel. This generator appears to be in good condition and maintenance records show that it is routinely tested and exercised. It currently has 351 hours on the engine.

### Electrical Distribution

The existing Main Distribution Panel in the basement is in fair condition. This panel feeds the many lighting and appliance load centers located throughout the building. All of these load panelboards are of the circuit breaker type. Some have been abandoned and are used as a junction box for a new panel mounted adjacent. Over the lifespan of the building, the loads on these panels have pushed the panels to capacity. According to personnel, tripping of breakers is common.

Several panels have been retrofitted with mini breakers to accommodate more circuits. In addition, loads have been pulled from panels that are not in the vicinity of the load served and circuits are improperly tagged. Several of the panel violate the NEC safety clearance area. The ATS door does not open due to mechanical piping mounted in front. This is a safety hazard in the event maintenance was required.

Wiring throughout the building includes wire and conduit, as well as MC Cable. Due to the age of the building, most of the wiring throughout is in need of upgrades. Overloading of circuits and time has deteriorated the integrity of the insulation.

### Lighting

The lighting throughout is made up of a variety of sources and wattages. Several sources that were witnessed include T12 fluorescent lamps, incandescent down lights, halogen floodlights, T8 linear fluorescent, and compact fluorescent. Many of these sources are inefficient and/or no longer produced. A general overview of the path of egress appears to show a deficiency in the quantity of exit signage.

### Receptacles

The electrical system appears to be in fair condition and grounded.

### Recommendations

We recommend replacing the electrical distribution system in its entirety. The electrical service is undersized and has a significant amount of added stress from the addition of new loads over the years. These include vehicle exhaust systems, AC loads, and computer loads. Due to the critical nature of the facility being utilized as an emergency operations center, the building should be updated to accommodate the new loads and provide an appropriate level of reliability. In addition, the generator should be replaced to increase with the building load to support a “whole house” emergency system.

The entire service entrance equipment should be replaced and brought up to code. New lighting and appliance panelboards should be installed with adequate spare capacity for future loads. Panel loads shall be separated to segregate life safety from normal emergency loads. Transient Voltage Surge Suppression should be installed to protect the building loads. In addition, a Lightning Protection System is highly recommended due to the critical nature of the building.

The lighting throughout all of the areas, not including the 1996 renovation, should be replaced with energy efficient lighting.