Wolf
ARCHITECTURE
an alaskan corporation

Nathan Duval
Capital Facilities Director
212 Chenega Avenue
Valdez, AK 99686

July 22, 2019

Mr. Duval—

Subject: Existing Fire Station 1 Assessment

Attached find Structural and Mechanical evaluations, completed by consulting engineers, PND Engineers and RSA Engineers respectively, documenting conditions at the existing Fire Station 1 at 212 Chenega Avenue. Additionally, below are a short list of known and reported fire and building code and regulatory deficiencies present at the Station. These findings add to known deficiencies relative to both overall condition and specific occupancies of the structure.

This collective review joins those of prior consultants in finding the building fails to meet many standards and codes for a modern fire and emergency services facility. Along with structural and ventilation conditions, many industry standards governing emergency response facilities are not being met at the current station. As was summarized in *City of Valdez HQ Fire Station—Programming and Site Evaluations, 2018,* "not meeting these standards increases risks to not only personnel but also to equipment, apparatus, and community safety."

Codes governing fire department operational and facility standards include:

- NFPA 1581—Infection Control
- NFPA 1851—Care of Fire Fighting Equipment
- NFPA 403—Standard for AFF Services
- NFPA 1500—Occupational Safety
- OSHA 1910—Construction & Maintenance
- IBC—International Building Code, Essential Facility
- ADA—Americans with Disabilities Act

Specific Areas of Deficiency—

Infection and Toxic Contamination Control

Currently, the facility falls short of multiple standards established by the National Fire Protection Association (NFPA). Key among the problems is a lack of space to house proper facilities for cleaning, decontaminating and storing equipment and personal protection ensembles (PPE) gear which each fire fighter wears when responding to an incident. NFPA 1500—10.1.2 states, "*Fire departments shall provide facilities for disinfecting, cleaning and storage in accordance with NFPA 1581.*" The station currently has no functioning Decontamination Room. Soiled PPE returning from a call are either cleaned in the Apparatus Bays or laundered in the repurposed holding bay at the Police Department and brought back to the Station for drying and storage. There is no contained area for cleaning air masks, helmets, backboards, medical equipment and other gear contaminated by infectious bodily fluids or by toxic compounds from burning materials. Once such gear returns from a call and enters the Apparatus bays, it risks cross contaminating other parts of the Station and beyond—including Crew quarters, areas of the building housing non-departmental City personnel, and the public.

Fire and EMS personnel returning from a fire may also have toxic or infectious materials on their undergarments or skin. Separated laundering and showering are not supported within the facility for either gender. Men may use the bathroom and shower adjacent to the Apparatus Bay for cleaning. There is no such equivalent facility for women responders on site. To use the bathroom, women must enter the Crew Dormitory or the Public hall outside the area, breaching containment and risking contamination of other parts of the building (NFPA 1581, 5.4).

In some instances, female responders have traveled home after a fire--in their personal vehicles--to clean themselves and their clothing, risking spreading contaminants and toxins. This practice not only violates NFPA standards for occupational safety and infection control (NFPA 1581, 8.4.5.2) but unfairly burdens female staff, volunteers, and their families over their male counterparts.

While remediating mold from the Decontamination Room and placing this area back in service will help, the department will continue struggling to find adequate space to temporarily store, clean, and disinfect gear thereby failing to limit contamination risks (NFPA 1581, 5.5.5, 5.6, 5.7). Absent properly sized and located cleaning and bathing facilities for both genders, risks of contamination remain elevated at the station and beyond.

Fire Fighting Gear

Firefighting equipment and PPE gear require specialized care, cleaning, repair and storage. (NFPA 1851). Contaminated gear shall be isolated during the incident personnel decontamination process and removed from service until the elements can receive specialized cleaning. (NFPA 1851, 7.1.4.1) Isolating gear for specialized cleaning is not currently possible given the lack of available area.

Vehicle Exhaust and Station Ventilation

Contaminants, other than those from outside the station are also highly problematic and Valdez Station 1. Exhaust from Apparatus preparing to depart or returning from a call foul the air and leave greasy and toxic particulates on the walls, floor and on every surface and item exposed to the fumes. NFPA 1500, 10.1.5 states, *"The fire department shall prevent exposure to fire fighters and contamination of living and sleeping areas to vehicle exhaust."* The facility lacks both carbon monoxide and nitrous oxide detectors commonly used to monitor levels and switch on fans to evacuate vehicle exhaust (NFPA 1500 10.1.3.4). Furthermore, since the only access to the Crew dayroom, kitchen or dormitory is through an Apparatus Bay, vehicle exhaust fall-out enters these areas every time a door is opened, and someone walks through.

Station ventilation and exhaust issues and recommendations are covered in the accompanying report by RSA. Modernizing the 53-year-old air handling unit and installing a proper exhaust monitoring and evacuation system are necessary for meeting the NFPA 1500 standards. However, the immediate adjacency of crew areas to Apparatus Bays will remain a problem even with these upgrades.

Life Safety

NFPA 1500 10.1.4 requires all new buildings housing fire, rescue or ambulance services be protected throughout by an approved automatic sprinkler system. Sprinklers provide an elevated level of protection to occupants, building and apparatus regardless of facility age or condition. While the adjoining City Hall administration and Police Department are so protected, Station 1 has no sprinklers. While not code required, such protection is highly advised, particularly for facilities essential to the public and commercial infrastructure of the community.

Built in 1966, well prior to adoption of modern codes governing safe egress for occupants, Station 1 lacks required life safety and accessibility attributes. Changes in area function have created egress and exiting violations. For example, both current second floor uses—Crew Sleeping (R2) and Training (B)—require two exits to conform to the State-adopted, International Building Code. IBC 2012, Chapter 10, Section 1021 requires second floor, R2 and B occupancies provide two exits unless protected by an automatic sprinkler system. The single exit stairs which descend from these areas fail to qualify as acceptable egress pathways on multiple accounts:

	Code Standard (IBC 2012)	Actual
Stair width (accessible)	48″ clear (IBC 1007.3)*	32″
Stair width regular	44″ clear (IBC 1009.4)	32″
Stair rise/run	7″max/11″ min (IBC 1009.7.2)	8″**/11″; 6.5″/10.5″**
Handrails	Both sides (IBC 1009.15) w/extensions	One side, no extensions
Exit Signage	Required for B occupancy (IBC 1011)	None

**unless protected by an automatic sprinkler system*
*** does not meet standard*

Other IBC and Americans with Disabilities Act (ADA 2010) standards for life safety and accessibility are not being met at Station 1. As a public building, the fire station is obligated to provide accessible accommodations for personnel, volunteers, and visitors who may be sight, hearing or ambulatorily impaired. The ADA provides direction for all public facilities to be surveyed for accessibility barriers and to have a plan formulated for their remedy. *"A fire station is a public building and must be designed, built, and maintained with public use in mind,"* (NFPA 1500 Handbook, Chapter 10).

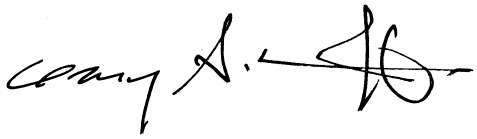
Tsunami Inundation

Along with these facility conditions, recent USGS mapping shows the site subject to tsunami inundation further complicating compliance and functionality as an essential facility or emergency operations center.

Conclusion

As demonstrated above and in the attached reports, the facility housing Valdez Fire Station 1 is deficient in construction, size, and functionality. Structural, life safety, occupational, and accessibility defects create an environment unfit for the essential functions of the department and the public they serve. At a minimum, additional structural and life safety analysis and a mitigation plan are recommended for the facility to be considered compliant for occupancy. Ongoing occupancy as an essential emergency facility would require a higher and likely cost prohibitive degree of upgrade. Given the construction type, mechanical and space limitations and overall site size/location, it is our professional opinion the existing facility is unsuitable for continued use as an essential facility.

Sincerely,



Gary S. Wolf, AIA

625 Cobb Street, Ste. 200 Palmer, AK 99645 *ph.* 907.746.6670 *www.*wolfarchitecture.com

PND ENGINEERS, INC.

July 15, 2019 PND Project No. 181184

Chris Whittington Evans
Wolf Architecture
625 S. Cobb Street
Palmer, Alaska 99645

Subject: Structural Evaluation of the Fire Station 1, Valdez Alaska

At your request, PND has modified our previous structural evaluation to include additional information concerning governing codes for existing buildings and established procedures for seismic evaluation thereof. We also have included more information on the increased loading requirements for essential emergency response facilities.

Scope of Structural Evaluation

The scope of the structural evaluation was performed from an inspection of the existing drawings for the fire station portion of the building located at 212 Chenega. As most structural members cannot be examined from a visual inspection, a study of available plans was used to perform the evaluation. The findings which follow are based on the examination of a partial set of plans which are dated April 1966. Calculations were performed on roof rafters to estimate snow load capacity. A quick screening of seismic systems was performed using the FEMA P-154 *Rapid Visual Screening of Building for Seismic Hazards*. No calculations were performed on the seismic capacity of shear walls or diaphragms as that was considered to be beyond the scope of this report.

Description of Existing Structure

The focus of the evaluation is on the original wood-framed fire station consisting of apparatus bays, crew quarters, and offices with a second floor mezzanine for training and dormitory functions. Plans for both structural and architectural were combined into a few sheets of drawings as was common in the 1960's. Review of the adjacent office wing was not part of this analysis as no plans were available.

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 at 1'-4" centers at 4 to 12 pitch spanning approximately 18-feet. The walls are constructed of 2x6 wood studs with 3/8" plywood sheathing. PND could find no information on the plans for design loads. No information on the plans was evident for lateral wind and seismic design such as shear wall and diaphragm nailing.

Relevant Structural Codes

If adopted by the City of Valdez, the building is governed by the 2009 *International Building Code* (IBC) and the local amendments adopted by the City. The IBC series of codes also

includes the *International Existing Building Code* (IEBC). Although it does not appear that the City has adopted the IEBC, language from the IEBC has been incorporated into the City of Valdez local amendments for section 116 dealing with unsafe and dangerous structures.

Essential Facilities

This building is being operated as an emergency response facility or essential facility. This occupancy is designated a Risk Category IV. Risk Category IV facilities requires higher levels of safety for snow, ice and seismic loads. These loads are amplified by importance factors. For a Risk Category IV fire station, loads are amplified according to the IBC as follows:

Snow	1.2
Seismic	1.5

Should the building change occupancy, and be repurposed for storage or warehouse, the Importance Factors for the loads on essential facilities are not required. Importance Factors become 1.0.

Snow Loads

Snow loads in Valdez have been incrementally increased over the last 20-years. The local code for ground snow load is now 160 psf. Using ASCE 7 snow load formulas for a warm sloping roof, the minimum roof snow load for the Valdez Fire Station with the 1.2 Importance Factor should be 126 psf.

Provisions of the International Building Code and Local Amendments

City of Valdez local amendments to Section 116 of the IBC deal with unsafe and dangerous buildings. The terms *unsafe* and *dangerous* are defined in the amendments as a structural condition where the stress in any material, member or portion thereof due to all dead and live loads, is more than one and one half times the working stress or stresses allowed in the IBC code.

Structural Deficiencies

From PND's examination of the building and plans we have identified some structural deficiencies. The following items have been identified as deficient and possibly dangerous.

Roof Framing:

Using the City of Valdez Snow loads multiplied by the essential facility Importance Factor, PND's calculations show the existing roof rafters are stressed to more than 1.8 times allowable stress in bending. This is assuming the wood to be Douglas Fir

No. 1 grade. Other grades or species would result in even more overstress. PND finds the roof rafters under full snow load to be stressed significantly more than 150% of their capacity. This means the roof structure may be categorized as dangerous or unsafe unless snow is routinely removed by shoveling during the winter months.

Lateral Loads:

Plywood sheathing on the walls and roof of the structure provide resistance to lateral loads such as wind and seismic. Methods for the seismic evaluation and strengthening of existing buildings is contained in both the IEBC code and in the *Seismic Evaluation and Retrofit of Existing Buildings* (ASCE 41-13). PND recommends an ASCE 41-13 Tier 1 seismic evaluation of this building. We have attached the forms that are used to conduct that evaluation. (The Tier 1 evaluation take time and effort to complete and is considered beyond the scope of this report.)

Using the less comprehensive Rapid Visual Screening techniques developed by FEMA P-154 for seismic hazards, PND has determined that the fire station is may be deficient for the high seismic loads in Valdez and the 1.5 Importance Factor that should be applied to seismic loads for essential facilities. The lateral deficiencies are primarily due to the age of the code under which the building was designed. FEMA P-154 uses a Benchmark Code for different types of structural systems to assist in determining a score. The benchmark code for wood-framed structures is 1976. Any building constructed before the benchmark code receives a lower score due to the changes in code since the Benchmark. This building predates that code by 10-years. Essential facilities with FEMA P-154 scores less than 2.5 are recommended for further Tier 1 seismic evaluations. The Fire Station score is 1.7.

Conclusions and Recommendations

Structural remediation or shoveling of the roof is probably needed even if this building is repurposed. The roof snow load capacity may present an unsafe condition and could pose a risk to occupants if snow is not removed during the winter. If there are unsafe or dangerous conditions, the code official is required to issue orders to abate the illegal or unsafe conditions.

Seismic and wind design criteria was not indicated on the original drawings. For evaluation of existing buildings, ASCE 41-13 "*Seismic Evaluation and Retrofit of Existing Buildings"* should be used for an evaluation. PND recommends a Tier 1 evaluation be performed.

Even if the occupancy of the building is changed to a lower risk category, the evaluation should be performed based upon the age of the facility and the code under which it was designed. The lateral deficiencies may be 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 or the EIBC.

PND Engineers, Inc.

F. Charles Kenley, P.E., S.E.
Principal Engineer

Rapid Visual Screening of Buildings for Potential Seismic Risk
FEMA-154 Data Collection Form

HIGH Seismicity

Address:212 Chenega Street
Zip: 99686
Other Identifiers:
No Stories: 2
Year Built: 1966
Screener: 5
Date: None
Total Floor Area (sq. ft.): 10000
Building Name: **Valdez Fire Station**
Use: None

Occupancy

☐ Assembly	☑ Govt	☑ Office
☐ Commercial	☐ Historic	☐ Residential
☐ Emer. Services	☑ Industrial	☐ School

Number of Persons: ☐ 0-10 ☑ 11-100 ☐ 101-1000 ☐ 1000+

Soil Type

A Hard Rock	B Avg. Rock	C Dense Soil	D Stiff Soil	E Soft Soil	F Poor Soil
☐	☐	☑	☐	☐	☐

Falling Hazard

☐ Unreinforced Chimneys ☐ Parapets ☐ Cladding

Other:

Basic Scores, Modifiers, and Final Score, S

Building Type	W1	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM
Basic Score	4.3	3.6	2.7	2.9	3.1	2.7	1.7	2.4	2.7	1.3	2.5	2.3	2.7	2.7	1.5
Mid Rise(4-7 stories)	☐ NA	☐ NA	☐ 0.2	☐ 0.4	☐ NA	☐ 0.4	☐ 0.4	☐ 0.4	☐ 0.4	☐ 0.2	☐ NA	☐ 0.2	☐ 0.4	☐ 0.4	☐ 0.0
High Rise(>7 stories)	☐ NA	☐ NA	☐ 0.6	☐ 0.8	☐ NA	☐ 0.8	☐ 0.8	☐ 0.6	☐ 0.8	☐ 0.3	☐ NA	☐ 0.4	☐ NA	☐ 0.6	☐ NA
Vertical Irregularity	☐ -2.5	☐ -2.0	☐ -1.0	☐ -1.5	☐ NA	☐ -1.0	☐ -1.0	☐ -1.5	☐ -1.0	☐ -1.0	☐ NA	☐ -1.0	☐ -1.0	☐ -1.0	☐ -1.0
Plan irregularity	☐ -0.5	☑ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5	☐ -0.5
Pre-Code	☐ 0.0	☑ -1.0	☐ -1.0	☐ -0.8	☐ -0.6	☐ -0.8	☐ -0.2	☐ -1.2	☐ -1.0	☐ -0.2	☐ -0.8	☐ -0.8	☐ -1.0	☐ -0.8	☐ -0.2
Post-Benchmark	☐ 2.4	☐ 2.4	☐ 1.4	☐ 1.4	☐ NA	☐ 1.6	☐ NA	☐ 1.4	☐ 2.4	☐ NA	☐ 2.4	☐ NA	☐ 2.8	☐ 2.6	☐ NA
Soil Type C	☐ 0.0	☑ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4	☐ -0.4
Soil Type D	☐ 0.0	☐ -0.8	☐ -0.6	☐ -0.6	☐ -0.6	☐ -0.6	☐ -0.4	☐ -0.6	☐ -0.6	☐ -0.4	☐ -0.6	☐ -0.6	☐ -0.6	☐ -0.6	☐ -0.6
Soil Type E	☐ 0.0	☐ -0.8	☐ -1.2	☐ -1.2	☐ -1.0	☐ -1.2	☐ -0.8	☐ -1.2	☐ -0.8	☐ -0.8	☐ -0.4	☐ -1.2	☐ -0.4	☐ -0.6	☐ -0.6
Final Scores		1.7													

Comments:

Detailed Evaluation Required: ☑

* = Estimated, subjective or unreliable data
DNK - Do Not Know

BR = Braced Frame
FD = Flexible Diaphragm
LM = Light Metal
MRF = Moment-resisting frame
RC - Reinforced concrete
RD = Rigid diaphragm
SW = Shear Wall
TU = Tilt Up
URM INF = Unreinforced masaonry infill

Project Name _____
Project Number _____

ASCE 41-13 Tier 1 Checklists

FIRM:	
PROJECT NAME:	
SEISMICITY LEVEL:	
PROJECT NUMBER:	
COMPLETED BY:	
DATE COMPLETED:	
REVIEWED BY:	
REVIEW DATE:	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

Project Name _____
Project Number _____

16.310 Immediate Occupancy Structural Checklist for Building Type W2: Wood Frames, Commercial and Industrial

Very Low Seismicity

Seismic-Force-Resisting System

RATING				DESCRIPTION	COMMENTS
C ☐	NC ☐	N/A ☐	U ☐	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)	
C ☐	NC ☐	N/A ☐	U ☐	SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than the following values (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1): Structural panel sheathing 1,000 lb/ft Diagonal sheathing 700 lb/ft Straight sheathing 100 lb/ft All other conditions 100 lb/ft	
C ☐	NC ☐	N/A ☐	U ☐	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)	
C ☐	NC ☐	N/A ☐	U ☐	GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used as shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U		
☐	☐	☐	☐	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)	
C	NC	N/A	U		
☐	☐	☐	☐	WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec. 5.5.3.6.2)	
C	NC	N/A	U		
☐	☐	☐	☐	HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3)	
C	NC	N/A	U		
☐	☐	☐	☐	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U		
☐	☐	☐	☐	OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5)	
C	NC	N/A	U		
☐	☐	☐	☐	HOLD-DOWN ANCHORS: All shear walls have hold-down anchors, constructed per acceptable construction practices, attached to the end studs. (Commentary: Sec. A.3.2.7.9. Tier 2: Sec. 5.5.3.6.6)	

Connections

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☐	☐	WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3)	
C	NC	N/A	U		
☐	☐	☐	☐	WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U		
☐	☐	☐	☐	GIRDER-COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)	

Foundation System

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☐	☐	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec.A.6.2.3.)	
C	NC	N/A	U		
☐	☐	☐	☐	SLOPING SITES: The difference in foundation embedment depth from one side of the building to another shall not exceed one story high. (Commentary: Sec. A.6.2.4)	

Low, Moderate, and High Seismicity

Seismic-Force-Resisting System

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☐	☐	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

Project Name _____
Project Number _____

Diaphragms

RATING				DESCRIPTION	COMMENTS
C ☐	NC ☐	N/A ☐	U ☐	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1)	
C ☐	NC ☐	N/A ☐	U ☐	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Commentary: Sec. A.4.1.3. Tier 2: Sec. 5.6.1.1)	
C ☐	NC ☐	N/A ☐	U ☐	PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Commentary: Sec. A.4.1.7. Tier 2: Sec. 5.6.1.4)	
C ☐	NC ☐	N/A ☐	U ☐	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

C	NC	N/A	U		
☐	☐	☐	☐	STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)	
☐	☐	☐	☐	SPANS: All wood diaphragms with spans greater than 12 ft consist of wood structural panels or diagonal sheathing. Wood commercial and industrial buildings may have rod-braced systems. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)	
☐	☐	☐	☐	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft and aspect ratios less than or equal to 3-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)	
☐	☐	☐	☐	OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)	

Legend: C = Compliant, NC = Noncompliant, N/A = Not Applicable, U = Unknown

Project Name _____

Project Number _____

Connections

RATING				DESCRIPTION	COMMENTS
C	NC	N/A	U		
☐	☐	☐	☐	WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less, with proper edge and end distance provided for wood and concrete. (Commentary: Sec. A.5.3.7. Tier 2: Sec. 5.7.3.3)	

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October 7, 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 23rd 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 20th 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 steam.

c. AHU-1 supply air to the residential quarters should remain in place supplying air to the kitchen/lounge area on the 1st floor. The supply air ductwork to the 2nd 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.

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 (NO2) gas detectors with sensors located near to the exhaust outlets of the stationary vehicles. This CO/NO2 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/NO2 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

ttg/hhm
16-0618/L6192

Karen Feero

From: Stanley Porritt
Sent: Friday, February 26, 2016 9:39 AM
To: Ashley Briggs; George Keeney; Karen Feero; Tina Fifarek
Subject: FW: Mold Report: Fire Station 1
Attachments: 101611734.pdf

Attached please find the Mold Test results for the whit room at the Fire Station #1

-----Original Message-----
From: Frontdesk [mailto:frontdesk@whitelabsllc.com]
Sent: Friday, February 26, 2016 9:36 AM
To: Jodi Fowler; Stanley Porritt
Subject: Mold Report: Fire Station 1

To valued clients,
Please note that we have changed e-mail addresses (see below) from frontdesk@whitelabsllc.com to frontdesk@wecenv.com.

Thank-you,

White Environmental Consultants, Inc.
383 Industrial Way, Suite #300
Anchorage, AK 99501
Office: (907) 258-8661
Fax: (907) 258-8662
frontdesk@wecenv.com

WHITE ENVIRONMENTAL CONSULTANTS INC.
383 Industrial Way, Suite 300 Anchorage Alaska 99501

May 29th, 2015

City of Valdez
212 Chenega Ave
Valdez, AK 99686

Attn: Jennifer Smith

RE: Fire Station One – Microbial IAQ Screening

On May 20th, 2015 White Environmental Consultants (WEC) performed IAQ (indoor air quality) inspection and sampling within the living quarters and day room of Fire Station One located in Valdez, Alaska. Air samples were collected at the request of our client, The City of Valdez. WEC spread representative sampling in and around the offices of concern. There was no visible microbial growth within the areas of concern at the time of inspection.

Microbial IAQ air samples were collected from the first and second floors of the structure, and one microbial IAQ air sample was collected outdoors for comparison purposes. Allergenco D cassettes were utilized for all air samples collected at the property. The air quality at the time of inspection was acceptable, with no discernable amounts of fungal spores present in the sampling locations.

Particulate Air Sampling – Allergenco D Cassette

The Allergenco D air quality sampler is a particulate sampling cassette designed for the rapid collection and analysis of a wide range of airborne aerosols including mold spores, pollen, insect parts and skin fragments. This sampling device is useful in providing rapid analysis of airborne contaminates in indoor air quality testing, allergy testing and flood restoration monitoring. The results are reported as a total, meaning spores counted can include both viable and non-viable fungal spores.

WEC collected six Allergenco D indoor air quality samples total. (See attached analytical results)

Air Sample Results

Client ID #	Collection Date	Sample Description	Sample Location	**Results** Total Fungal Spores Count/M^3
001	05/20/15	Allergenco D	Outside Building	1,700
002	05/20/15	Allergenco D	2nd Floor Living Quarters	270
003	05/20/15	Allergenco D	2nd Floor Living Quarters Bath	320
004	05/20/15	Allergenco D	Dayroom	110
005	05/20/15	Allergenco D	Dayroom	110
006	05/20/15	Allergenco D	Bay 1,2 & 3	110

WEC WHITE ENVIRONMENTAL CONSULTANTS INC.
383 Industrial Way, Suite 300 Anchorage Alaska 99501

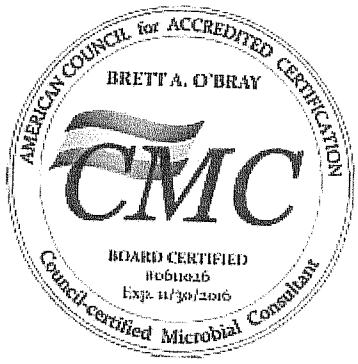
Conclusions

The following conclusions are based on our inspection of visually accessible areas and the results of microscopic examination of air samples:

- No Signs of visible microbial growth were detected at the time of inspection.
- Areas of concern were dry.
- Fungi and fungi levels found during sampling are typical and does not represent current active fungal amplification within the areas of concern.
- Relative humidity levels were at acceptable levels at all sampling locations.
- Sample correlation show fungal types extremely similar to what would be typical for the weather conditions and the season of the year and building conditions. All other fungi types illustrate non-significant amounts of fungal spore that typically would be seen at the current season and time of year. In summary, on the basis of this mold screening investigation, WEC offers the following recommendations:
- If MVOC's are detected in the future search for possible water intrusion and repair under restoration conditions by a licensed certified remediation firm.
- Maintain humidity levels below 60% to discourage mold growth.

Respectfully,

Brett O'Bray - CMC (Board Certified Microbial Consultant)
Vice President
White Environmental Consultants Inc.



Northeast Laboratory Services

1-800-244-8378 Phone
1-207-873-7022 FAX
227 China Rd.
Winslow, ME 04901

Analysis Report
Direct Microscopic Exam

Client:	White Environmental Consult
Address:	383 Industrial Way Suite 300 Anchorage, AK 99501

SOP: Tape 4.3.25 Swab 4.3.26 Bulk 4.3.27

Date Sampled:	2/19/2016
Date Received:	2/24/2016
Date Reported:	2/25/2016
Project Number:	City of Valdez
Project:	Fire Station 1

Lab Number	Sample Type	Description	Background Debris (1)	Mold Growth (2)	Comments
101600732	BULK MATERIAL	FS-1 De-Con Inside Chase	2	2 Stachybotrys	
101600733	BULK MATERIAL	FS-1 De-Con 10:20	2	4 Stachybotrys	
101600734	BULK MATERIAL	FS-1 De-Con 10:30	2	1 Chaetomium 4 Stachybotrys	

Qualitative Scale: N.D. = Not Detected; 1 = Lowest (Trace); 5 = Highest (Heavy or Highly Abundant Presence)
*= Spores only, no growth structures present.

(1) Background particles include organic and inorganic debris from a variety of sources, and generally occur as a result of settling from an airborne state.

(2) Mold observed with associated vegetative structures (unless otherwise indicated). In addition to a relative numerical abundance rating, molds present are identified to the highest level possible. Mold growing at level 4 or above could obscure the visibility of other, smaller mold growing under and/or within the heavily growing mold.

Report Reviewed By: Brett Goodrich

Brett Goodrich, Manager, Environmental Microbiology Dept.

Northeast Laboratory Services

Ship samples to:

227 China Road
Winslow, Maine 04901

Phone: 1(800) 244-8378
Email: info@nelabservices.com
Website: www.nelabservices.com

1016007328

Chain of Custody Record
Environmental Microbiology Analysis

Client: White Environmental Consultants	Lab Use Only
Address: 383 Industrial Way Suite 300	
City, State, Zip: Anchorage AK 99501	
Contact: ~~Brett O'Bray~~ Joel Hicklin	
Phone: 907-258-8861	
Email: joel@WECENV.com	Project #: City of Valdez Project Name: Fire Station
Sampled by: Client	Report by: Fax Email Regular Mail only
Turnaround*: V Standard (2-Day) Next Day (as available) RUSH – Same Day (surcharge applies)	

Sample Type Codes

AC = Air Culture Plate	BS = Bulk Solid	RCS = RCS Air Strip	ST = Spore Trap	WC = Wall Cavity (air)
AND = Anderson Plate	BURK = Burkard/Allergenco Slide	SAS = SAS Plate	T = Tape Lift	WP = Wipe
AOC = Air-O-Cell Cassette	D = Dust	S = Surface Swab	W = Water	O = Other (describe)

Sample Information

Lab No.	Sample Identification	Type	Date/Time	Volume/Area	Analysis Requested**
1016007328	FS-1 De-Con Inside Chair	BS	2.19.16		Mold
33	FS-1 De-Con @10:20	BS	"		Mold
34	FS-1 De-Con @10:30	BS	"		Mold

Spore Traps – Brand & Type (e.g. Allergenco-D, Air-O-Cell etc.):

Air Culture Plates – Sampler & Type (e.g. Anderson N6, SAS-100, etc.):

Special sample information, testing or reporting instructions:

PO AK-0632

Custody Record

Date	Time	Samples relinquished by:	Samples received by:	Comments
2-23-16	1145AM	J. Hicklin	[illegible] 2/24/16 1:15PM	

*Turnaround times are for Direct-Exam analysis only and are contingent on daily workload; culture sample turnaround is 5-6 business days. Please contact NEL prior to submitting samples for same-day turnaround.
**Analysis Requested. Please describe or use NEL Analysis Code.

LA- 016933

Memorandum

To: White Environmental

From: Jodi Fowler, Sr. Office Assist, Building Maintenance Dept, City of Valdez

Date: February 19, 2016

Subject: Mold testing

Enclosed are samples taken from the City of Valdez Fire Station 1 that we would like tested to see what kind of mold they contain so we can figure out the correct way to remove it.

Please contact either myself or Stan Porritt, Building Maintenance Superintendant, with any questions you may have and for billing.

Thank you,

Jodi Fowler
Sr. Office Assist
Building Maintenance
City of Valdez
PO Box 307
Valdez, AK 99686
Ph: 907-835-5411
Email: jfowler@ci.valdez.ak.us

Stan Porritt
Building Maintenance Superintendant
Building Maintenance
City of Valdez
PO Box 307
Valdez, AK 99686
Ph: 907-835-5412; Cell: 907-831-0112
Email sporritt@ci.valdez.ak.us.

Rcvd: JHicklin
2.22.16

NORTHEAST LABORATORY SERVICES
SAMPLE RECEIPT CONDITION REPORT

Client: White Eard

Date/Time Received: 2/24/16 11AM **Initials:** MB

Project: City of Valdez

Rush? Yes No TAT

NEL Sample Numbers: 1016 0732-34

Delivered by:

Tracking Number: 6268 3787 4583

FOOD AND WATER

	Yes	No
1. Are custody seals present?		
2. Is the COC properly filled out?		
3. Do sample labels match the COC?		
4. Are samples within the analytical hold time?		
5. Is there sufficient volume to perform tests?		
6. Are samples in good condition?		
7. Is temperature between 4 +/- (2) C°		

TEMP

Comments:

INDOOR AIR QUALITY

	Yes	No
1. Is the COC properly filled out?	✓	
2. Do sample labels match the COC?	✓	
3. Are samples in good condition?	✓	

Comments:

CONTROLLED