

Nathan Duvall  
Capital Facilities Director  
City of Valdez

May 17, 2019

Mr. Duvall—

Attached is a cursory Structural condition report provided by PND and a Mechanical Investigation Report by RSA documenting deficiencies and hazards present at the existing Fire Station and Planning Department facility at 212 Chenega. In addition, I reference a 2009 Facility Analysis Report recommending demolishing and replacement of the “Old City Hall” facility and numerous upgrades and additions to the Fire Station not yet completed.

These reports add to previously and newly identified code (life safety, occupational safety & health, accessibility/gender bias) and emergency services standard procedure problems present at the Station. Recent USGS mapping shows the current site subject to tsunami inundation discouraging use as an essential facility, emergency operations center or backup dispatch.

The existing Valdez Fire Station 1, at a minimum, requires considerable remedies—well beyond the commonly discussed mold remediation and a diesel exhaust system—to be considered compliant for ongoing occupancy as a public fire station. Given the construction type, mechanical and space requirements and overall site condition/location, it is neither economical nor practical to address these issues at the present site.

The age, condition, structural and functional issues present at Station 1 put emergency personnel, city staff, and the served public and property at increased risk. Recruitment and morale of paid and volunteer staff is observably impeded by these conditions. Public use of the facility—whether for touring or training is discouraged.

It is, therefore, our advisement to the Council to proceed with relocating the facility, as planned, to the selected site with sufficient areas to meet current and future equipment, housing, storage and training needs necessary to continue serving and protecting the Valdez community.

Sincerely,

Gary S. Wolf, AIA

## 3.2 Structural System

### 3.2.1 Scope of Structural Evaluation

The scope of the structural evaluation was performed from an inspection of the existing drawings for the buildings. As most structural members cannot be examined from a visual inspection a study of available plans is used to perform the evaluation. The findings which follow within this report are based on the examination of a partial set of plans which are dated April 1966.

### 3.2.2 Description of existing structures

The focus of the evaluation is on the original wood-framed fire station consisting of apparatus bays and offices with a second floor mezzanine. Plans for both structural and architectural were combined into a few sheets of drawings.

The original building is essentially a wood stick-framed structure. The floor is a concrete slab on-grade. The mezzanine is constructed of 2x12 wood joists. The roof consists of 2x12 wood rafters spanning approximately 18-feet. The walls are constructed of 2x6 wood studs with 3/8" plywood sheathing. There is no information on the plans for lateral design such as shear wall and diaphragm nailing.

### 3.2.3 Relevant Structural Codes

This structure is currently an emergency facility which requires higher levels of safety for snow, wind and seismic loads. Loads are amplified by importance factors for an emergency facility. We understand that it may be repurposed for storage or warehouse use which would use an importance factors of 1.0.

Snow loads in Valdez have been incrementally increased over the last 20-years. The local code for ground snow load is now 160 psf. The minimum flat roof snow load should be around 138 psf.

The floor loads for the mezzanine should be 40 psf for the residential areas and 100 psf for the fan room.

Seismic and wind design criteria was not indicated on the drawings. For evaluation of existing buildings, ASCE 41-13 "*Seismic Evaluation and Retrofit of Existing Buildings*" is used. This code uses bench mark code years to establish whether a building needs to be evaluated for seismic safety. The benchmark code for wood-framed buildings is 1976. This building predates that code by 10-years and therefore should be evaluated for seismic performance.

### 3.2.4 Structural Deficiencies

From our examination of the building and plans we have identified some structural deficiencies. More specific evaluation seismic evaluation is warranted. The following items have been identified as deficient based on this evaluation.

#### 3.2.4.1 Roof Framing

Based upon our calculations, the current roof rafters are good for somewhere in the range of 50-60 psf depending upon the grade and species of wood used. This is less than half of the required snow loads in Valdez.

The mezzanine fan room floor joists should also be checked for the weight of the mechanical equipment.

#### 3.2.4.2 Lateral Loads

Even without an evaluation using the ASCE 41-13 code, it is evident from the 3/8" plywood sheathing that this building is deficient for the high seismic loads in Valdez. This is primarily due to the code under which the building was designed. A seismic evaluation should be performed before the building is repurposed.

### 3.2.5 Conclusions and Recommendations

Due to the age of the facility and the codes under which it was designed, structural remediation is needed before this building is repurposed. The roof snow load capacity is a serious concern and could pose a risk to occupants.

Some of the lateral deficiencies are serious enough that corrective measures may need to be taken. Any retrofit for lateral loads should be done in accordance with the ASCE 41-13 code.

October 6, 2016

Arcadis U.S., Inc.  
880 H Street, Suite 101  
Anchorage, AK 99501

ATTENTION: Matt Yeomans

Dear Matt,

**REFERENCE: Valdez Fire Station  
Mechanical Site Investigation Report**

As requested, RSA engineering traveled to Valdez September 27, 2016 to investigate reported HVAC issues at the City Fire Station and the needs of Fire Department personnel. Accompanying this inspection were Matt Yeomans from Arcadis, Tracy Raynor and Mike Weber from the Valdez Fire Department, and Brad Sontag from the City of Valdez Building Maintenance. At the time of this inspection there was no precipitation, temperature was approximately 54°F and winds were calm.

Noted issues and recommendations:

A. Issue: Significant black mold is present behind fiberglass reinforced wall paneling, above ceiling in the truss work and within walls.

I. Observations:

- a. This mold was visually apparent largely in the bio-hazard/decontamination. Some discoloration was apparent in the three vehicle bay and adjacent boiler room walls. Discoloration of the walls appeared to also be due to water damage.
- b. It was reported by the fire department personnel that there are significant leaks in the roofing system which allows moisture into the walls and attic spaces.
- c. The ventilation systems serving the apparatus bay are typical for the occupancy and are not a contributing factor to mold growth.
- d. The heat recovery ventilator (HRV) dedicated to the bio-hazard/decontamination room is out of service.
- e. Testing of bulk material samples from the bio-hazard/decontamination area was performed by White Environmental Consultants February 23<sup>rd</sup> 2016, the lab results indicated moderate to high *Stachybotrys* and *Chaetomium* mold growth.

II. Recommendations:

- a. Water infiltration into the attic space and walls is the major contributing factor with this mold issue. Additional HVAC equipment or upgrades to the existing equipment will not solve this issue. It is recommended that the roof be repaired and the mold affected building materials be demolished and replaced.
- b. If the bio-hazard/decontamination is to be occupied, the existing HRV unit should be repaired or replaced to return it to operating condition.

B. Issue: Air quality in sleeping quarters located upstairs of the residential area is reported to be poor, causing respiratory issues with the occupying personnel.

I. Observations:

- a. The existing air handler (AHU-1) serving the administration and residential areas of the fire department area is located in the attic space adjacent to the training area. This unit is original to the building and beyond its useful life.
- b. The air handler (AHU-1) outside air damper was in the closed position at the time of this inspection, and no fresh air was being delivered to the served areas. Investigation of the direct digital control (DDC) of the unit indicated that AHU-1 was

under command to provide significant outside air both for ventilation and cooling, but the damper remained closed. DDC notes from the time of inspection follow:

1. Supply air temperature reset setpoint: 53.5 °F.
  2. Space temperature: 73.5 °F.
  3. Supply air temperature: 78.3 °F.
  4. Outside air temperature: 53.8 °F.
- c. AHU-1 has a single return air opening at the wall of the stairwell serving the training area. This return air opening is extremely close (within 8') to the main supply air opening within the same stairwell. It is apparent that this air handler is short circuiting and supplying little ventilation to the connected areas. The net result of the closed outside air damper and short circuiting of the unit is only a small amount of indoor air is being re-circulated throughout the area. It should be noted that the return air grill is near the vehicle bay and exhaust fumes may be drawn into the air handler return grill.
- d. Supply air to the residential area is provided from AHU-1. The supply air ductwork from this air handler to the residential area is a single 8" branch supply air duct routed over head in the three vehicle bay area. This supply duct has a small inline booster fan installed to overcome the pressure losses associated with extended duct run and increase the overall air flow to the residential space.
- e. The 8" residential area supply duct terminates at two supply registers, one in the ceiling of the kitchen/lounge and one in the sleeping quarters area. The adjustable face damper on the sleeping quarter grill has been closed completely off by the occupants. The grill to the kitchen/lounge remains open and was observed to be supplying significant air volume.
- f. No return air ductwork is present from the residential area, resulting in positive pressurization the residential area. This is desirable to mitigate direct migration of diesel fumes to the residential area from the adjacent vehicle bays, however may be a contributing factor for diesel fumes migration back into the AHU-1 return duct.
- g. An investigation of airborne mold spores in the kitchen/lounge area was performed by White Environmental Consultants May 20<sup>th</sup> 2015, the investigation reported "The air quality at the time of the inspection was acceptable, with no discernable amounts of fungal spores present in the sampling locations."
- II. Recommendations:
- a. If within budget, AHU-1 and supply ductwork should be demolished and replaced with a new unit and the supply ductwork re-routed to supply directly to individual occupied spaces to avoid short-circuiting and maintain space pressurization to mitigate odor migration.
  - b. If the unit is to remain, the AHU-1 controls should be troubleshot and repaired to re-establish control of the damper actuators and provide outside air mixing with the return air stream.
  - c. AHU-1 supply air to the residential quarters should remain in place supplying air to the kitchen/lounge area on the 1<sup>st</sup> floor. The supply air ductwork to the 2<sup>nd</sup> floor sleeping quarters should be capped.
  - d. It is recommended a new residential type heat recovery ventilator be supplied and installed in the attic space adjacent to the sleeping quarters. This unit will be utilized to supply 100% fresh outside air to the sleeping quarters and will exhaust air from the lounge/kitchen area below. In addition to providing only clean, fresh air to the sleeping space, it will serve to pressurize the space relative to the kitchen/lounge and the adjacent vehicle bays to mitigate direct diesel fume migration into the residential area. The AHU outside air and exhaust air duct terminations will be out the exterior wall above the residential sleeping quarters windows. A small soffit may be required overhead to conceal duct routing, and the condensate from the unit will be drained to the kitchen sink tailpiece below.

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- e. As a betterment for the residential HRV installation, a small heating coil can be provided on the outside air duct to temper the air entering the space to give the occupants temperature control of the sleeping quarter space during the heating months.
- C. Issue: Vehicle exhaust systems are not functioning automatically to exhaust diesel fumes when engines are run within the vehicle bays.
- I. Observations:
    - a. Both the two vehicle and three vehicle bay exhaust fans are in working order and are suitably size for general area exhaust operation. Both fans are manually controlled by a wall timers to be operated by the fire station personnel when needed.
    - b. There is no makeup air into either vehicle bay.
  - II. Recommendations:
    - a. All vehicle bay doors should be fit with optical eyes to trigger automatic operation of the vehicle bay exhaust systems for an adjustable amount of time. The vehicle optical eyes shall be selected and installed to trigger the exhaust fans only upon the crossing of a vehicle, and not upon personnel or other similar brief interruptions.
    - b. Both the three vehicle bay and the two vehicle bays should be fit with Carbon Monoxide (CO) and Nitrogen Dioxide gas (NO<sub>2</sub>) gas detectors with sensors located near to the exhaust outlets of the stationary vehicles. This CO/NO<sub>2</sub> sensor will serve to trigger the exhaust systems upon detection if the vehicles are run without opening the doors or leaving the bays. A CO/NO<sub>2</sub> detector is required in vehicle parking bays per current mechanical code.
    - c. New air openings with motorized insulated dampers into each vehicle bay should be installed to provide for makeup air during fan operation. The motorized dampers will be interlocked to open upon exhaust fan operation.

If you have any questions concerning the above, please do not hesitate to call me.

Sincerely,



Tyler T. Gray, PE  
Project Engineer

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