



CITY OF
PITTSBURGH
PROPERTY CONDITION REPORT



B142 – Firehouse 35
1519 Orchlee St.
Pittsburgh, Pennsylvania 15212

June 2014



Massaro
www.massarocms.com

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1 Executive Summary

1.1 General Description

The City of Pittsburgh contracted with MCMS to provide a Property Condition Assessment (PCA) in order to prepare a Property Condition Report (PCR) of the subject property, located in the Brighton Heights neighborhood at 1519 Orchlee St. Pittsburgh, PA. A walk-through survey of the subject property was conducted on July 30, 2013.

The subject property consists of a 2-story fire station with basement; containing an apparatus room, storage, break room, lockers and offices. It is unclear when this facility was constructed. The property is on a 0.2 AC municipal lot.

1.2 General Physical Condition - FAIR

The general physical condition of properties is typically categorized as:

- **New** – Constructed within the last year.
- **Good** – Well constructed and maintained, without significant deficiencies.
- **Fair** – Apparent deferred maintenance issues and deficiencies that can be remedied at reasonable cost.
- **Poor** – Inadequately constructed and/or maintained, with substantial deficiencies that require significant cost and scope of work to remedy. Some items may require additional detailed analysis and testing to fully define the deficiency.
- **Derelect** – State of deficiencies and failure to maintain renders the property unfit for use and may pose direct hazard to occupants and/or the general public. For these properties, either major rehabilitation or demolition and replacement will be required.

Generally, the property appears to have been constructed within typical industry standards for the building type and period of construction. However, based on the findings of this PCA, the subject property is considered to be in **FAIR** overall condition. The major deficiencies and deferred maintenance issues are as follows:

- The interior stairs are in need of replacement within 5 yrs.
- The shingle roofing system is in need of replacement
- The apparatus room floor is in need of repair
- The fire detection/notification and protection systems are inadequate.

1.3 Recommendations – Table 1

See various sections of this Report for details. For the Summary of Recommendations see Table 1, Attached.

Immediate and Short Term Repairs - Table 1
 Opinion of Probable Costs
 Building #B142 - Firehouse 35. NORTH SIDE
 MCMS Project No. 13-707.10

| Section | Item | Quantity | Unit | Unit Cost | Cycle Replacement | Replacement % | Immediate Total | Short-Term Total |
|---------------|--|----------|------|-----------|-------------------|---------------|-----------------|------------------|
| 3.1 | SITE | | | | | | | |
| a | Remove vegetation from existing brick paving (in-house) | 1 | EA | \$0 | | | | |
| b | Repair concrete apron and seal joints | 1 | EA | \$5,000 | | | | \$5,000 |
| 3.2 | SUBSTRUCTURE | | | | | | | |
| 3.3 | SHELL | | | | | | | |
| b | Replace shingle roofing system | 5,000 | SF | \$22 | | | | \$110,000 |
| c | Replace EPDM roofing system at tower (5yrs) | 200 | SF | \$28 | | | | \$5,500 |
| 3.4 | INTERIORS | | | | | | | |
| a | Repair interior stairs (5yrs) | 1 | EA | \$15,000 | | | | \$15,000 |
| b | Evaluate north wall at apparatus room for fire protection rating (A/E study) | 1 | EA | TBD | | | | |
| 3.5 | SERVICES | | | | | | | |
| | Plumbing | | | | | | | |
| a | Install backflow preventer | 1 | EA | \$3,300 | | | | |
| | HVAC | | | | | | | |
| b | Boiler safety testing | 1 | EA | \$250 | | | \$250 | |
| c | Close off hose drying tower at basement | 1 | EA | \$1,500 | | | | \$1,500 |
| | Fire Protection | | | | | | | |
| d | Remove LP gas tank | 1 | EA | \$0 | | | | |
| e | Add Fire Alarm devices and fire extinguishers | 1 | EA | \$1,800 | | | | \$1,800 |
| f | GFI receptacles | 1 | EA | \$1,800 | | | | \$1,800 |
| g | Emergency Light/sign fixtures | 3 | EA | \$2,750 | | | | \$8,250 |
| h | CO detector in Boiler Room | 1 | EA | \$3,500 | | | | \$3,500 |
| | Electrical | | | | | | | |
| 3.6 | EQUIPMENT AND FURNISHINGS | | | | | | | |
| 3.7 | SPECIAL CONSTRUCTION | | | | | | | |
| TOTALS | | | | | | | \$250 | \$152,350 |

2 Team, Purpose and Scope

2.1 PCA Team

Team Lead, Site, Architectural, Accessibility, Drawings:

Massaro CM Services, LLC

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2.2 PCA Purpose & Scope

Massaro Construction Management Services (MCMS) is providing Property Condition Assessment (PCA) services in general accordance with the ASTM E2018-08 *Standard Guide for Property Condition Assessments; Baseline Property Condition Assessment*. This standard is widely recognized in the real estate industry as a benchmark tool for evaluating the condition of real property. The City of Pittsburgh is undertaking a multi-year effort to complete PCA's with the following goals:

- Gain greater insight into the current scope and condition of their real property assets.
- Quantify physical deficiencies and immediate repair needs along with short and medium term capital reserve needs for preservation of those assets.
- Identify opportunities to implement Energy Efficiency Measures (ECM) to reduce energy use and hence, energy and/or demand costs.

The general scope of work in a typical PCA includes the following tasks:

- Document Review and Interviews
- Walk-Through Survey
- Opinion of Probable Costs
- Property Condition Report

2.3 Document Review and Interviews

Documents provided by the Owner include: drawings dated 1980, 1983 and 1988 for structural and electrical modifications. It is unclear when the Firehouse was originally constructed. Although formal interviews were not performed the Point of Contact (POC) Mr. Henry Cafardi, Facilities Maintenance Supervisor, was available to answer questions.

2.4 Walk-Through Survey

The scope of the walk-through survey was limited to representative visual observations of site and property improvements and should NOT be considered all-inclusive. It is conducted without protective clothing, exploratory probing, removal or relocation of materials, testing, or the use of equipment, such as ladders (except as required for roof access), stools, scaffolding, metering/testing equipment, or devices of any kind. Out-of scope issues include but are not limited to:

- Operating, measurement and/or testing of any building systems.
- Assessment of any process-related equipment or systems.
- Assessing components of systems that are not readily observable.
- Entering limited access or confined spaces.
- Accessing pitched roof areas or any roof area that appears unsafe.
- Determining applicability of Life Safety/Fire Protection code requirements.

2.5 Opinion of Probable Costs

Replacement, repairs, and routine maintenance of various building components and systems are discussed in various sections of this report and opinions of their probable costs are summarized for the evaluation period in the attached tables. Per ASTM E2018-08; costs indicated should be considered preliminary, order of magnitude budgets. Actual costs most probably will vary from those contained within depending on such matters as type and design of suggested remedy, quality of materials and installation, manufacturer and type of equipment or system selected, field conditions, whether a physical deficiency is repaired in part or replaced in whole, phasing of the work (if applicable), quality of contractor, quality of project management exercised, market conditions, and whether competitive pricing is solicited, etc. Certain opinions of probable costs can not be developed within the scope of this assessment without further study. Where applicable, the opinion of the probable costs for further study will be included.

- **Immediate Costs** are to remedy those deficiencies that require immediate action as the result of any of the following:
 - material existing or potential unsafe condition
 - material building or fire code violations
 - conditions that if left uncorrected have the potential to result in or contribute to critical element or system failure within one year or will result most probably in a significant escalation of its remedial cost.
- **Short-Term Costs** are to remedy physical deficiencies, such as deferred maintenance, that may not warrant immediate attention, but require repairs or replacements that should be undertaken on a priority basis in addition to routine preventative maintenance. Unless noted otherwise, generally the time frame for such repairs is 1-2 years. Such opinions of probable costs may include costs for testing, exploratory probing, and further analysis; or these services may be evaluated separately.

2.6 Property Condition Report (PCR)

The Property Condition Report documents the findings of the PCA. This report is for the use of this Client only, for the stated purpose above. Specific language in the descriptions of the various PCA processes, intent, scopes of work, and/or definitions throughout Section 1-2 of this PCR are excerpted directly in whole or in part from the ASTM E2018-08 Standard (herein the ‘Standard’) document without specific attribution. All rights remain with the ASTM. In the event of any discrepancy between statements in this Report and the Standard, the scope and intent in the respective sections of the Standard shall govern. A complete copy of the Standard may be made available upon request.

2.7 Additional Scope Considerations

For this assessment, in addition to the baseline PCA tasks, further considerations are taken into account and additional deliverables are included as follows:

- **Schematic Floor Plans** – Produced using Autodesk Revit™ Building Information Modeling (BIM) software, and including limited field check of representative dimensions and documentation of changes to layout. These drawings and associated floor area information provide a helpful quick reference tool for General Services and Architectural Division staff. They are schematic in nature and should NOT be considered complete documentation of as-built conditions. City develop a BIM Standard and/or Computer Aided Facilities Management (CAFM) program in the future, this initial modeling effort can be further enriched and aligned with those initiatives.
- **Energy Audit** – Level 1, Walk-Through Analysis, per the *Procedures for Commercial Building Energy Audits, 2nd Ed.* Published by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE). This Audit provides an overview of building systems and their functional operation, benchmarks the Energy Use Index (EUI) of the subject property against comparables, identifies low/no-cost changes to current Operations and Maintenance (O&M) process to provide savings, and identifies potential capital improvements for further study.

3 Element Descriptions and Observations

3.1 Site

The building is located on an approximately two-tenths acre (0.2AC) parcel. Overall the Site is in Fair condition.

1. Topography and Drainage – The site rises slightly from Orchlee St. but is relatively flat and appears to be positively drained away from the building.
2. Access and Egress – Limited vehicle access to the subject property is available from Orchlee St. on the east side of the building. The narrow brick paved drive along the east side is not wide enough for access past the stairwell to basement. There is a gravel drive on the adjacent property to the west that may or may not have been used informally for vehicle access to the west side of the site. Egress from the building to grade is available from the first and lower levels.
3. Paving, Curbing and Parking – The site paving is generally brick. Concrete apron and adjacent walk have areas of joint spalling but are in Fair condition. Accessible parking is NOT available. The only on-site parking that appears to be usable is one space at the east side of the apron on Orchlee St. Overall the site paving is in Fair condition.

Recommendations:

- Remove vegetation from existing brick paving.
 - Repair concrete apron and seal all joints.
4. Landscaping and Appurtenances – Landscaping and plantings consist primarily of grass lawns in Fair condition. On the day of the PCA it appears that the lawn at the west was recently damaged by a manlift used during masonry repairs/restoration.
 5. Site Amenities / Accessory Structures- The flagpole is in Fair condition.

3.1 Site: Photos



ST1 – Looking NW from Orchlee St.



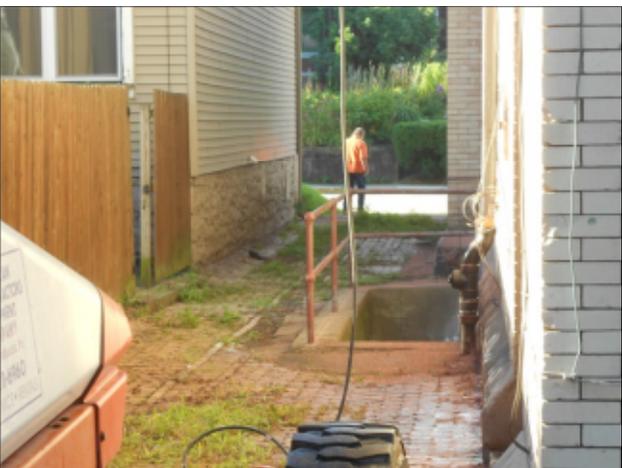
ST2 – Looking north from Orchlee St. – the driveway at left is on adjacent property; damage to lawn from manlift is apparent



ST3 – Looking east along the north wall



ST4 – Looking SW along the north wall



ST5 – Looking south along brick paved drive at east side



ST6 – Looking north along brick paved drive at east side

3.2 Substructure

This visual inspection included the observation of the substructure including foundation and basement construction. Overall the Substructure is in Good condition.

1. Foundation
 - a. Constructed of stone masonry - Good condition
 - b. Areas of foundation wall were supplemented with newer CMU wall construction at interior during structural repairs.
 - c. The exterior basement stair well has a few light cracks.
2. Slab on grade: The basement floor is concrete and has some light cracks and areas of spalling. Prior repairs are evident.

3.2 Substructure: Photos



SS1 – Lower level - original masonry foundation and newer CMU infill



SS2 – Lower level looking east at door to exterior stair up to grade

3.3 Shell

1. Overall the Shell is in POOR condition.
2. Building Frame
 - 2.1. The floor system is reinforced concrete T Beams that have been additionally supported by steel framing the steel framing has one area of heavy rust
 - 2.2. The concrete floor slab has 6' x27' area that has severe spalling with exposed rusted rebar and the overhead door area
 - 2.3. There is 4'x4' area at an old hatch door that has heavy spalling with exposed rebar
 - 2.4. The concrete floor has areas of map cracking

Recommendations: - 1 Year: Repair Concrete Floor - \$25,000

3. Building Facade
 - 3.1. Construction: The building walls are constructed with brick masonry. Wall penetrations include: 1 garage door with wood frame, 3 man doors with wood frames, 24 windows with metal sashes and metal frames, 13 wood louvers in the tower.
 - 3.2. Condition: They are currently being cleaned and repointed
4. Roof Deck
 - 4.1. Construction: The roof deck is wood sheathing supported by a wood truss system.
 - 4.2. Condition: No conditions were observed that would indicate deck problems.
5. Roof Insulation
 - 5.1. Construction: No core cuts were taken.
 - 5.2. Condition: No insulation is assumed to be installed on the sloped roof areas or the tower area.
6. Roof System
 - 6.1. Construction: The roof system on both sloped areas is three tab, fiberglass shingles. The drawings indicate the shingles were installed in 1989. The roof system on the Tower area is a fully adhered EPDM membrane.
 - 6.2. Condition: The shingle roof systems appeared in poor condition. Some shingles are missing, broken and loose. Some shingles have been replaced. The EPDM roof system appeared in fair condition. The membrane is loose from the wall and bridged.
7. Flashings
 - 7.1. Construction: Aluminum flashing is installed in the sloped roof around the Hose Tower and around the chimney.
 - 7.2. Condition: The flashings appear to be in fair condition.
8. Perimeter Terminations
 - 8.1. Construction: The sloped roof building walls end at the eave line. The eaves and gable areas are constructed with a detailed painted wood cornice. The Tower roof walls extend above the roof line and are terminated with stone coping covered with EPDM membrane.
 - 8.2. Condition: The cornices are in fair condition. The paint is peeling. Some repairs were observed.

9. Roof Top Penetrations

- 9.1. Firehouse 35: 1 vent pipe, 1 chimney on the main roof area.
- 9.2. Condition: The penetrations are in fair condition.

10. Drainage System

- 10.1. Construction: The Hose Tower roof drains into an interior roof drain. The Main roof area and Porch roof area slopes to and drains into a copper hanging gutter system with copper downspouts. It appears there is slope to the drains in the gutters.
- 10.2. Condition: These gutters are in fair condition and there was no evidence of leakage observed.

11. Access: Providing an extension ladder is the only access to the roof areas.

CONCLUSIONS

One leak stain was observed in the second floor area of the SE corner of the Tower.

The building walls are in fair condition. A few defects were observed. A few cracks were observed in the stone foundation walls. A few brick joint cracks were observed. The masonry is being cleaned and repaired now.

The roof decking appears to be in fair condition. We did not observe any signs that would suggest a serious problem with the roof decking systems at this time.

The shingle roof systems are in poor condition. Some shingles are loose, broken and missing. The EPDM roof system on the Tower is in fair condition. Some membrane shrinkage was observed.

The painted wood trim is in poor condition. Numerous areas of peeling paint were observed.

The roof top penetrations are in fair condition.

The drainage system is in fair condition. Any debris should be cleaned from the gutter system and continued to be cleaned twice yearly.

With proper Maintenance and corrective repairs, it is our opinion that the EPDM roofing system on the Tower is in a maintainable condition for the next five years. The shingle roof systems are 24 years old and should be replaced.

Estimates:

1 year: Replace the shingle roof systems – Estimated cost: \$50,000 (5,000 SF x \$10/SF). Paint all wood trim – Estimated cost: none (can be performed in house). Inspect roofs and walls yearly and remove debris from the gutter system.

5 year: Replace the EPDM roofing system – Estimated cost: \$4,000 (200 SF x \$20/SF)

10 year: Maintain a pro-active maintenance program. Inspect the roof system and walls on a regular schedule – minimum twice a year (late spring and late fall). Estimated cost: none (perform in-house)

3.3 – Shell: Photos



SH1 – View from above – Orchlee St. is at right, north is to the left



SH2 – 'Repair' of masonry damage at apparatus door



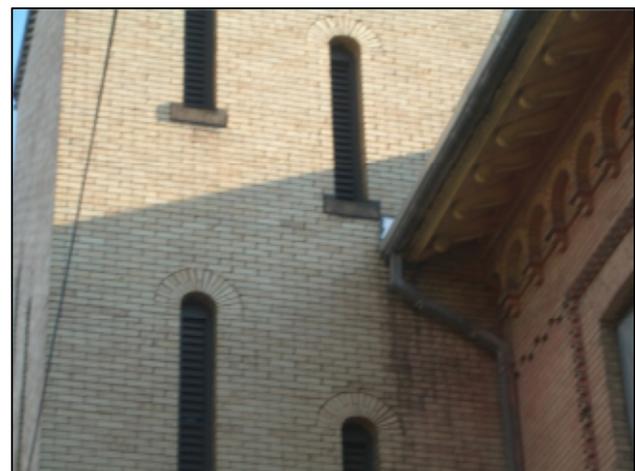
SH3 – Basement stair well



SH4 – Peeling paint at cornice



SH5 – Masonry repair in progress at lintel



SH6 – Typical louvers at tower

3.3 – Shell: Photos Continued



SH7 – Missing and damaged shingles at west face



SH8 – Missing, damaged and lifting shingles



SH9 – EPDM membrane on tower, roofed over skylight, loose and bridged flashing



SH10 – Tower roof – loose and bridged flashing



SH11 – South face of porch roof



SH12 – West face of porch roof

3.4 Interiors

1. Interior Construction

- 1.1. Interior partitions are primarily wood framed with cement plaster or drywall and are in fair condition.
- 1.2. The partition separating the Apparatus Bay from the Kitchen / Dining Area is constructed of wood and offers little or no fire separation rating. This appears to be a safety hazard.
- 1.3. Doors and frames are typically wood construction with commercial grade hardware.

Recommendation – Evaluate partition at Apparatus Bay / Kitchen for fire rating and determine required level of compliance.

2. Stairs

- 2.1. The tower staircase interior is wood construction and in very poor condition. There are cracked stringer boards and supports that have pulled away from the wall and bricks have step cracking near anchor points of stairs
- 2.2. The stair area landing on the first floor is wooden and has heavy rot
- 2.3. The stair flight down to the basement has low headroom and is marked with a warning sign

Recommendation – 5 year: Replace Interior Stairs- \$15,000

3. Interior Finishes – Typical flooring throughout the building is resilient tile in Fair condition. Ceilings are typically ACT throughout and are in Fair condition. The ceiling in the apparatus room is pressed tin.

3.4 Interiors: Photos



11 – Apparatus bay



12 – Wood partition separating apparatus bay from Kitchen / Dining area



13 – Kitchen / Dining



14 – Fitness Center / Lounge



15 – Dormitory



16 – Lower level – Storage / Laundry / Work Area

Building Mechanical Systems: HVAC 4.5.1

1. HVAC System – General Description: Primary space heating for fire station is supplied by a central hot water system. It is comprised of central equipment, distribution systems, and room level terminal units. The boiler, piping, and room terminal units are reported to be original to the building. Space cooling is provided by window air-conditioning units (WACU).
 - 1.1. Room level terminal units: Room based heating terminals are comprised of various combinations of local window air conditioners, hot water convectors, and exhaust fans. Individual room heating units are interconnected with hot water supply and return distribution piping.

| Room | Heating | | | Cooling | | | Ventilation | | | TStat | Notes - Comments |
|-------------------|---------|-----|----|---------|-----|-----|-------------|----|-----|-------|----------------------------|
| | RAD | BBD | UH | WACU | SAG | RAG | EAG | EF | GRV | | |
| Men's Dorm | 2 | - | - | 1 | - | - | - | - | - | - | One (1) RAD control valve |
| Women's Dorm | 1 | - | - | 1 | - | - | - | - | - | - | One (1) RAD control valve |
| Lieutenant's Room | 1 | - | - | 1 | - | - | - | - | - | - | One (1) RAD control valve |
| Weight Room | 2 | - | - | 2 | - | - | - | - | - | - | Two (2) RAD control valves |
| Locker Room | 1 | - | - | - | - | - | - | - | - | - | One (1) RAD control valve |
| Toilet | 1 | - | - | - | - | - | - | - | - | - | One (1) RAD control valve |
| Lounge w/ Kitchen | 1 | - | - | 1 | - | - | - | - | - | - | No RAD control valve(s) |
| Apparatus room | - | - | - | - | - | - | - | - | - | - | No RAD control valve(s) |
| Basement | - | - | - | - | - | - | - | - | - | - | Portable dehumidifier |

BBD = Hot Water Base Board - Copper Fin-Tube Element
 DCVEX = Direct Connect Vehicle Exhaust System (Nederman)
 EAG = Exhaust Air Grille
 EF = Exhaust Fan
 GRV = Gravity Relief Ventilator
 RAD = Cast Iron Hot Water Radiator
 RAG = Return Air Grille
 SAG = Supply Air Grille
 TStat = Thermostat
 UH = Hot Water Unit Heater - Integral Fan
 WACU = Window Air Conditioning Unit

1.1.1. Condition: Room terminal units - **Derelect**

- | | |
|---|--|
| 1.1.1.1. Safety Deficiencies: | Gasoline storage containers paled on hot water radiators |
| 1.1.1.2. Physical Deficiencies: | None reported or observed |
| 1.1.1.3. Functional Deficiencies: | None reported or observed |
| 1.1.1.4. Performance Deficiencies: | None reported or observed |
| 1.1.1.5. Maintenance observations: | WACU casing corrosion |
| 1.1.1.6. Remaining useful life observations (RUL) | |
| 1.1.1.6.1. WACU: | 1-3 years |
| 1.1.1.6.2. Heating, Cooling, Ventilation: | 3-5+ years |
| 1.1.1.6.3. DCVEX: | 10+ years |

1.2. Heating Distribution System: The hot water heating distribution system includes black steel hot water supply and return piping and one (1) in-line centrifugal hot water pump.

1.2.1. Construction

- 1.2.1.1. Hot water piping: Black steel
- 1.2.1.2. Piping Insulation: None Observed
- 1.2.1.3. One (1) Pumps: Fractional HP, in-line centrifugal
- 1.2.1.4. Pump controls: Partially de-commissioned

1.2.2. Condition: Heating distribution system - **Poor**

- 1.2.2.1. Physical Deficiencies: No piping insulation
- 1.2.2.2. Functional Deficiencies: None reported or observed
- 1.2.2.3. Performance Deficiencies: None reported or observed
- 1.2.2.4. Maintenance observations: None reported or observed
- 1.2.2.5. Remaining useful life observations (RUL)
 - 1.2.2.5.1. Pump: 3-5 years

1.3. Central Boiler System:

1.3.1. Construction: The hot water system consists of two (2) Hydrotherm Hot water boiler (195 MBH), one (1) circulation pump, black steel circulation piping, expansion tank, black steel fuel piping, boiler mounted safety devices, and vent pipe, and temperature controls. The boiler is fuelled by natural gas and is natural combustion type. The boiler, circulating pump, control system are functioning beyond their expected useful life (EUL), and are located in the basement mechanical equipment room (MER). **The Physical clearance from the boiler to clothes washer is less than minimum requirement. Potential L&I violation.**

1.3.2. The hot water heating control system consists of original, partially decommissioned field mounted devices. Boiler manufacturer and BTU capacity information not available.

| <u>Location</u> | <u>Boiler</u> | <u>Type</u> | <u>Fuel</u> | <u>Comb</u> | <u>Pump(s)</u> | <u>Type</u> | <u>XTank</u> | <u>CA</u> | <u>Control</u> | <u>Comments</u> |
|--------------------|---------------|-------------|-------------|-------------|----------------|-------------|--------------|-----------|----------------|----------------------------------|
| Basement M.E.R. | 2 | HW | NG | ND | 1 | ILC | 1 | Yes | Decom. | No boiler inspection certificate |

Note 1: Boiler safety devices and control testing not included in project scope.

Note 2: Boiler inspection should be performed by competent official as required by L&I.

Note 3: Boiler safety devices testing should be performed by competent technician, twice during heating season.

CA = Combustion Air supply duct

Comb = Combustion Type

Decom. = De-Commissioned, Partial

HW = Hot Water

ILC = In-Line Centrifugal Pump

M.E.R. = Mechanical Equipment Room

ND = Natural Draft

NG = Natural Gas

X-Tank = Thermal Expansion Tank

1.3.3. Condition: Central Boiler - **Poor**

- 1.3.3.1. Safety Concerns: None reported or observed
- 1.3.3.2. Physical Deficiencies: No high discharge CA grill on CA duct
- 1.3.3.3. Functional Deficiencies: None reported or observed
- 1.3.3.4. Performance Deficiencies: OA reset
- 1.3.3.5. Maintenance observations: Physical clearance to clothes washer
- 1.3.3.6. Remaining useful life observations (RUL): 3-5 years

Note: The field audit and PCA did not include functional testing of boiler safety devices, water heater safety devices, nor fire or smoke alarm systems.

1.4. Controls

- 1.4.1. Construction: The central and room level control systems are reported to be original to the building. The controls are observed to be in a partially de-commissioned state. The boiler and hot water pump controls appear to employ outside air temperature input.
- 1.4.2. Condition: Controls - **Poor**

1.5. Performance Observations

- 1.5.1. Energy and Sustainability: The heating system is consuming excess natural gas due to lack of fully functioning controls for the hot water heating system, old low efficiency boiler, uncalibrated thermostats, lack of local control from self-contained radiator thermostatic valves, and lack of set-back controllers. The resulting excess in energy consumption is estimated at 15% of the related utility bills.

2. Utilities
 - 2.1. General Description: Natural gas.
 - 2.2. Construction
 - 2.2.1. Low pressure natural gas meter and associated threaded, black steel piping.
 - 2.3. Condition Assessment: **Fair**

3. Energy Performance Summary
 - 3.1.1. Preliminary Energy-Use Analysis

4. Conclusion:
 - 4.1. The HVAC system as a whole is in poor condition.

5. Estimates: Suggested remedies and opinions of probable Cost
 - 5.1. De minimus conditions
 - 5.1.1. Boiler Safety Testing: \$250 (Fire and Ice heating)
 - 5.1.2. De-lamp lighting fixtures to new ASHRAE/IES standard.
 - 5.2. Immediate Costs
 - 5.2.1. Replace old uncalibrated thermostat with programmable, wireless device: \$800
 - 5.2.2. Close-off hose drying tower: \$1,500
 - 5.2.3. Install 2nd combustion air grill in existing ductwork: \$750
 - 5.3. Short-Term Costs
 - 5.3.1. Replace Three (3) existing manual lighting switches with motion based detectors (occupancy): \$2,000
 - 5.3.2. MER Insulation (Armaflex type): \$2,000
 - 5.3.3. Install Three (3) Motion based occupancy detectors for Window Air Conditioning Unit control (WACU): \$1,600
 - 5.3.4. Install OA reset controller (Tekmar 246 - BacNet): \$2,800
 - 5.3.5. Install vent damper for boiler systems, HWS and HWR sensors: \$3,600
 - 5.3.6. Install new wireless, WEB based Energy Management Controller/Gateway/WEB server: \$4,000
 - 5.3.7. Replace existing boiler with high efficiency model (Triad 600SH): \$26,000

6. Energy Conservation

6.1.1. Preliminary Energy Efficiency Measures: EEM's

EEM Summary Table

| Measure Number | Measure Description | Expected energy reduction* | Estimated cost with Incentive | | |
|--------------------------------------|--|----------------------------|-------------------------------|-----------------------------|------------------|
| | | | Measure Cost | Potential Utility Incentive | Net Measure Cost |
| EEM-1 | A: Replace old uncalibrated thermostat(s) with programmable, wireless devices. B: Replace existing manual lighting switches with motion based detectors (occupancy). C: Install pipe insulation at boiler supply and hot water supply. D: De-lamp lighting fixtures to new ASHRAE/IES standard. | 9% | \$ 4,400 | \$ 200 | \$ 4,200 |
| EEM-2 | Extend motion based occupancy detectors to Window Air Conditioning Unit control (WACU). | 5% | \$ 1,600 | \$ 150 | \$ 1,450 |
| EEM-3 | A: Install OA reset controller (Tekmar 246 - BacNet). B: Actuated vent damper for boiler systems, HWS and HWR sensors. C: Domestic water temperature set-back controls. | 7% | \$ 6,800 | \$ 200 | \$ 6,600 |
| EEM-4 | Install new wireless, WEB based Energy Management Controller/Gateway/WEB server | 10% | \$ 4,000 | \$ 400 | \$ 3,600 |
| TOTALS (Recommended Measures) | | 15%** | \$ 16,800 | \$ 950 | \$ 15,850 |

* Percentage of contributing system, not overall energy cost

** Expected percentage of overall gas and electrical energy cost

4.5.1.1 – HVAC: Roof and perimeter



HVAC 1 – WACU-1



HVAC 2 – WACU-2



HVAC 3 – WACU-3



HVAC 4 – DCVEX Exhaust fan

4.5.1.2 – HVAC: 1st Floor



HVAC 5 – Apparatus room



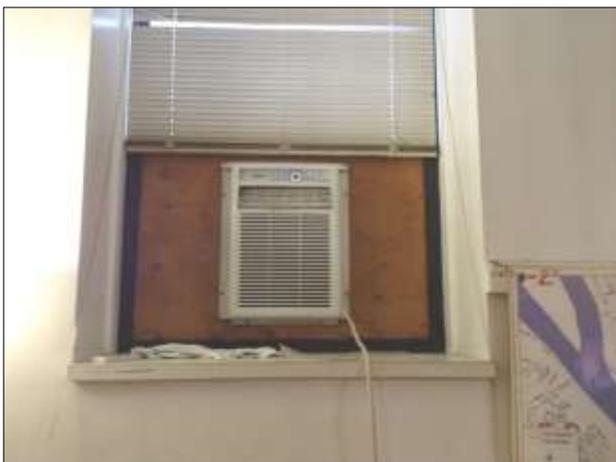
HVAC 6 – Hot water radiator (Gasoline Storage)



HVAC 7 – Exhaust Duct (abandoned in place)



HVAC 8 – Hot water radiator Leak



HVAC 9 – WACU-4



HVAC 10 – Hot water radiator - 1

4.5.1.3 – HVAC: 2nd Floor



HVAC 11 – WACU-5



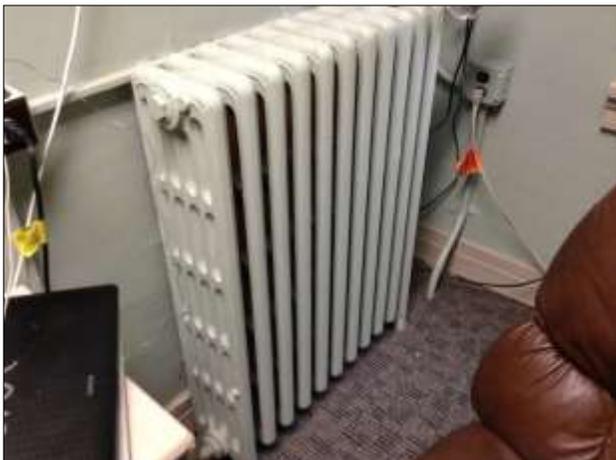
HVAC 12 – Hot water radiator - 2



HVAC 13 – Self-contained radiator control valve



HVAC 14 – Hot water radiator - 3



HVAC 15 – Hot water radiator - 4



HVAC 16 – Thermostat

4.5.1.4 – HVAC: Boilers



HVAC 17 – Hot water boiler - 1



HVAC 18 – Hot water boiler - 2



HVAC 19 – Hot water boiler - 3



HVAC 20 – Hot water boiler - 4



HVAC 21 – Hot water boiler - 5



HVAC 22 – Make-up water pressure regulator (PRV)

4.5.1.5 – HVAC: Boiler, Utilities, and Misc.



HVAC 23 – Hot water pump



HVAC 24 – Hot water boiler - 6



HVAC 25 – Hot water heating boiler - 7



HVAC 26 – Natural gas meter

Building Electrical Systems 4.5.2

1. Interior Lighting

1.1. General Description: interior lighting is provided to the building by a combination of windows, and recessed mount and surface mount florescent fixtures.

1.2. Construction

| Room | Lighting Fixtures | | | Type | Lamps | | | W2 | Comments |
|-----------------------|-------------------|---------|--------|---------|-------|----|------|-------|----------------------------|
| | Q1 | Mount | Length | | W1 | Q2 | Type | | |
| Men's Dorm Room | 6 | Recess | 4' | Fluor. | 32 | 4 | T8 | 614 | Man Sw, Mag Bal, 8'AFF |
| Women's Dorm Room | 2 | Recess | 2' | Fluor. | 25 | 4 | T8 | 160 | Man Sw, Mag Bal, 8'AFF, NL |
| Lieutenant's Room | 3 | Recess | 2' | Fluor. | 25 | 4 | T8 | 240 | Man Sw, Mag Bal, 8'AFF, NL |
| Weight Room | 6 | Recess | 4' | Fluor. | 32 | 4 | T8 | 614 | Man Sw, Mag Bal, 8'AFF, NL |
| Locker Room | 4 | Recess | 4' | Fluor. | 32 | 4 | T8 | 410 | Man Sw, Mag Bal, 8'AFF |
| Toilet | 2 | Recess | 4' | Fluor. | 32 | 4 | T8 | 205 | Man Sw, Mag Bal, 8'AFF, NL |
| Hallway | 1 | Surface | 4' | Fluor. | 32 | 4 | T8 | 102 | Man Sw, Mag Bal |
| Stairwell | 2 | Surface | 4' | Fluor. | 32 | 2 | T8 | 102 | Man Sw, Mag Bal |
| Stairwell to Attic | 3 | Surface | na | Incand. | 75 | na | na | 225 | Not working |
| Lounge w/ Kitchen | 6 | Recess | 4' | Fluor. | 32 | 6 | T8 | 922 | Man Sw, Mag Bal, NL |
| Apparatus room (a) | 6 | Suspend | 8' | Fluor. | 80 | 2 | T12 | 960 | Man Sw, Mag Bal |
| Apparatus room (b) | 1 | Suspend | 4' | Fluor. | 80 | 1 | T8 | 320 | Man Sw, Mag Bal, 8'AFF |
| Apparatus room (c) | 1 | Suspend | na | Incand. | 75 | na | na | 75 | Man Sw |
| Apparatus room (d) | 1 | Suspend | 4' | Fluor. | 40 | 4 | T12 | 160 | Man Sw, Mag Bal, 8'AFF |
| Total: Apparatus room | | | | | | | | 1,515 | |
| Stairwell (a) | 1 | Surface | 4' | Fluor. | 32 | 2 | T8 | 51 | Man Sw, Mag Bal, 8'AFF |
| Stairwell (b) | 1 | Surface | 4' | Fluor. | 40 | 1 | T12 | 40 | Man Sw, Mag Bal, 8'AFF |
| Total: Stairwell | | | | | | | | 91 | |
| Toilet | 1 | Surface | na | Incand. | 75 | na | na | 75 | Man Sw |
| Main Room (a) | 7 | Surface | 4' | Fluor. | 32 | 2 | T8 | 358 | Man Sw, Mag Bal, 8'AFF |
| Main Room (b) | 1 | Surface | na | Incand. | 75 | na | na | 75 | Man Sw |
| Total: Main Room | | | | | | | | 433 | |
| Storage | 1 | Surface | na | Incand. | 75 | na | na | 75 | Man Sw |
| Perimeter | 3 | Surface | na | HPS | 150 | na | na | 450 | Photo Cells not working |

Note #1: Four (4) total lamps out

AFF = Mounting Height Above Finished Floor

Flour = Fluorescent

Length = Standard Fixture Length

Mag Bal = Magnetic Ballast

Man Sw = Manual Wall Switch

NL = Natural Lighting

Q1 = Fixture Quantity

Q2 = Lamp Quantity per Fixture

W1 = Watts per Lamp

W2 = Watts/room (Net: 0.80 BF applied for T8 fixtures)

1.3. Condition Assessment: Interior

1.3.1. Condition: Fair

2. Power Distribution
 - 2.1. Construction and condition
 - 2.1.1. Distribution panels (original to building): Condition-**Fair**
 - 2.1.2. General Receptacles (original to building): Condition-**Fair**

3. Utilities Service
 - 3.1. Construction
 - 3.1.1. One (1) 3-phase original electric service.
 - 3.2. Condition Assessment
 - 3.2.1. Condition Power Service: **Fair**
 - 3.2.2. Condition Electric Meter: **Good**

4. Conclusions:
 - 4.1. The interior electrical system as a whole is in fair condition.

5. Estimates: Suggested remedies and Opinion of probable cost
 - 5.1. Immediate Costs
 - 5.1.1. Replace three (3) light switches at base of stairwell: \$300

4.5.2.1 –Interior Lighting: 1st Floor



E1 – Apparatus room



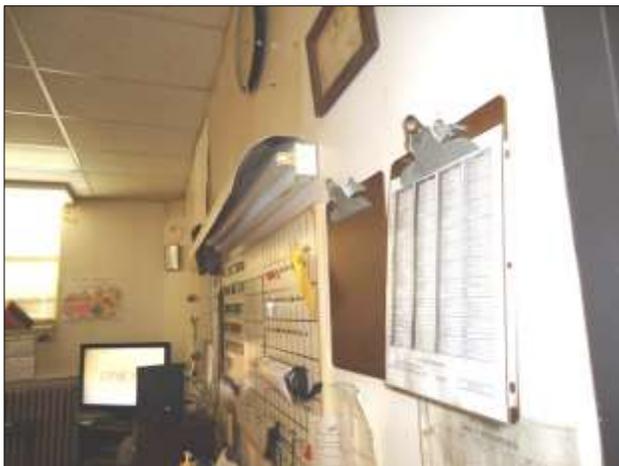
E2 – Apparatus room - 2



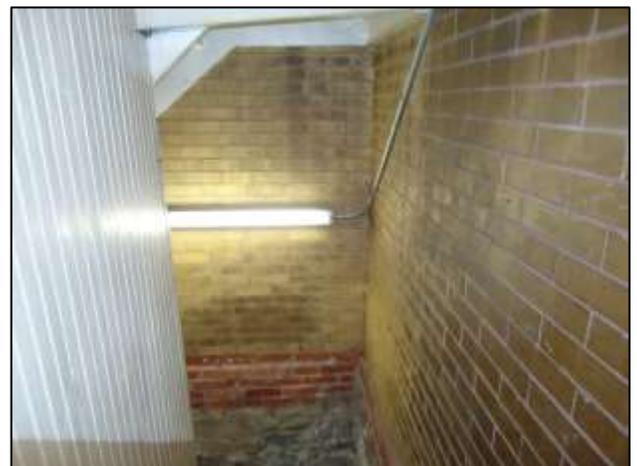
E3 – Kitchen



E4 – Apparatus room - 1



E5 – Apparatus room - 2



E6 – Apparatus room - 3

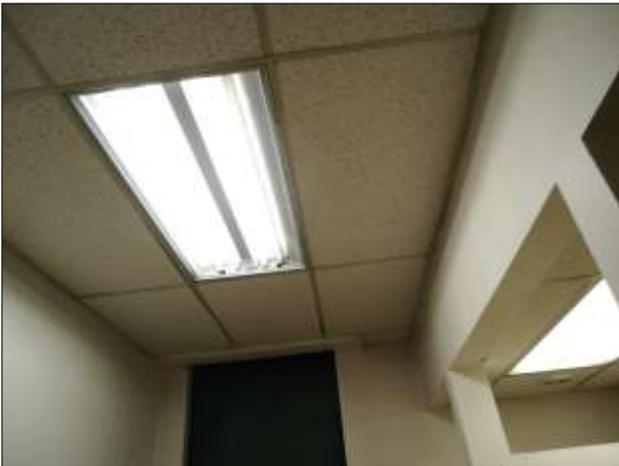
4.5.2.2 –Interior Lighting: 2nd Floor



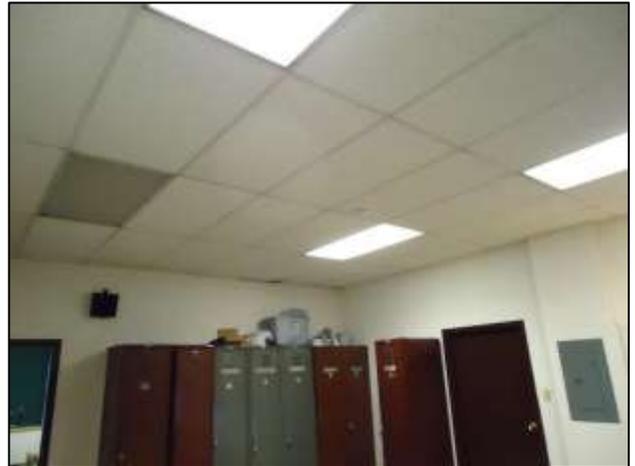
E7 – Recessed fixture dormitory



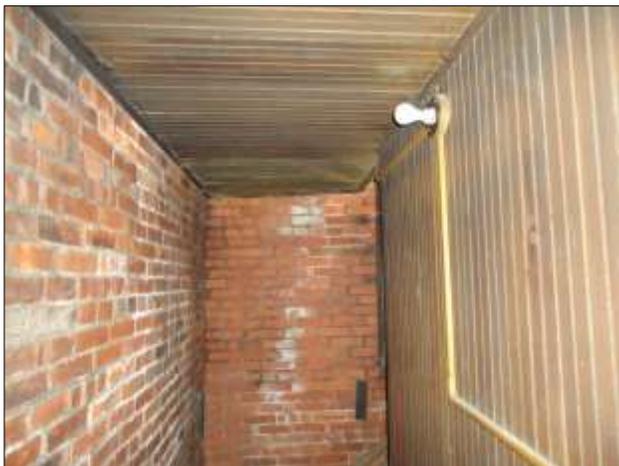
E8 – Recessed fixture - 1



E9 – Recessed fixture - 2



E10 – Locker area



E11 – Incandescent light



E12 – Exercise room

4.5.2.3 –Interior Lighting: Basement



E13 – Basement area -1



E14 – Basement area -2



E15 – Basement area -3



E16 – Boiler / Laundry (clearance issue)



E17 – Basement area - 4

4.5.2.4 – Electrical: Perimeter lighting, Electric-Service-Distribution-Receptacles



E18 – Electric service - 1



E19 – Electric meter



E20 – Electric service - 2



E21 – Breaker panel 1st floor



E22 – Breaker panel 2nd floor



E23 – Perimeter lighting - 2

Building Plumbing Systems 4.5.3

1. Fixtures

- 1.1. General Description: The plumbing system is served by a combination of sanitary fixtures, supply and drain piping, and supply water meter service. Serving the locker room, men’s and ladies’ rooms, lunch room kitchen area, and laundry.
- 1.2. Construction
 - 1.2.1. Two (2) toilets
 - 1.2.2. Three (3) lavatory sinks
 - 1.2.3. One (1) shower head
 - 1.2.4. One (1) kitchen type sink
 - 1.2.5. One (1) janitor’s sink
- 1.3. Condition Assessment
 - 1.3.1. Condition: **Fair**

2. Domestic Water Production

Construction: The domestic water heating system is served by one (1) A.O. Smith ProMax 50 gallon, commercial water heater and supply piping.

| <u>Location</u> | <u>DWH</u> | <u>Type</u> | <u>CAP</u> | <u>Fuel</u> | <u>Pump</u> | <u>SSw</u> | <u>XTank</u> | <u>PRV</u> | <u>CA</u> | <u>Control</u> | <u>Comments</u> |
|--------------------|------------|-------------|------------|-------------|-------------|------------|--------------|------------|-----------|----------------|----------------------------|
| Basement M.E.R. | 1 | Tank | 50 | NG | No | Yes | No | No | Yes | Unit | Installation Date: 3/29/10 |

Note 1: Water heater safety devices and control testing not included in project scope.

Note 2: Water heater safety devices testing should be performed by competent technician.

- CA = Combustion air source: dedicated
- CAP = Storage Capacity: Gallons
- DWH = Domestic Water Heater
- M.E.R. = Mechanical Equipment Room
- NG = Natural Gas
- PRV = Pressure relief valve with extension piping
- SSw = Spill Switch: Draft safety
- XTank = Thermal Expansion Tank

2.1.1 Water Heater Condition: **Fair**

3. Utilities

- 3.1 General Description: Potable water supply
- 3.2 Construction
 - 3.2.1 Original meter, shut-off valve, and piping.
 - 3.2.2 No back-flow prevention.**
- 3.3 Condition Assessment: **Fair**

4. Conclusions:

- 4.1 The plumbing systems are in fair to poor overall condition. Routine maintenance should continue to extend serviceability. Building water pressure is observed to be excessive due to the presence of secondary pressure regulation devices.

5. Estimates: Suggested remedies and Opinion of probable cost

- 5.1 De minimus conditions
 - 5.1.1 Insulate supply pipes from water heaters.
- 5.2 Immediate Costs
 - 5.2.1 Install back-flow preventer: \$2,000.

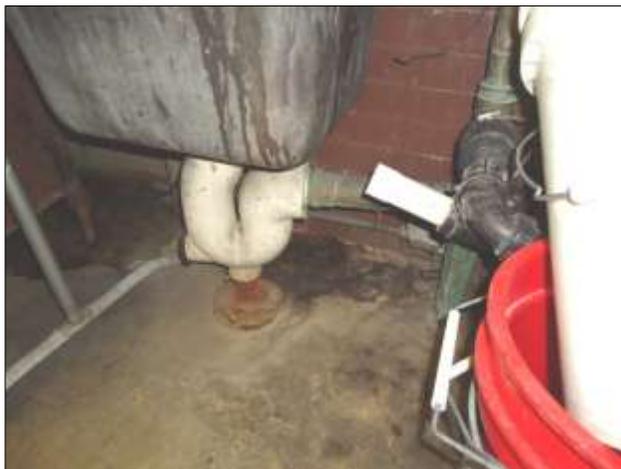
4.5.3.1 – Plumbing: Fixtures 1st Floor



P1 – Kitchen sink



P2 – Janitor sink - 1



P3 – Janitor sink - 2

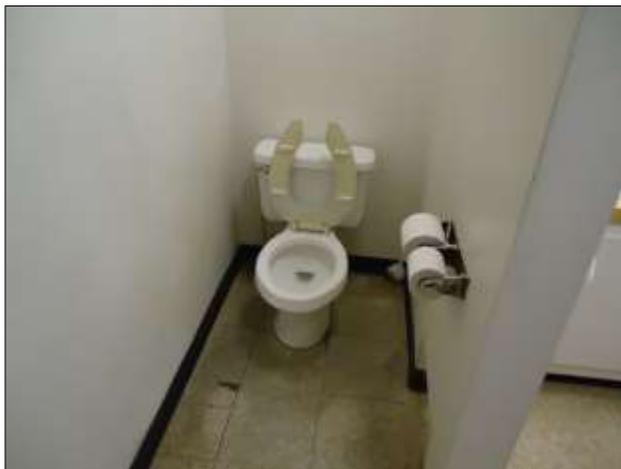
4.5.3.2 – Plumbing: 2nd Floor



P4 – Room lavatory sink - 1



P5 – Room shower - 1



P6 – Room toilet - 1



P7 – Room toilet - 2



P8 – Room shower - 2

4.5.3.2 – Plumbing: Basement



P9 – Domestic water heater - 1



P10 – Domestic water heater - 2



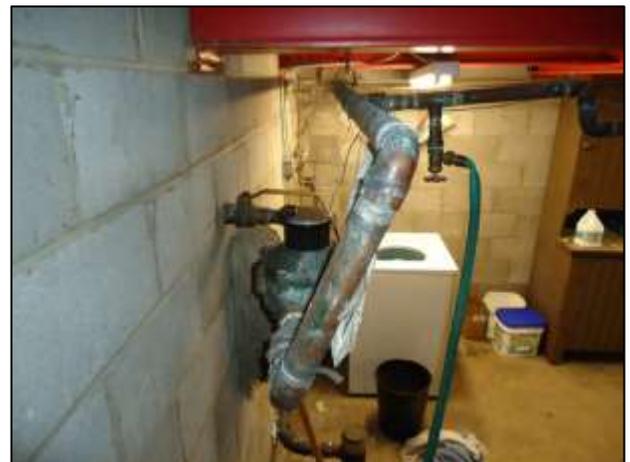
P11 – Domestic water heater - 3



P12 – Domestic water secondary pressure regulators



P13 – Water meter



P14 – Domestic water meter and piping - 2

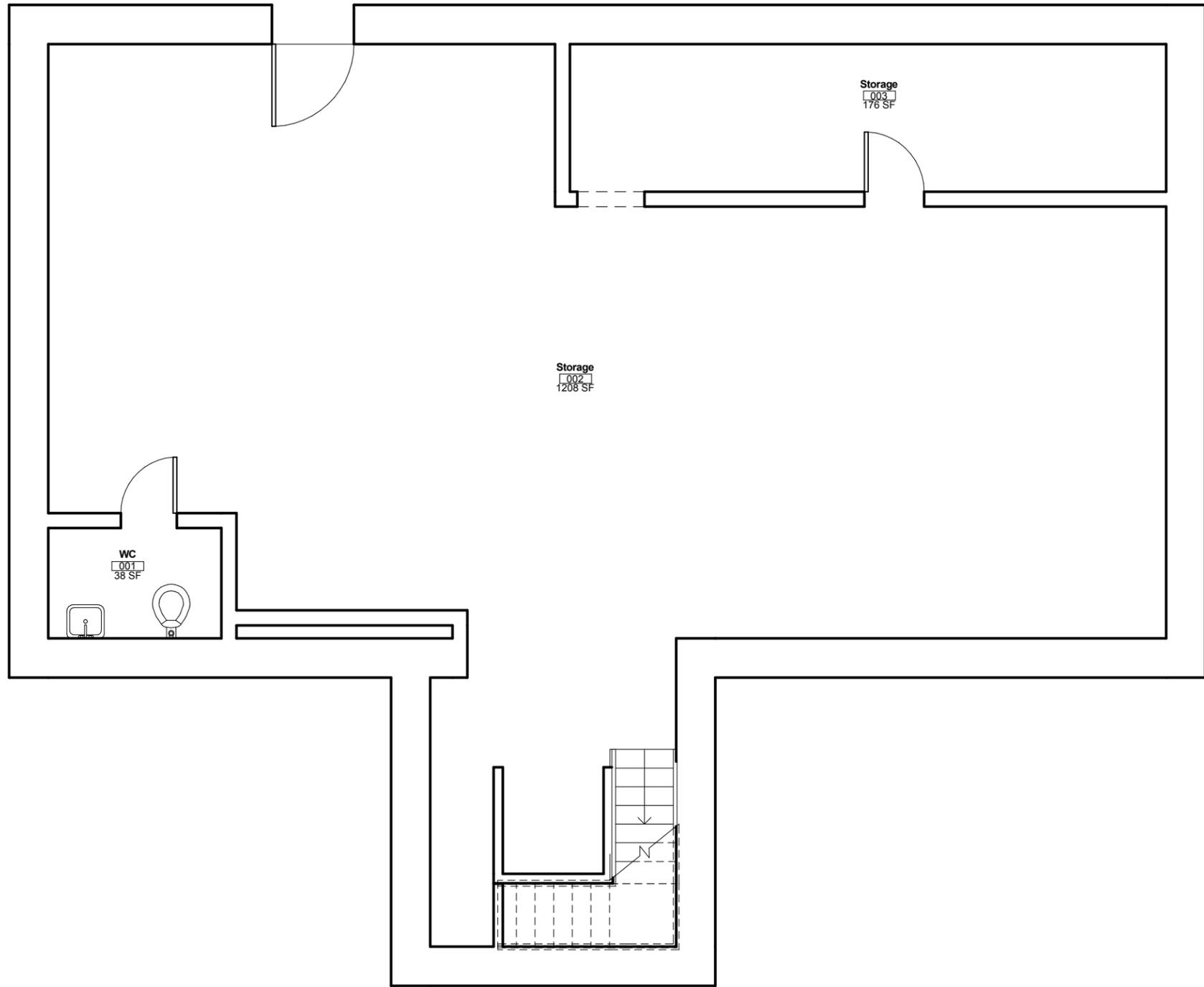
Building Fire Protection and Life Safety Systems 4.5.4

1. Flammable Gas Storage
 - 1.1. Liquid Propane (LP) gas tank is stored in the apparatus room/Vehicle garage with commercial BBQ grill. **Code Violation.**
2. Fire Extinguishers
 - 2.1. No observable fire extinguishers present. **Potential code violation.**
3. Alarm Systems
 - 3.1. One smoke detector present in dormitory.
 - 3.2. Condition: **Fair**
4. Smoke Evacuation System and Stairwell Pressurization
 - 4.1. No Smoke Evacuation System or Stairwell Pressurization.
5. Sprinklers and Standpipes
 - 5.1. No sprinkler system present.
6. Emergency Lighting
 - 6.1. No observable emergency light fixtures or signage present. **Potential code violation.**
7. Ground Fault Interruption
 - 7.1. Construction: Two (2) GFI's present at laundry and lavatory sink.
 - 7.2. Condition: **Fair**
8. Conclusions:
 - 8.1. The building fire protection and life safety systems are physically deficient.
9. Estimates: Suggested remedies and Opinions of probable cost
 - 9.1. De minimus conditions
 - 9.1.1. Remove liquid propane (LP) gas tank for BBQ grill.
 - 9.2. Short-Term Costs
 - 9.2.1. Add a minimum of Three (3) fire extinguishers
 - 9.2.1.1. Basement: \$250
 - 9.2.1.2. 1st Floor: \$250
 - 9.2.1.3. 2nd Floor: \$250
 - 9.2.2. Add a minimum of Four (4) smoke-fire detector/alarms:
 - 9.2.2.1. Basement: \$350
 - 9.2.2.2. 1st Floor: \$350
 - 9.2.2.3. 2nd Floor: \$350
 - 9.2.2.4. MER: \$350
 - 9.2.3. Add a minimum of One (1) GFI receptacles: \$300
 - 9.2.4. Add a minimum of three (3) emergency light/sing fixtures – LED type: \$1,400
 - 9.2.5. Add Carbon Monoxide Detector-Alarm in Boiler Room: \$3,500

4.5.4.1 – Fire Protection and Life Safety Systems



FP1 – Smoke detector dormitory



① Ground Floor Plan
3/16" = 1'-0"

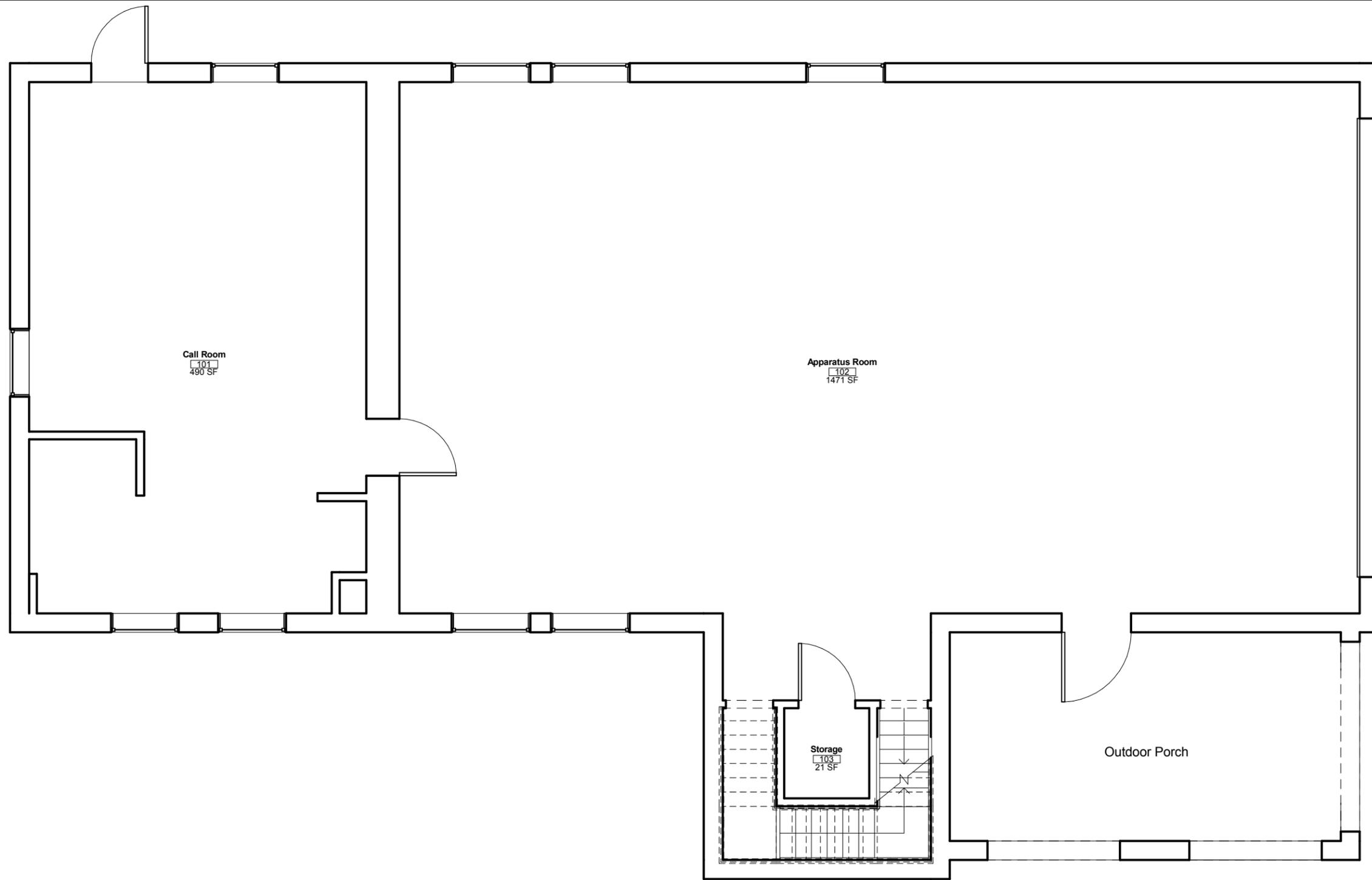


The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.

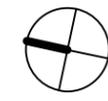


Firehouse 35
City of Pittsburgh

| | | |
|--------------------------|----------|---------------------|
| Ground Floor Plan | | A1.00 |
| Date | 07/31/13 | |
| Drawn by | AS | Scale 3/16" = 1'-0" |



① L1 Floor Plan
3/16" = 1'-0"

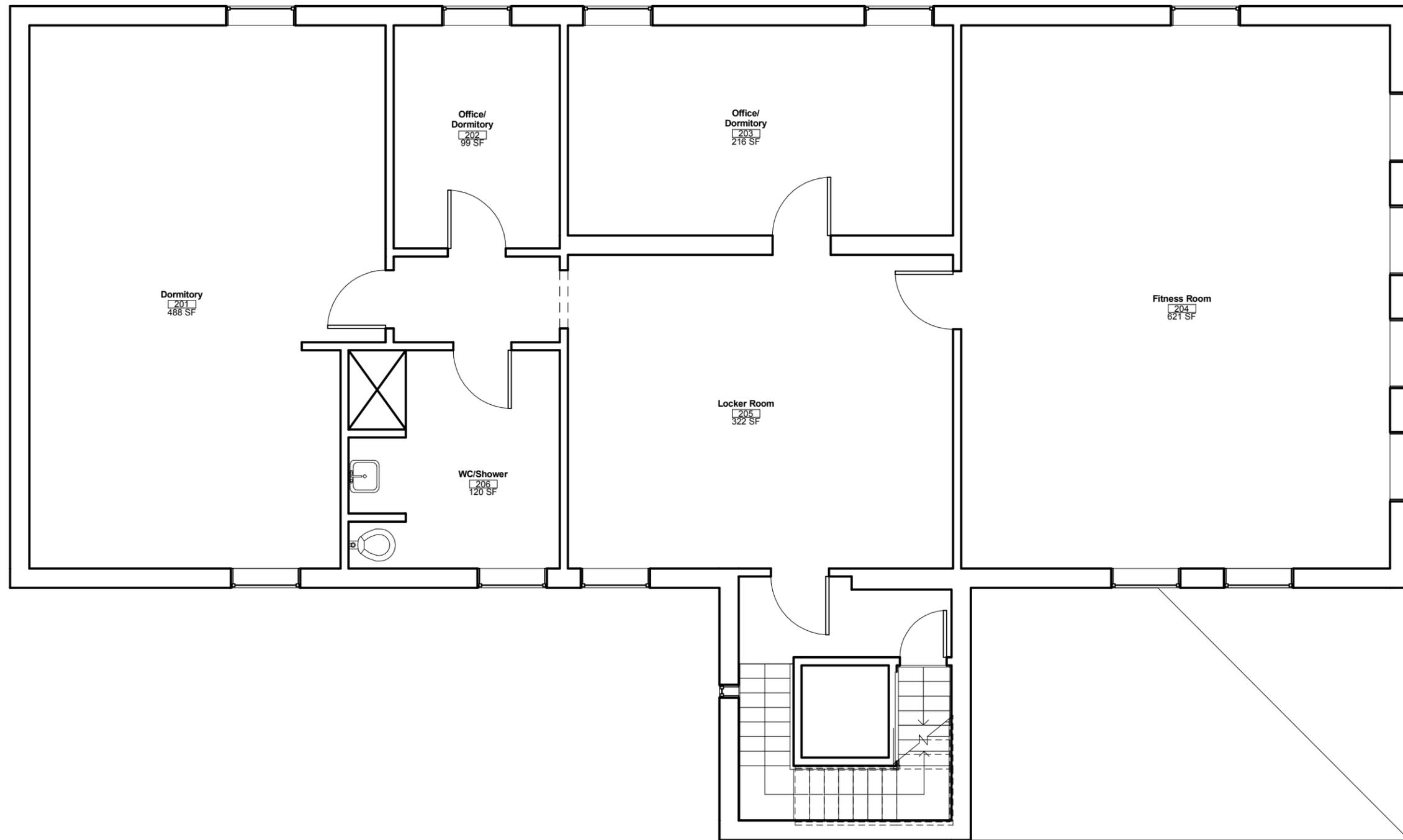


The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.



Firehouse 35
City of Pittsburgh

| | | |
|----------------------|----------|---------------------|
| L1 Floor Plan | | A1.10 |
| Date | 07/31/13 | |
| Drawn by | AS | Scale 3/16" = 1'-0" |

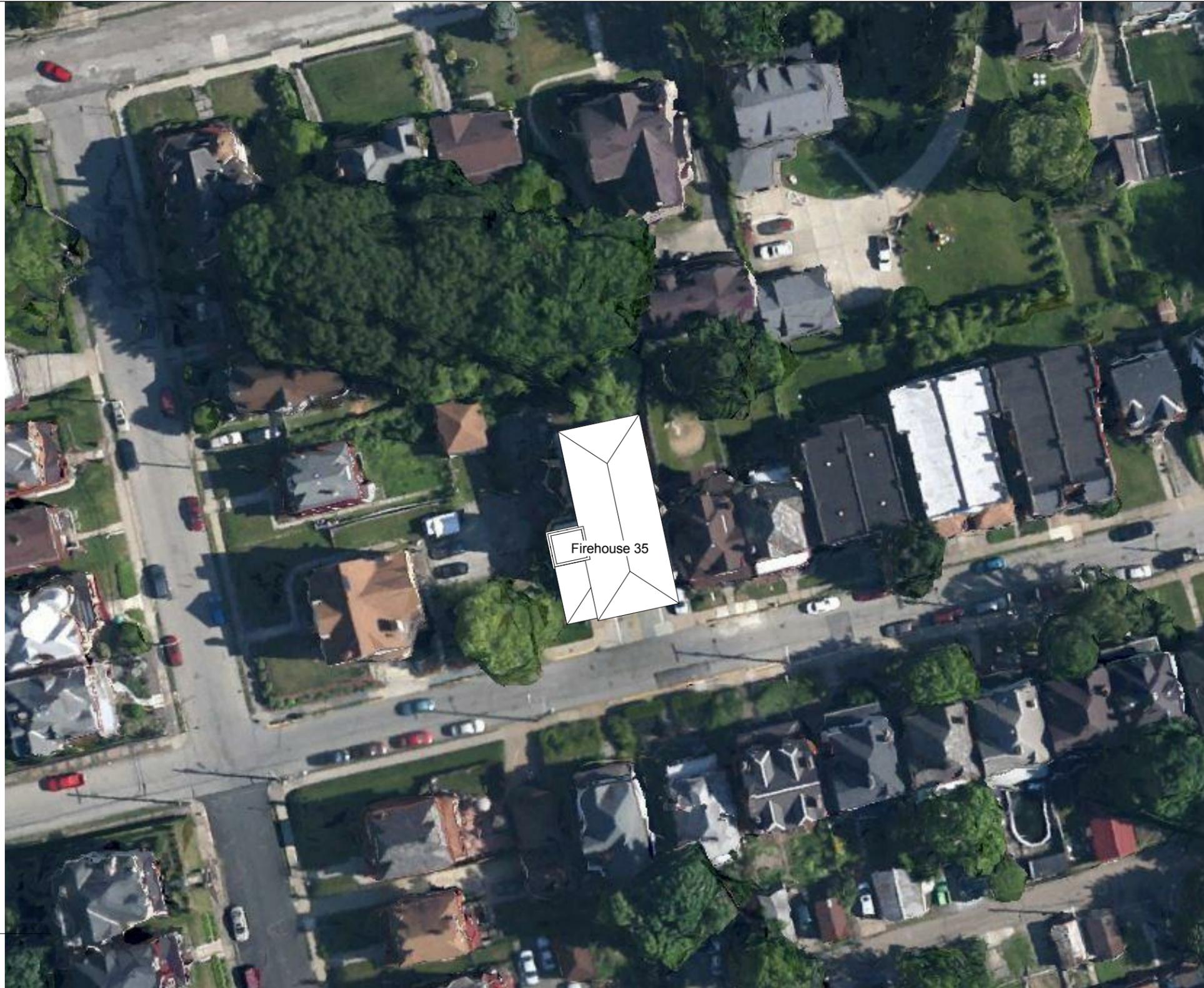


① L2 Floor Plan
3/16" = 1'-0"



Firehouse 35
City of Pittsburgh

| | | |
|----------------------|----------|---------------------|
| L2 Floor Plan | | A1.20 |
| Date | 07/31/13 | |
| Drawn by | AS | Scale 3/16" = 1'-0" |



① Site Plan
1" = 40'-0"



The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.



Firehouse 35
City of Pittsburgh

Site Plan

Date 07/31/13
Drawn by AS

C1.01

Scale 1" = 40'-0"

B142 - FIRE HOUSE 35

| Tier II: Abbreviated Accessibility Survey | | | | | |
|---|--|-------------------------------------|-------------------------------------|-------------------------------------|----------|
| | Item | Yes | No | N/A | Comments |
| A. Building History | | | | | |
| 1. | Has an ADA survey previously been completed for this property? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 2. | Have any ADA improvements been made to the property? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. | Does a Barrier Removal Plan exist for the property? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4. | Has the Barrier Removal Plan been reviewed/approved by an arms-length third party such as an engineering firm, architectural firm, building department, or other agency, etc.? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 5. | Has building ownership or building management reported receiving any ADA related complaints that have not been resolved? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 6. | Is any litigation pending related to ADA issues? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| B. Parking | | | | | |
| 1. | Are there sufficient accessible parking spaces with respect to the total number of reported spaces? (See Table X2.1) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Are there sufficient van-accessible parking spaces available (96 in. wide by 60 in. aisle)? (See Table X2.1) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Are accessible spaces marked with the International Symbol of Accessibility? Are there signs reading "Van Accessible" at van spaces? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4. | Is there at least one accessible route provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, if provided, and public streets and sidewalks? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 5. | Do curbs on the accessible route have depressed, ramped curb cuts at drives, paths and drop-offs? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 6. | Does signage exist directing you to accessible parking and an accessible building entrance? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| C. Ramps - N/A | | | | | |
| 1. | If there is a ramp from parking to an accessible building entrance, does it meet slope requirements? (1:12 slope or less)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Are ramps longer than 6 ft complete with railings on both sides? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Is the width between railings at least 36 in.? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4. | Is there a level landing for every 30 ft horizontal length of ramp, at the top and at the bottom of ramps and switchbacks? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| D. Entrances/Exits | | | | | |
| 1. | Is the main accessible entrance doorway at least 32 in. wide? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 2. | If the main entrance is inaccessible, are there alternate accessible entrances? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Can the alternate accessible entrance be used independently? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4. | Is the door hardware easy to operate (lever/push type hardware, no twisting required, and not higher than 48 in. above floor)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 5. | Are main entry doors other than revolving doors available? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6. | If there are two main doors in series, is the minimum space between the doors 48 in. plus the width of any door swinging into the space? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

FIG. X2.1 Abbreviated Accessibility Survey

| Tier II: Abbreviated Accessibility Survey | | | | | |
|--|--|-------------------------------------|-------------------------------------|--------------------------|----------|
| | Item | Yes | No | N/A | Comments |
| E. Paths of Travel | | | | | |
| 1. | Is the main path of travel free of obstruction and wide enough for a wheelchair (at least 36 in. wide)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Does a visual scan of the main path of travel reveal any obstacles (phones, fountains, etc.) that protrude more than 4 in. into walkways or corridors? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Is at least one wheelchair-accessible public telephone available? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. | Are wheelchair-accessible facilities (toilet rooms, exits, etc.) identified with signage? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 5. | Is there a path of travel that does not require the use of stairs? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| F. Elevators → <i>N/A</i> | | | | | |
| 1. | Do the call buttons have visual signals to indicate when a call is registered and answered? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Is the "UP" button above the "DOWN" button? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Are there visual and audible signals inside cars indicating floor change? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 4. | Are there standard raised and Braille markings on both jambs of each hoist way entrance? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 5. | Do elevator doors have a reopening device that will stop and reopen a car door if an object or a person obstructs the door? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6. | Do elevator lobbies have visual and audible indicators of car arrival? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 7. | Are elevator controls low enough to be reached from a wheelchair (48 in. front approach/54 in. side approach)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 8. | Are elevator control buttons designated by Braille and by raised standard alphabet characters (mounted to the left of the button)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 9. | If a two-way emergency communication system is provided within the elevator cab, is it usable without voice communication? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| G. Toilet Rooms | | | | | |
| 1. | Are common-area public toilet rooms located on an accessible route? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Are door handles push/pull or lever types? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 3. | Are there audible and visual fire alarm devices in the toilet rooms? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. | Are corridor access doors wheelchair-accessible (at least 32 in. wide)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 5. | Are public toilet rooms large enough to accommodate a wheelchair turnaround (60 in. turning diameter)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 6. | In unisex toilet rooms, are there safety alarms with pull cords? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 7. | Are toilet stall doors wheelchair-accessible (at least 32 in. wide)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 8. | Are grab bars provided in toilet stalls? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 9. | Are sinks provided with clearance for a wheelchair to roll under (29 in. clearance)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 10. | Are sink handles operable with one hand without grasping, pinching, or twisting? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 11. | Are exposed pipes under sinks sufficiently insulated against contact? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| H. Guestrooms → <i>N/A</i> | | | | | |
| 1. | Are there sufficient reported accessible sleeping rooms with respect to the total number of reported guestrooms? (See Table X2.2) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. | Are there sufficient reported accessible rooms with roll-in showers with respect to the total number of reported accessible guestrooms? (See Table X2.2) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

FIG. X2.1 Abbreviated Accessibility Survey (continued)

4.3 ASHRAE Level-1 Energy Audit

Executive Summary

The building systems for Firehouse 35 have been analyzed and evaluated according to ASHRAE Level-1 methodology and reporting requirements.

The following sections are complimentary to the PCR with additional focus on energy costing, benchmarking, and remediation planning. The detailed information as provided is of an initial nature according to the level-1 structure.

Methodology, calculations, standards, and reference material are drawn from these industry publications:

1. ASHRAE Procedures for Commercial Building Energy Audits -2011 Second Edition
2. ANSI/ASHRAE Standard 105-2007: Standard Methods of Measuring, Expressing, and Comparing Building Energy Performance
3. DOE/EIA US Energy Information Administration: U.S. Commercial Building Energy Intensity -2003 Table 7b.
4. Energy Star Target Finder tool
5. "Commercial Energy Auditing Reference Handbook", Steven Doty, PE, CEM

Scope of Work

The scope-of-work associated with the ASHRAE Level-1 includes the following items.

- Conduct walk-through survey: Completed see - PCR
- Identify low-cost/no-cost recommendations: Completed see - PCR
- Identify capital improvements and potential EEM's: Completed - see PCR
- PEA analysis
- Energy Systems Condition Assessment
- Utility rate structure commodity programs
- EUI target and comparative evaluation
- Potential savings from new EUI target
- Proposed Action Plan: Phase #1

Preliminary Energy Analysis (PEA)

Historical Energy Consumption by Year and Type:

2011 - Electricity

YEAR: 2011

| Month | Cooling Degree Days | Billed Demand (kW) | Electric Use (kWh) | Demand Cost (\$) | Total Bill (\$) |
|--------------|---------------------|--------------------|--------------------|------------------|-----------------|
| January | 0 | 6 | 2,880 | TBD | \$250.98 |
| February | 0 | 7 | 2,730 | TBD | \$240.78 |
| March | 0 | 7 | 2,610 | TBD | \$231.40 |
| April | 21 | 8 | 2,630 | TBD | \$240.21 |
| May | 94 | 8 | 2,790 | TBD | \$260.75 |
| June | 182 | 12 | 5,020 | TBD | \$462.07 |
| July | 397 | 12 | 5,190 | TBD | \$479.26 |
| August | 206 | 13 | 6,210 | TBD | \$563.08 |
| September | 78 | 12 | 4,320 | TBD | \$408.45 |
| October | 0 | 10 | 2,810 | TBD | \$281.03 |
| November | 0 | 8 | 3,020 | TBD | \$283.88 |
| December | 0 | 7 | 2,790 | TBD | \$260.48 |
| Annual Total | | | 42,990 | \$0 | \$3,962 |

2011 - Natural Gas

YEAR: 2011

| Month | Heating Degree Days | MCF | therms | Total Bill (\$) |
|---------------|---------------------|-----|---------|-----------------|
| January | 1240 | 117 | 117200 | \$480.51 |
| February | 917 | 103 | 103000 | \$1,240.81 |
| March | 781 | 80 | 80000 | \$958.91 |
| April | 350 | 59 | 59100 | \$722.61 |
| May | 138 | 20 | 19600 | \$259.12 |
| June | 12 | 5 | 4700 | \$83.36 |
| July | 0 | 5 | 4500 | \$81.04 |
| August | 1 | 4 | 3800 | \$72.80 |
| September | 87 | 5 | 4600 | \$81.56 |
| October | 401 | 14 | 14100 | \$191.63 |
| November | 532 | 48 | 47700 | \$578.57 |
| December | 849 | 77 | 77100 | \$878.91 |
| Annual Totals | | | 535,400 | \$5,630 |

2012 - Electricity

YEAR: 2012

| Month | Cooling Degree Days | Billed Demand (kW) | Electric Use (kWh) | Demand Cost (\$) | Total Bill (\$) |
|---------------------|---------------------|--------------------|--------------------|------------------|-----------------|
| January | 0 | 13 | 6,340 | TBD | \$576.03 |
| February | 0 | 7 | 2,770 | TBD | \$258.10 |
| March | 0 | 7 | 2,750 | TBD | \$255.34 |
| April | 21 | 7 | 2,740 | TBD | \$258.19 |
| May | 94 | 12 | 3,450 | TBD | \$338.47 |
| June | 182 | 12 | 4,550 | TBD | \$429.35 |
| July | 397 | 12 | 5,960 | TBD | \$543.68 |
| August | 206 | 12 | 5,800 | TBD | \$529.91 |
| September | 78 | 12 | 4,730 | TBD | \$447.50 |
| October | 0 | 7 | 2,920 | TBD | \$274.42 |
| November | 0 | 9 | 3,230 | TBD | \$307.11 |
| December | 0 | 7 | 3,010 | TBD | \$282.34 |
| Annual Total | | | 48,250 | \$0 | \$4,500 |

2012 - Natural Gas

YEAR: 2012

| Month | Heating Degree Days | MCF | therms | Total Bill (\$) |
|---------------------|---------------------|-----|----------------|-----------------|
| January | 1240 | 90 | 90100 | \$1,020.38 |
| February | 917 | 72 | 72400 | \$789.18 |
| March | 781 | 61 | 61100 | \$666.29 |
| April | 350 | 32 | 31900 | \$347.91 |
| May | 138 | 17 | 17100 | \$193.68 |
| June | 12 | 5 | 4700 | \$66.06 |
| July | 0 | 4 | 4100 | \$62.25 |
| August | 1 | 4 | 4200 | \$63.35 |
| September | 87 | 5 | 4500 | \$66.66 |
| October | 401 | 10 | 10400 | \$130.71 |
| November | 532 | 41 | 40800 | \$457.40 |
| December | 849 | 65 | 64900 | \$641.57 |
| Annual Total | | | 406,200 | \$4,505 |

2013 - Electricity

YEAR: 2013

| Month | Cooling Degree Days | Billed Demand (kW) | Electric Use (kWh) | Demand Cost (\$) | Total Bill (\$) |
|---------------------|---------------------|--------------------|--------------------|------------------|-----------------|
| January | 0 | 0 | 0 | TBD | \$0.00 |
| February | 0 | 7 | 2,900 | TBD | \$272.88 |
| March | 0 | 8 | 2,980 | TBD | \$284.13 |
| April | 21 | 8 | 2,330 | TBD | \$305.76 |
| May | 94 | 11 | 3,240 | TBD | \$323.16 |
| June | 182 | 12 | 4,410 | TBD | \$390.13 |
| July | 397 | not avail. | not avail. | TBD | not avail. |
| August | 206 | not avail. | not avail. | TBD | not avail. |
| September | 78 | not avail. | not avail. | TBD | not avail. |
| October | 0 | not avail. | not avail. | TBD | not avail. |
| November | 0 | not avail. | not avail. | TBD | not avail. |
| December | 0 | not avail. | not avail. | TBD | not avail. |
| Annual Total | | | 15,860 | \$0 | \$1,576 |

2013 - Natural Gas

YEAR: 2013

| Month | Heating Degree Days | MCF | therms | Total Bill (\$) |
|---------------------|---------------------|------------|----------------|-----------------|
| January | 1240 | 99 | 99300 | \$1,020.38 |
| February | 917 | 121 | 120500 | \$789.18 |
| March | 781 | 91 | 90500 | \$666.29 |
| April | 350 | 54 | 54100 | \$347.91 |
| May | 138 | 16 | 16400 | \$193.68 |
| June | 12 | 6 | 6300 | \$66.06 |
| July | 0 | not avail. | not avail. | not avail. |
| August | 1 | not avail. | not avail. | not avail. |
| September | 87 | not avail. | not avail. | not avail. |
| October | 401 | not avail. | not avail. | not avail. |
| November | 532 | not avail. | not avail. | not avail. |
| December | 849 | not avail. | not avail. | not avail. |
| Annual Total | | | 387,100 | \$3,084 |

Energy Performance Summary

The EUI values include in the performance summary below have been calculated using ASHRAE forms and formulas. Due to the low sampling response for Public order and Safety facilities in the northeast sector, the direct and literal application of these calculations is not advisable. The sections that follow will establish more a realistic target value in the context of a phased energy reduction program. The significant differences in these EUI rating will be treated in terms of potential opportunity.

The total annual cost information data source is the client provided utility bill spread sheet.

| ENERGY PERFORMANCE SUMMARY | | | | | |
|---|------------------|--------|-----------------------|----------------|------------------------|
| Commercial Building Energy Audit Sample Forms | | | | | |
| Energy Type | Total Annual Use | Units | Conversion Multiplier | kBtu | Total Annual Cost (\$) |
| Electricity | 46,362 | kWh | 3.412142 | 158,193 | \$ 4,336.74 |
| Natural Gas | 4,920 | therms | 100 | 492,000 | \$ 5,243.11 |
| Purchased Steam | | | 0 | - | |
| Purchased Hot Water | | | 0 | - | |
| Purchased Chilled Water | | | 0 | - | |
| Oil #: | | | 0 | - | |
| Propane | | | 0 | - | |
| Coal | | | 0 | - | |
| Thermal—On-Site Generated | | | 0 | - | |
| Other | | | 0 | - | |
| Electricity—On-Site Generated | | | 0 | - | |
| Thermal or Electricity—Exported | | | 0 | - | |
| | | | 0 | - | |
| Total | | | | 650,193 | \$ 9,579.85 |

| | |
|--|---------|
| Gross Conditioned Area | 5270 |
| EUI (kBtu/ft ²) | 123.38 |
| Target Finder Score* | 182.5 |
| CBECS EUI (for comparable , kBtu/ft ²) | 88.3 |
| ECI (\$/ft ²) | \$ 1.82 |

Notes: The CBECS sampling pool for Public Order and Safety facilities is limited for buildings in the North East sectors nad must be interpreted accordingly.

Energy Systems Condition Assessment

The energy systems condition assessment is an additional effort beyond the scope of the ASTM PCA standard and the typical ASHRAE Level-1 requirements. It is a basis for a targeted audit as referred to in ASHRAE standard. This approach supplements the PCR and formal Level-1 to develop a credible EUI target and an actionable remediation program.

This section also provides an initial performance assessment of energy consuming systems and devices as part of the targeted audit effort.

Heating System

Energy System Condition: Boiler system including pump(s), piping, and room radiators - **Poor**

Boiler System Deficiencies

- Combustion Efficiency: Poor
- Age: Near EUL see PCR
- Maintenance Condition: Poor see PCR

Control System Deficiencies

- Space Set-Point Control: **Poor**. Uncalibrated thermostat, excessive set-point temperatures, and open occupant adjustment
- Boiler Water Set-Point Control: **Poor**. Decommissioned controls, see PCR.
- Set-Back Controls: **None**
- Weekly Scheduling Controls: **None**

Energy Management System Deficiencies

- Active Energy Monitoring and Management System: **None**

Utility rate structure commodity programs

The energy billing and cost data received to date are understood to be directly from local, single source utility companies. Energy rate structures may be reduced through a commodity sourcing approach. Such an approach could include natural gas and electrical energy brokering services. While such services have been successful in reducing cost per kWh and MCF, additional risk of such approach must be carefully considered. It would be expected that energy rate costs could be reduced from 10-15% in a city wide contract. However, such saving would typically require Smart Metering and potential interruption in service, which may not be compatible or acceptable for emergency services facilities. However, full consideration should be given to 'bidding' Natural Gas supply as contractual arrangement may be more acceptable. Further, alternative energy supply opportunities should be explored as peak season interruption obligations are in a state of change, which often favors the consumer.

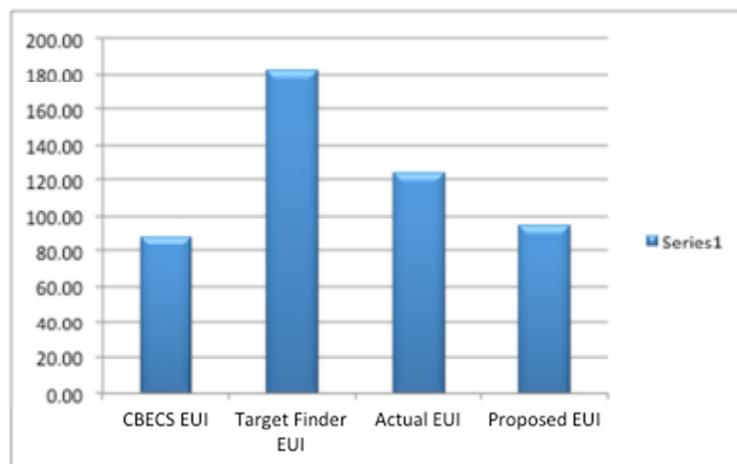
EUI target and comparative evaluation

The EUI for Firehouse 35 is calculated at 123.38 kBtu/Ft².

The CBECs (Commercial Building Energy Consumption Survey) and 'Target Finder' scores, calculated in the above ASHRAE Energy Performance Summary section, conflict with empirical evidence provided by utility consumption data, Degree-day weather patterns, and the energy systems condition assessment. However, these EUI ratings are useful as bracketing limits.

An EUI of 95 is proposed as an initial working target pending level-2 modeling or future on-site system sub-metering efforts.

| | |
|-------------------|--------|
| CBECs EUI | 88.30 |
| Target Finder EUI | 182.50 |
| Actual EUI | 123.38 |
| Proposed EUI | 95.00 |



Potential savings from achieving proposed EUI target

| Energy Type | Total Annual Use | Units | Conversion Multiplier | kBtu | Total Annual Cost (\$) |
|---------------------------------|------------------|--------|-----------------------|----------------|------------------------|
| Electricity | 35,698 | kWh | 3.412142 | 121,805 | \$ 3,339.20 |
| Natural Gas | 4,920 | therms | 100 | 492,000 | \$ 4,037.09 |
| Purchased Steam | | | 0 | - | |
| Purchased Hot Water | | | 0 | - | |
| Purchased Chilled Water | | | 0 | - | |
| Oil #: | | | 0 | - | |
| Propane | | | 0 | - | |
| Coal | | | 0 | - | |
| Thermal—On-Site Generated | | | 0 | - | |
| Other | | | 0 | - | |
| Electricity—On-Site Generated | | | 0 | - | |
| Thermal or Electricity—Exported | | | 0 | - | |
| | | | 0 | - | |
| Total | | | | 613,805 | \$ 7,376.28 |

| | |
|------------------------------------|----------------|
| Gross Conditioned Area | 5270 |
| Actual EUI (kBtu/ft ²) | 123.38 |
| Target EUI (kBtu/ft ²) | 95.00 |
| Target ECI (\$/ft ²) | \$ 1.40 |

Proposed action plan: Phase #1

Scope: Wireless, WEB based energy management system with wireless instruments including:

- One (1) Boiler Control
- Three (3) Room level heating radiator controls
- Three (3) Lighting controls
- Three (3) Cooling controls
- Set-point, set-back, and scheduling controls