

## **FIRE STATION 21**

9816 Forbes Creek Dr  
Built 1997

### **General**

Fire Station 21 is a 3-bay, +/-6,700 square foot building on +/- 1.7 acres of site area. The station is a 2-story building which mitigates the challenge of building on a sloped site. Emergency response is onto 98<sup>th</sup> Ave NE to the west. The bays are back-in. Parking is provided to the southeast of the station and can be accessed from Forbes Creek Dr.

### **Architectural**

**Site:** The front apparatus bay apron is concrete paving and is good condition; some cracking was observed at the apparatus bay door thresholds. Site drives and parking are asphalt cement paved which was found to be in fair to good condition. Cracking was observed at concrete curbs. The property is heavily vegetated with wetlands. The front entry is accessed from a concrete walk which is in good condition. There is a paved pedestrian connection to Forbes Creek Dr.

**Exterior:** The exterior finishes are primarily E.I.F.S (Exterior Insulated Finishing System) and wood siding and are in good condition. Concrete walls retain earth and there is a lower level at the northeast portion of the building footprint.

The station has hipped standing seam metal roofs which are in good condition. Gutters and tight-lined downspouts drain the roof.

The exterior envelope is well insulated. The wood framed roofs are insulated with R-38 batt insulation and the 2x6 wood framed walls are insulated with R-19 batt insulation. Openings are aluminum windows, aluminum storefront entrances, hollow metal doors and overhead sectional doors.

**Interior:** The existing materials and finishes exhibit normal signs of wear. The following materials were noted:

- Concrete apparatus bay slab
- Vinyl flooring (good condition)
- Athletic flooring
- Ceramic tile (lobby, kitchen, restrooms)
- Roll carpet
- Carpet tile
- Rubber base
- Gypsum wallboard walls
- Ceramic tile wainscot (restrooms –good condition)
- Plastic laminate wainscot (restrooms)
- Fiberglass reinforced plastic panel wainscot (apparatus bay)
- Painted metal doors
- Wood doors in hollow metal frames
- Kitchen cabinetry and countertops
- Acoustical panel ceilings
- Gypsum wallboard ceilings
- Exposed vapor barrier at apparatus bay ceiling

**Programming/Space Planning:** The public entry, lobby, restrooms, offices, work and meeting areas are southeast of the apparatus bay at the upper level. 5 single occupant sleeping rooms, restrooms, showers, the kitchen and dayroom are located to the east of the apparatus bay.

Bunker gear storage, medical gas, a work bench and the extractor are located at the perimeter of the apparatus bay. A laundry alcove and mechanical mezzanine are accessed from the apparatus bay.

The lower level is accessed from a stair in the apparatus bay. The exercise room, storage, fire inspection room, and an equipment room (with a generator and SCBA compressor) are located at this level.

The building is not served by an elevator.

Storage space was found to be insufficient at the station.

**Code:**

The building is sprinklered.

The building lacks a 1 hour fire resistive separation between the apparatus bay and sleeping rooms (WAC 296-305-06507).

For a sprinklered building, the International Building Code (IBC) requires a 1/2-hour fire partition between sleeping rooms. This does not appear to exist.

Medical gas storage (the oxygen cascade for EMS bottles) in excess of 504 cubic feet must be stored in a 1-hour room ventilated per the requirements of the International Fire Code (IFC). The medical gas stored in the closet off of the apparatus bay is in excess of the permit limit. The room does not provide a 1-hour fire barrier and is not ventilated per the IFC. The room would need to be rated and either mechanically ventilated or moved to an exterior wall for passive ventilation. The gas range is served by the required emergency shut-off and reset. The BBQ does not have an emergency shutoff.

There is no ADA accessible path between the levels of the building, e.g., no elevator.

The building would not meet the current State Energy Code.

**Also noted:**

- Sleeping rooms are separated by wardrobe lockers which offer little acoustical separation.
- The apparatus bay width does not allow for the 3 foot minimum clearance (with vehicle doors open) at the sides of vehicles required by WAC 296-305-06509.

May 25, 2022

Brian Harris  
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**RE**                    *Kirkland Fire Stations – District Study*

Dear Brian:

This is a brief letter outlining our findings from a cursory ASCE 31-03 evaluation of Kirkland Fire Stations 21, 22, 25, 26, and 27. We visited the stations on February 25, 2015 with the design team to tour each facility and observe possible deficiencies.

### **Analysis and Document Review**

These stations were evaluated for general conformance to the requirements of ASCE 31-03, an approved national standard that uses a performance based design methodology for evaluating existing buildings. ASCE 31-03 recommends the use of seismic forces that vary depending on the expected level of performance for the structure. Each station was evaluated to an Immediate Occupancy (IO) performance level, which aims for a very low risk level for life-threatening injuries. In addition, the damage level to the structure is low enough such that only minor repairs are necessary and the building can remain operational following the design seismic event. ASCE 31-03 offers three different levels of analysis, or tiers, to determine a structure's adequacy. We performed a Tier 1 analysis, which is a screening approach that contains a set of conservative evaluation statements that help guide the engineer towards areas of concern.

The evaluation of non-structural items to an Immediate Occupancy performance level was not performed. Non-structural items include, but are not limited to, utilities, fire suppression piping, mechanical and electrical equipment, computer equipment, ceilings, partitions, building contents, hazardous material storage, cladding, glazing, and stairs. All of these items may have significant impacts for the immediate occupancy of the building following a major earthquake.

For your convenience the results of our analysis and associated recommendations for each station below are numbered to correspond with each other. The recommendations could be used to develop preliminary seismic upgrade pricing.

## **Station Observations and Recommendations**

### **STATION 21**

Built in 1997, this wood framed station is set against a hillside creating a two story space on the north and one story apparatus bay to the south. The apparatus bay slab is 8 inches thick and all other slabs are 4 inches thick. The level 2 wood framed floor consists of 11 7/8 inch I-joist with plywood sheathing. The gabled roof is framed with connector plate trusses. A majority of the exterior walls are both load bearing and sheathed with 1/2 inch plywood for shear resistance.

#### **Results:**

1. The west wall of the apparatus bay along grid C.5 exceeds the allowable shear wall stress and may become damaged.

2. The low roof diaphragm at grids C.5 and 4 creates a re-entry corner. The existing drawings do not indicate additional reinforcing or straps to transfer shear stress concentrations at this location.

**Recommendations:**

1. Complete a Tier 2 evaluation to further analyze the shear walls around the apparatus bay. It is anticipated that the plywood shear walls on the east elevation along grid C.4 may need added nails to increase capacity.
2. Complete a Tier 2 evaluation to further understand diaphragm stresses. It is anticipated that light gage-metal straps and wood blocking will be required at the low roof near grids C.5 and 4.

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## Kirkland Fire Station #21

### Mechanical Systems Survey

March 10, 2015

We visited Station #21 on Wednesday February 25, 2015 to evaluate existing mechanical systems and discuss issues relevant to remodel possibilities and usable life span. The following is our report of the existing conditions and relevant discussion items.

#### **EXISTING SYSTEMS STATION 21**

- A. **Utilities:**
1. Domestic Water and Fire – are served by connections off the south side of the building.
  2. Waste – is served by a 4” connection off the East side of the building.
  3. Gas – Natural gas is served by a meter on the Southeast corner of the building.
- B. **Fire Sprinklers:** The building has a sprinkler system. Water is supplied by a 4” connection to the sprinkler riser in the apparatus bay.



**C. Plumbing:**

1. Public Restrooms

- a. Water closets: China, valve type flush, in good condition with ADA grab bars.
- b. Lavatories: China, wall mounted with single handle faucet, in good condition with ADA trap insulation protection.

2. Women's Restroom:

- a. Water closet: China, valve type flush, in good condition with ADA grab bars.
- b. Lavatory: China, counter mounted with single handle faucet, in good condition with ADA trap insulation protection.
- c. Shower: Tiled enclosure with shower curtain, single handle mixing valve, in good condition.

3. Men's Restroom:

- a. Water closet: China, valve type flush, in good condition.
- b. Urinal: China, flush valve, in good condition.
- c. Lavatories: China, counter mounted with single handle faucet, in good condition.
- d. Shower: Tiled enclosure with shower curtain, single handle mixing valve, in good condition.

4. Kitchen:

- a. Sink: Stainless steel, double bowl kitchen sink with insta-hot water supply, single handle pull-down faucet and garbage disposal, in good condition.
- b. An under-counter dishwasher is located next to the sink.

5. Apparatus bay:

- a. Drains: Each bay has a single floor drain at the center of the bay. These drains are connected to an oil water separator located outside of the East side of the building.

6. Utility Room:

- a. Service Sink: Stainless steel sink dual handle faucet, in good condition.
- b. Washer: Residential clothes washer with laundry box.

7. Compressed Air: A 35 gallon horizontal tank with mounted compressor rated at 125 PSIG is located in the mezzanine. In good condition.



8. Piping: The domestic water service pipe that was visible is copper. Piping is in good condition.
9. Domestic hot water: The plumbing fixtures are served by a 125 gallon natural gas fired commercial water heater. The water heater was manufactured in 1997 but appears to be in fair condition.



**D. Heating, Ventilation and Air Conditioning (HVAC):**

1. HVAC Systems: The building has three gas furnaces with split DX cooling. One system serves the dorms and main corridor. A second system serves the office spaces and the building entry. The third system serves the kitchen and day room. The DX cooling outdoor condensing units are located outside at the northeast corner of the building. The furnaces and the condensing units are in poor condition.



2. Refrigerant: All systems use R-22 refrigerant.
3. Ventilation: All three furnaces have outdoor air intake capabilities.
4. Radiant Heating: The apparatus bay is heated by overhead radiant vacuum tube system, in fair condition.
5. Heat Pumps: Three through wall heat pumps provide heating and cooling for the fitness area, the lower level storage space, and the meeting room. The heat pumps are in poor condition.



6. Exhaust:
  - a. The public restrooms are each provided with an exhaust fan control by a separate switch.
  - b. The dormitory restrooms are provided with an exhaust fan controlled by a programmable thermostat that is on during occupied hours.
  - c. The kitchen range is provided with down draft exhaust.
  - d. The utility/laundry room is provided with an exhaust fan.
  - e. General exhaust in the apparatus bay is provided by two side wall propeller exhaust fans.
  - f. Exhaust of the lower level spaces is provided by three independently switched exhaust fans.
  - g. No source capture vehicle exhaust is present in the Apparatus Bay.

## **MECHANICAL IMPROVEMENT DISCUSSION**

### **A. Operational Related:**

1. Plan on providing new HVAC systems for any building addition, as the existing systems are not expandable.
2. We recommend that any future building remodel replace the HVAC system with commercial/institutional equipment which can provide:
  - i. Longer equipment life.
  - ii. Additional zoning for comfort and individual control in sleep rooms.
  - iii. Better ventilation (exhaust, outside air supply and filtration) for improved indoor air quality.
  - iv. Quick space temperature adjustment for firefighter recovery and rehab.
3. We recommend providing a Bunker Gear Storage room to extend life and effectiveness of gear by storage in a dark environment. This space should

have exhaust to remove odor and moisture and heat to promote moisture evaporation.

4. Plan on providing a vehicle exhaust capture system such a Nederman or Plymovent with overhead rails, trolley and tailpipe nozzle. (Such ventilation would be required in a new station per WAC 296-305-06511(4).)
5. Plan on providing commercial grade kitchen hood and exhaust to capture cooking grease and contain kitchen odors.
6. Plan on providing plumbed emergency eye wash in decon room.
7. Plan on providing separate decon and laundry facilities.

**B. Maintenance Related:**

1. The mechanical systems are of a 1997 vintage and approaching the end of useful life. Replacement or upgrade should be anticipated in the next 3 years.
2. The condensing units which use R-22 refrigerant cannot be directly replaced due to the phase out of that refrigerant. When considering replacement of refrigerant equipment, it will need to be a newer refrigerant like R-410a. This will necessitate replacing not only the exterior condensing unit but also the indoor coil and refrigerant piping all at the same time.
3. The exterior refrigerant pipe insulation is in poor condition and should be replaced and provided with aluminum jacket or galvanized sheet metal cover for protection.
4. While individual restroom exhaust fans can be replaced as necessary, we would recommend common in-line or roof mounted exhaust fan(s) with ceiling grilles in each restroom. This arrangement would provide better ventilation control and a longer equipment life expectancy than residential style exhaust fans.

# ***Fire Station 21***

## **Fire Station 21**

Address: 9816 Forbes Creek Drive, Kirkland  
Built: 1998  
General:  
Documents reviewed: No Record Electrical Drawings

## **Electrical Systems**

### **Assessment**

#### Power

- The service switchboard and branch circuit panels were manufactured by Square D and are in good condition.
- The service voltage to the building is 400A 208Y/120 volts, 3-phase, 4-wire and originates from a PSE transformer (location unknown).
- The service switchboard has three main disconnects with three spaces.
- The service disconnects are circuit breakers.
- Clearance is maintained in front of electrical panels per the NEC.
- The facility does not contain any step-down transformers.
- The receptacles are grounding-type and were spot-tested. GFCI-type receptacles are present where required by code.

#### Optional Standby Power

- The generator is original to the building. It is 50 kW/60 kVA diesel genset with an output circuit breaker. The generator is an Katolight and is in good condition.
- The generator is classified as an optional standby (NEC 702) system.
- The panels connected to the generator include circuits feeding general lighting, receptacles, overhead doors and selected mechanical equipment.

#### Lighting

- The majority of the lighting fixtures in the facility have T-8 lamps and are in good condition.

- The exterior lighting fixtures have been replaced with LED fixtures and are in good condition.
- Occupancy sensors have been installed in various parts of the facility and function properly.

#### Data/IT

- The server rack is located in the main electrical room.
- There are Wireless Access Points (WAP's) throughout the facility.
- There is an existing, operational fire alarm system in the building.

#### Alerting

- The station receives its dispatch information from a Locution system located in the apparatus bay.
- The alerting system appears to be operating properly.
- Each sleeping room contains a speaker.
- Fluorescent lighting fixtures in the common pathways operate during dispatch.
- There are speakers in the restrooms and common areas that broadcast the dispatch material.
- The range has a shutoff with reset pushbutton in kitchen.
- Dispatch strobes are present in locations with high-ambient noise like the apparatus bays.

#### Recommendations

- The service and branch circuit panels are in good condition and do not need replacing. Replacement circuit breakers are readily available.
- It is recommended that regular thermal testing be done on the electrical equipment.
- The lighting fixtures are in good condition and provide adequate lighting in general. If alterations to the building are made, it is recommended that the existing lighting fixtures in those areas are changed to fixtures with energy-efficient LED lamps.