

## **SECTION 1**

### **FIRE STATION – 11 FIREHOUSE LANE**

#### **INTRODUCTION**

The following report was prepared for the Town of Norwich Vermont by a team of professionals assembled by Mink Brook Management, LLC with the intent to identify the code and functional deficiencies within the three Town buildings housing the Department of Public Works, the Town Police Department, and the Town Fire Department. We have included in this report budget figures showing estimated costs to bring these buildings up to code and meet the functional standards typical for each department if these buildings were new today. The standards were identified by the team of professionals who have designed and constructed complexes in each of the categories discussed. We understand that each of these buildings is in need of maintenance work at this time and there are line items in the budget showing some of the maintenance repairs identified during our inspections. It is not the intent of this report to try to sway the Town of Norwich to perform the remedial work as described as it may not be in the best interest of the Town to do so. It is the intent of the report to inform the Town of Norwich of the costs associated with the work described if in fact remedial work was to be done to each of the existing buildings. The results from previous studies were reviewed and considered while going through the inspection process in each of the buildings mentioned.

The Fire Department Building was originally built in 1925 as a wood frame building and was replaced in 1980 with a steel frame garage and brick veneer façade, and a wood framed training / social room. Much of that work was completed by the department staff as volunteers. The building is marginally heated and there was an exhaust extraction system for the fire apparatus installed in 2009. Facilities within the building for both physical requirements of modern firefighting, secured areas for safety and proper storage and sanitary/safety accommodations for staff are virtually nonexistent. The building has a fire alarm system but no sprinkler system. The steel framed building is 4,096 square feet, Type IIB, unprotected non-combustible construction.

Generally the facility with all its storage needs is past capacity even though the Town has eliminated one truck several years ago. The apparatus floor stores 2 engines, 1 tanker, 1 aerial ladder, and 1 forestry truck. There is still room for one small vehicle to be added to the fleet. Unfortunately the departments' other equipment is stored in the apparatus area as well. This includes PPE, hose, foam concentrate, tools, SCBA, and hand tools. This space is certainly too small to meet this storage demand.

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## 1. Summary

- 1.1. The building is of adequate size to house the fire apparatus and equipment but does not have enough room for essential support activities. The existing kitchen/meeting room could function as a decontamination area, workshop, and storage for EMS supplies, fire equipment etc. Apparatus floor storage would include turnout clothing, hose and foam.
- 1.2. Bathroom facilities are inadequate and there is no room for expansion.
- 1.3. There is no room for a training room, Chief's office, members' room, and showers.
- 1.4. The building needs some energy efficiency improvements.
  - 1.4.1. Insulate walls
  - 1.4.2. Replace overhead doors with insulated door.
  - 1.4.3. Replace single pane windows.
  - 1.4.4. Replace fluorescent lights.
- 1.5. The building is code compliant. It meets ADA standards for existing buildings. The expense associated with meeting the requirements for new buildings is not prudent and would not solve any of the functional deficiencies.
- 1.6. Parking and traffic flow for responding members is poor. The Grange building restricts responses and parking. Additional parking could be added behind the building but the current configuration of the building would have to be altered to maximize the effects of new parking.
- 1.7. There is a lack of space on the front ramp to train with fire apparatus.
- 1.8. The current fire station has value and can serve as part of a new public safety building.

## 2. Functional Deficiencies

- 2.1. Inadequate space for training.
  - 2.1.1. The department has approximately 40 members. There is not sufficient room to conduct training with table and chair seating for more than 20 members.
  - 2.1.2. The low ceiling height interferes with effective presentation because it is difficult to see presentations.
  - 2.1.3. This space is used by outside groups. These groups must enter the room through the apparatus floor.
  - 2.1.4. The front ramp area is not an effective area for apparatus training. There is not sufficient area to train with apparatus without restricting access to the private homes located adjacent to firehouse.
- 2.2. Storage Areas
  - 2.2.1. EMS supplies are in several cabinets on the apparatus floor. Access to these cabinets is difficult due to proximity of the fire apparatus and other storage.
  - 2.2.2. No secure storage for fire/rescue supplies. There is one small closet that can be locked. There are some supplies and equipment that needs to be secured to maintain inventory control and distribution.

- 2.2.3. Fire hose storage is directly behind Engine 2. There is no room between Engine 2 and the hose racks. The hose racks are not large enough to store all of the spare hose. As a result hose is stacked in any available space around the rack. The amount of hose rack space would have to be doubled to properly store all the hose. There is no room to put any additional hose racks.
- 2.2.4. There is no space to dry fire hose. Hose is washed then left on the apparatus floor to dry. This creates a tripping hazard because hose must be spread out between the apparatus. There is not enough room to dry the amount of hose typically used at a building fire. A hose dryer could solve this problem except there is no room for one.
- 2.3. Decontamination area.
  - 2.3.1. The small bathroom is the only sink that can be used to decontaminate equipment. VOSHA regulations do not permit decontamination operations in kitchen areas.
  - 2.3.2. Inadequate space/location for laundry. The washer/extractor for cleaning protective clothing is on the apparatus floor. There is no space for a dryer so garments must be dried on “make shift” racks.
- 2.4. Office
  - 2.4.1. The fire station office is about 120 gross square feet and contains several file cabinets, a copier, and desk. The electric panel is in the office and the National Electric Code requires 3 feet of clear space in front of the panel. There is a lack of adequate space for records storage and use of the space by more than two people is impractical.
  - 2.4.2. The Fire Chief does not have an office in the fire station. There is no space to add an office in the firehouse. The Chief’s office is in the police station and is too small (110 square feet); about 200 square feet are needed.
- 2.5. Parking.
  - 2.5.1. The existing parking lot areas around the Fire Station and Police Station have adequate square footage for ample parking for both facilities. However, the parking configuration is not operationally effective for response by fire department members.
  - 2.5.2. The primary parking area at the Firehouse is owned by the Grange who has given permission for the fire department to use the space. Members have to “double” park in the lot when responding to alarms. This forces members to park on Main St. and walk down the alley to the firehouse. This delays their response and creates a traffic hazard when the fire apparatus enters Main St. The Grange has three regular events each month. On these days there is no room for the first arriving members.
  - 2.5.3. The only area where additional parking can be developed is behind the firehouse. The buildings adjacent to the firehouse make it impossible to expand parking for responding firefighters to the front or side of the firehouse.
- 2.6. Servicing self contained breathing apparatus (SCBA) and filling air bottles.
  - 2.6.1. The SCBA service area is on the apparatus floor. The compressor is noisy and there are no areas to wash SCBA components other than the bathroom sink.
- 2.7. Personnel Areas
  - 2.7.1. There is one small bathroom with a sink. This is inadequate for the number of members particularly since the sink may be required for decontamination procedures.
  - 2.7.2. There is no shower for members to use after calls. Members should have the opportunity to clean up following a call to avoid bringing contaminants to their homes.
  - 2.7.3. The building does not have an area for sleeping that is code compliant. There may be occasions during extended emergencies where personnel would be needed to staff or remain at the station for extended periods of time. This is not permissible in the current building.

### 3. Building Components and Systems

#### 3.1. Structural components

3.1.1. The Fire Station had a new roof constructed over the existing with added insulation value of R 30 using two layers of 1½" rigid insulation. This roof added weight to the existing metal roof system with a pitch of 4:12. The original metal roof was installed on 8" purlins at approximately 4' on center. This is an essential facility (fire station) and in today's standards needs to meet Occupancy Category IV. Due to the stringent standards for Category IV buildings it is our opinion that none of the buildings included in this report would meet Category IV, and a structural evaluation would be expensive for each building. The new roof installed over the existing had the following evaluation from Stantec representative Gerry Vezina PE and reported to the Town in August of 2010. "Our calculations showed that the roof framing will marginally support the load of the existing and new roof with the design snow load of 42 PSF; with the building frame being the weakest part of the system. However, simply stated; the new roof system will carry approximately 5 PSF less snow load than before the new roof was added.<sup>1</sup> We encourage you to monitor the roof during periods of heavy snow and to remove the snow if the weight becomes excessive."

3.1.2. This facility is an Occupancy Category IV facility as defined in Table 1604.5 of IBC. The "Importance Factor" (or "I") is used in calculating snow, wind and seismic forces (NOT dead loads or other live loads). IBC does not include formulas to determining these forces but refers the designer to ASCE 7 "Minimum Design Loads for Buildings and Other Structures" to determine the magnitude of environmental forces. In ASCE 7, there are a number of formulas for calculating these forces and these formulas include the variable "I" along with numerous other variables (i.e. for exposure, site topography, building thermal characteristics, building size/height, soil characteristics, etc.) depending on what environmental force is being calculated. This increases the required design load significantly compared to an occupancy in a lower category. This implies, but does not conclude without further verification, that the existing facility may have a serious code deficiency in terms of the structural requirements of an essential facility. In order to determine whether or not this building would meet the Category IV requirements there would have to be a structural inspection and study performed. This study would have to identify any deficiencies in the building structural frame and supports and identify what procedures would have to be done in order to have the building comply with the regulation. It is our opinion that none of the buildings that we are looking at for the Town of Norwich would comply with this regulation. The buildings are too old and the requirement was not in place when the buildings were first utilized. The building has stood for over 40 years and is structurally as sound as it was when it was built. The new roof actually will serve to lower the amount of snowing loading by eliminating ice damming. The use of Category IV requirements for this building is setting a higher standard than is required by the VT Fire Prevention and Building Code (VTFPBC). The estimated cost for a structural report is \$7,500 per building but the costs could run anywhere between \$5,000 and \$15,000. The mean price of \$7,500 was used in this report.

#### 3.2. Energy Efficiency

3.2.1. The new roof has an R factor of 30 which meets current energy efficiency standards.

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<sup>1</sup> The actual weight of the new roofing was less so the net result was the snow load capacity was reduced by 1 PSF. The new roof eliminated ice jams so the actual load on the roof was less than in previous winters.

- 3.2.2. The existing Fire Station exterior walls are poorly insulated and remain at an R factor of 3. The standard R factor for a 2' x 6' wooden frame in anyone's home would be R-19. It would be a very good idea to improve the insulation characteristics of the Fire Station by implementing the foam procedure proposed by Dayco, Inc. (See Attached Proposal) Estimated cost ... \$5,000
- 3.2.3. The three overhead doors are not insulated. ) Estimated cost ... \$5,000
- 3.2.4. The windows are single pane glass and need replacing. ) Estimated cost ... \$4,000
- 3.2.5. The fluorescent light fixtures on the apparatus floor are not energy efficient. Efficiency Vermont offers rebates for the purchase of qualifying lights; it does not include installation cost. Estimated cost \$1,200

### 3.3. Apparatus floor

The apparatus floor drains do not drain to an approved oil separator. There is an existing grate and drain in the floor of the apparatus bay that does not meet underground injection control regulations. The Vermont Department of Environmental Conservation would govern what would need to be done to this existing drainage system so it was approved. This may require the installation of oil and grease interceptor and then a storage tank that could be pumped when needed. Floor drains require UIC (underground injection control) registration at a minimum. UIC registration does not guarantee acceptance by the VDEC (Vermont Department of Environmental Conservation). Oil and grease interceptor may be a necessity to obtaining approval from the VDEC. Please review the options under Appendix B in the upcoming pages. We would recommend using the option of a holding tank that could be pumped periodically. Based on discussion with Fire Station Personnel our belief is that holding tank may have to be pumped two times a year. This appears to be the most economical way to meet the code. Estimated cost ... \$4,500

- 3.3.1. The finish on the floor makes the floor slippery when wet.

### 3.4. Mechanical Systems

- 3.4.1. Heating System. The furnace room that is attached to the metal building in the back has no provisions for fresh air intake for the furnace and there is no fire separation between the furnace room and the Fire Station. The heating plant is an oil fired boiler that circulates hot water. It is old, problematic, and undersized for the area it's trying to heat.
- 3.4.2. Exhaust Extraction System. A source capture vehicle exhaust system was installed in 2009. This had dramatically improved the indoor air quality and prevents the build up of exhaust residue on equipment and the building. This system meets the requirements of NFPA 1500 Fire Department Occupational Safety and Health Program.
- 3.4.3. Electrical. The electrical system complies with the National Electric Code. Project Worksafe identified several electrical violations. These were corrected in July 2012. There is a need for additional electrical outlets (apparatus floor and kitchen) and lighting (overhead storage area and boiler room).

## 4. Americans with Disabilities Act (ADA).

- 4.1. It is our firm belief that all public buildings should comply with American with Disabilities Act (ADA) requirements for handicap access. Existing buildings are not required by the VTFPBC to be upgraded to meet all ADA standards. The VTFPBC does require that any new addition or construction meet ADA standards. The following codes and associated costs represent the items that would need to be completed in order to have the Fire Station comply with ADA requirements for new construction.
  - 4.1.1. ADA standards requirements for doors.
    - 4.1.1.1. All doors on an accessible route within the building shall have a minimum clear width of not less than 32" and a minimum height of 80". (ADA 28CFR Ch. 1, 7/1/94 edition, section 4.13.5)

- 4.1.1.2. All doors on an accessible route within the building shall have a minimum maneuvering clearance on the pull side of the door of 18". (ADA 28CFR Ch. 1, 7/1/94 edition, section 4.13.6 and figure 25)
- 4.1.1.3. Maximum allowable height of a door threshold is ½" with 1:2 bevel. (ADA 28CFR Ch. 1, 7/1/94 edition, section 4.13.8)
- 4.1.1.4. Code requires that door handles, pulls and latches be no higher than 48" above finished floor and that the handle shall not require tight grasping, pinching or twisting. (ADA 28CFR Ch. 1, 7/1/94 edition, section 4.13.9)
- 4.1.2. The existing doors do not meet ADA standards for new construction. There are at least five doors that would need to be replaced in order to meet the criteria set forth in the code. The replacement of these doors would entail removing the existing doors, frames, and hardware, adjusting the location of the door opening to fit within the confines of the room entered and allow the 18" clear to obstruction on the handle side of the door, patch and repair the finishes and install a new pre hung door unit, including hardware in its place. Replacing these doors is impractical due to the extensive modifications and the limited benefit. There is no requirement to change these doors even if the existing building was retained and used as part of a public safety building. Estimated cost ... \$20,000
- 4.1.3. Accessible kitchens are required to have a sink with a maximum height of 34" and an accessible counter with a maximum height of 34". (ADA 28CFR Ch. 1, 7/1/94 edition, section 4.24 and 4.32.4)
  - 4.1.3.1. The existing counter, sink, and base cabinets are at a height of 36" above the finish floor. The lower base cabinets would have to be cut down in order for the heights to work for the ADA requirement. The sink would have to be lowered to fit the condition as well. Renovating the kitchen is impractical due to the extensive modifications and the limited benefit. There is no requirement to modify the kitchen even if the existing building was retained and used as part of a public safety building. If this building is retained for use with an addition this space would not be used as kitchen. Estimated cost ... \$4,000
- 4.1.4. Toilet facilities are required for men and women and shall be accessible. There are numerous code violations (IBC, ADA) with the existing toilet room and the room is not large enough to do anything that will comply with the code requirements. It appears to be virtually impossible to correct these deficiencies without providing additional space through renovation (and/or building addition). The existing facility does not have adequate space to accommodate such a renovation without losing other necessary functional space. Looking at the existing facility and adding an addition 15' x 22' to house two bathrooms, one for men and one for women. These two bathrooms would have all handicap accessible dimensioning, handicap grab bars, doors, and hardware. Estimated cost ... \$50,000
- 4.1.5. Ceiling in the Day Room/Training Room does not meet the required clearance height for such spaces, which is 7'-6" minimum. (2006 IBC – Section 1208.2) Raising the ceiling is impractical due to the extensive modifications and the limited benefit. There is no requirement to change the ceiling height even if the existing building was retained and used as part of a public safety building.

## **5. Compliance with Applicable Codes and Standards**

- 5.1. VT Fire Prevention and Building Code.
  - 5.1.1. The building is in compliance with the VTFPBC. The VTFBC includes NFPA 101 Life Safety Code and the 2006 International Building Code.
- 5.2. Vermont Occupational Health and Safety Administration (VOSHA)
  - 5.2.1.1. The project WorkSafe inspection identified several VOSHA violations. All of these have been corrected.

### 5.3. NFPA Standards

5.3.1. NFPA 1500. The decontamination area does not meet NFPA 1500 standards.

5.3.2. A smoke alarm connected to the fire alarm system should be installed in the training room.

## 6. Functional and Operational Needs Program

- 6.1. Fire and Police can be collocated in a public safety building. This will be more efficient by using shared spaces and other resources. Police needs to be a secured area. Fire does not. Police can have full access to fire space. Access to police space is restricted to police only.
- 6.2. The space needs in the table below may be subject to modification to reduce the need for renovations to spaces that would function but do not meet the exact size.
- 6.3. Meeting/ training room for 50 people with table and chairs seating and classroom equipment.
- 6.4. Community access to training/meeting room
- 6.5. Bathrooms for male and female and male and female shower areas.
- 6.6. Should include one unisex bathroom accessible from apparatus floor.
- 6.7. Small meeting room. Shared space with Police Department
- 6.8. Sprinkler system and overhead fill for apparatus
- 6.9. Dormitory style room for potential “live in” fire department interns.
- 6.10. Fire alarm system
- 6.11. Standby generator
- 6.12. **Fire Department Space Needs Table**

<i>Norwich Fire Department</i>	<i>Approximate Square footage</i>	<i>Remarks Secured area</i>
Apparatus Floor	4800 (64 X 75)	Three bays. Drive through capability for one or two bays are desirable. Direct access from the outside for responding members.
Fire Chief	200	Near apparatus floor
FD Office	200	Near apparatus floor
FD Dorm rooms	300	Near bathrooms and shower
Kitchen and day room	200	May be shared with PD. Dayroom is separate
Bathrooms and Shower	374	Unisex and ADA. Accessible from Training room without entering PD or Apparatus Bay. Shower area restricted to employees
Workshop, Storage Compressor area	500	Adjacent to, or part of apparatus floor. Mezzanine area on apparatus floor is possibility for storage
<b>Public Safety Shared Space</b>		
Training room	750	Direct access to the outside for public use. Access to bathroom(s)
Small conference Room	200	Function as EOC. Accessible to fire and police
Storage Areas	455	Communications, janitor, supplies etc. Can be multiple closets located for ease of access.
<b>Total FD and shared spaces</b>	<b>7,679</b>	

- 6.13. Parking for members immediately adjacent to the apparatus
- 6.14. Training Spaces
  - 6.14.1. Apparatus operation outside the building without affecting public traffic flow.
  - 6.14.2. Storage for training props.
  - 6.14.3. Hose, ladder and search and rescue practice areas that can include stairs and areas with moveable partitions. May “share” building stairs and basement but they would have to be arranged so that they would not be damaged by water or training activities.
- 6.15. Hose drying area. May be wall mounted hose racks, hose dryer, or hose tower (Approximately 30 feet high).

## **7. List of Inspectors and Dates:**

- Landon Wheeler, Division of Fire Safety, State of Vermont (March 23, 2012)
- Hazel Hunter, Project WorkSafe, State of Vermont (May 1, 2012)
- Greg Coates, Architect, New London, New Hampshire (Several Visits over March and April)
- Calvin Hunnewell, Director of the Codes Department, Lebanon, New Hampshire (Several visits over March and April.)
- All inspections were accompanied by Mink Brook Management representative, Leet Ware.

Before any work is done to the Fire Station there should be an asbestos and hazardous materials inspection prior to any work in the existing building. This inspection would identify any and all hazardous materials that could be harmful to any worker during a demolition and retrofit procedure. Estimated cost ... \$600

## **8. Photos**



Photograph No. 1: Exterior side of the building looking toward Police station.





Photograph No. 2: Open storage for Personal Protective Equipment.



Photograph No. 3: More open storage and equipment.



Photograph No. 4: Bathroom with holes through the wall into furnace room.



Photograph No. 5: More bathroom.





Photograph No. 6: Holes in the wall through to the furnace room from outside the bathroom and from the main Fire Station building.



Photograph No. 7: Washing machine with partially hidden pull station.



Photograph No. 8: Training room exterior wall with window.



Photograph No. 9: Training room continued.

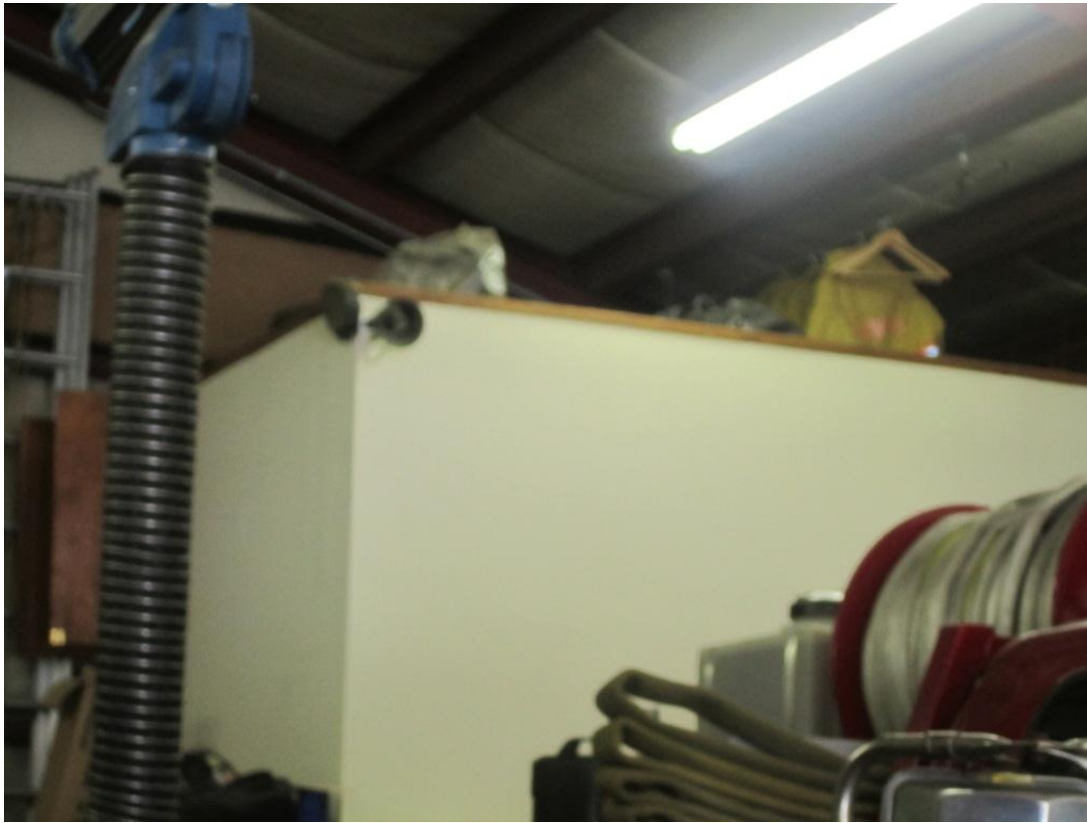




Photograph No. 10: Kitchen.



Photograph No. 11: Open floor grate that runs full length of the building.



Photograph No. 12: Exhaust extraction hose system and open storage beyond.



Photograph No. 13: Open storage and electrical, telephone office.





Photograph No. 14: Town water meter without backflow prevention.



Photograph No. 15: Exterior of the building looking toward the police station on the other side.



Photograph No. 16: Front of the building showing OH Doors for equipment and front entrance door.

Landon Wheeler report  
Letter from Stantec Structural Engineers

## **9. Parking**

9.1. There is ample room around the Fire Station and Police Station to set up parking for a minimum of 70 cars. This is more than enough parking spots for the need as the workforce count and Fire Station requirements have been explained. The Police Station has five people at the most at one time working on premises and the Fire Station has reported that typically there are 10 to 12 vehicles for a standard call. The largest problem with parking and vehicles is the traffic pattern and room to manipulate coming in from Main Street by the Grange. The single lane going around the right side of the Fire Station does not allow any room for parking close to the entry doors to the Station, and the front yard is not the place to accumulate cars and be able to get the Fire Equipment out of the station and on its way. It is also less than desirable to have vehicles parked on Main Street as vision in both directions is partially blocked when entering the traffic pattern. Even though it is not the most advantageous it appears the best scenario would be to park in the rear of the building and enter the Fire Station from the back through an addition.

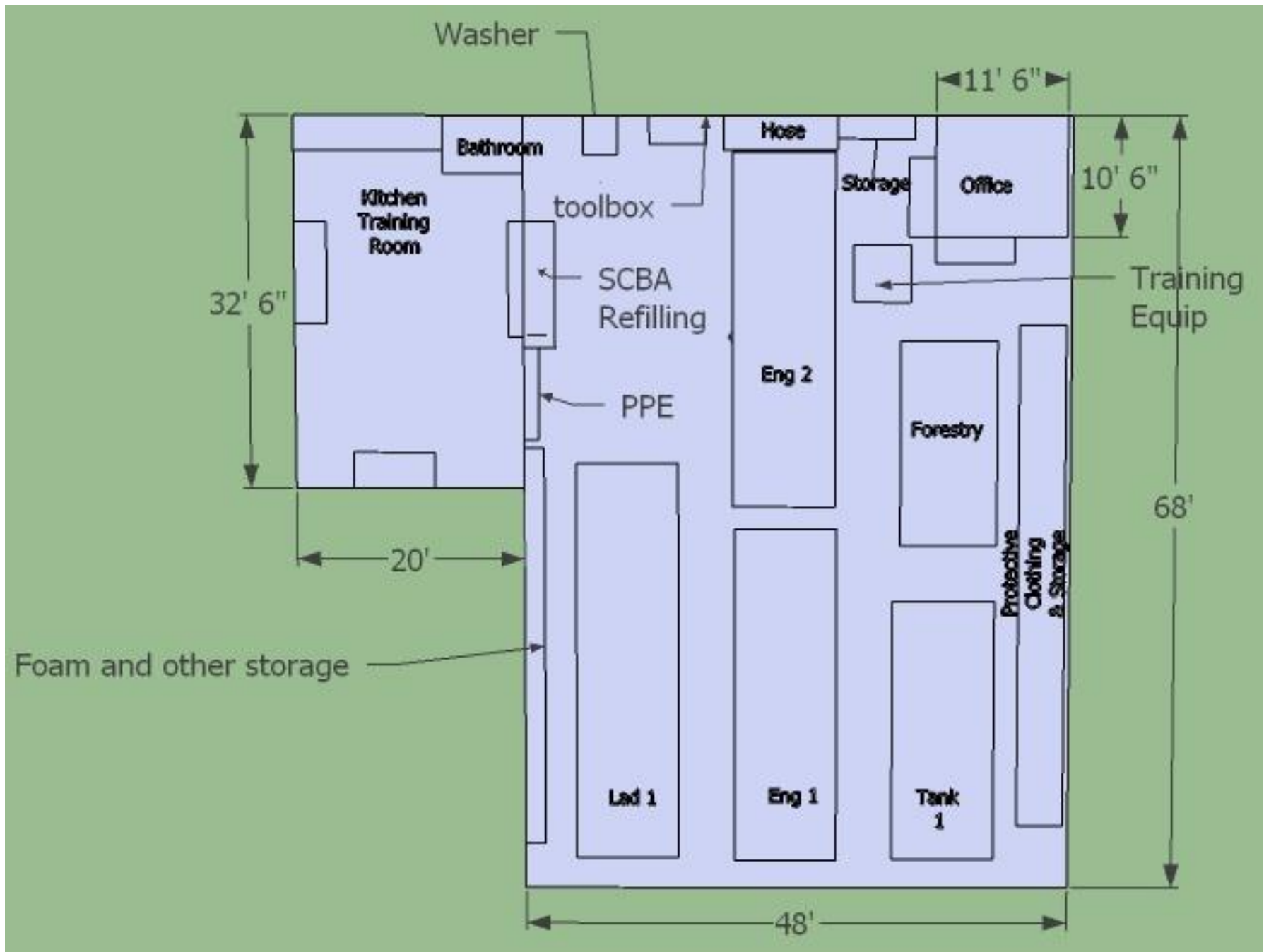
## **10. Evaluation of Firehouse**

10.1. The building has value and does what it originally was designed to. There have been some improvements, notably the new roof and the vehicle exhaust extraction system. The most significant problem with the building is that it is too small for the operations of the fire department. The building is overcrowded suffers from a severe lack of storage space, bathroom facilities, and training areas.



- 10.2. Site access is limited by the Grange building and the Marcus Residence. This limits parking options for responding firefighters and makes access to Main St. undesirable.
- 10.3. This building has value and could be used as part of a new public safety building.

## 11. Appendix A Building Floor Plan Diagram



## 12. Appendix B Underground Injection Control (UIC) Program

Registration is now required of all 5W20 and 5X28 (industrial, commercial, utility, and automotive) floor drain/injection well systems used for the disposal of fluid waste. Some of the information that the UIC Program will obtain from registration includes ownership and location of floor drain/injection well systems, types, and amounts of wastewaters being disposed to the floor drain/injection well system, and the type of business where floor drain/injection well systems exist. There will be no fee for registration. Registrations will remain valid for the life of the floor drain/injection well system unless there is a change in the information provided to the UIC Program in the original registration form.

### Recommended/Prioritized Alternatives to Floor Drain/Injection Well Use

1. Eliminate the floor drain. Some facilities report to the UIC Program that despite the existence of the floor drain/injection well system, there is no appreciable discharge. When this is the case, the DEC recommends that floor drains be closed and sealed. All closures should be reported to the UIC Program.
2. Reroute the floor drain to discharge to a municipal sewer line, where available and where acceptable to the municipality, or discharge to a facility accepting the generated wastewater. When wastewaters are generated, the DEC considers this option to be the best available technology.
3. Collect wastewater in a storage tank and dispose of via a local wastewater treatment plant or a hazardous waste hauler as appropriate. You must first determine if the wastewater is a hazardous waste before collection into storage tank. If the wastewater is determined to be a hazardous waste, you may need a permit from the Hazardous Materials Management Division. Guidance may be sought from the Hazardous Materials Management Division.
4. Reroute the floor drain to daylight. Approval must be obtained from the Permits, Compliance, and Protection Division.

### UIC Program Permits for Floor Drain/Injection Well Systems

Individual UIC permits are required for 5W20 and 5X28 floor drain/injection well systems. The schedule under which this permit requirement will be enforced is listed in the “Strategy for Implementation” section of the procedure. Individual UIC Permits require submittal of applications and fees. The discharges to 5W20 and 5X28 floor drain/injection well systems are generally considered to pose a contamination risk to groundwater. The permits issued will have conditions to protect groundwater quality.

Some floor drain/injection well systems create too high a risk to qualify for Individual UIC permits. These may include 5X28 floor drain/injections wells that receive waste from floor drains in areas where vehicle maintenance is performed or where hazardous materials and/or hazardous waste is stored or used. Other floor drain/injection well systems may be considered too high a risk if the UIC Program has evidence to suspect a violation of primary drinking water or groundwater quality standards caused by the waste injection. Such floor drain/injection well systems will not qualify for Individual UIC permits and must be closed.

### 13. Appendix C Roof Requirements



**Stantec**

**Stantec Consulting Services Inc.**  
54 Route 106 PO Box 29  
North Springfield VT 05150-0029  
Tel: (802) 886-2261  
Fax: (802) 886-2260

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August 30, 2010  
Norwich Fire Department  
PO Box 376  
Norwich, Vermont 05055

**Attention:**        **Stephen Leinoff, Fire Chief**

Dear Chief Leinoff:

**Reference:**        **Roof Evaluation**

At your request, we visited the Norwich Fire Station for the purpose of evaluating the roof framing of the existing fire station building for the purpose of adding a new roof directly on top of the existing roof.

The Fire Station building is a one story building with preengineered frames spaced at approximately 16' centers and a concrete slab floor. The main building is approximately 70' x 50' with a 20' x 35' addition on one side. The building is approximately 22' high at the peak. The existing roof is a metal roof with a pitch of approximately 4:12. We are unsure of the exact age of the building but the building was dedicated in 1980.

The existing roof system consists of metal roofing with thermal insulation fastened to 8" purlins at about 4' centers. The new roof system will consist of 2 -1 1/2" layers of rigid insulation under a 60 mil layer membrane roofing. It is anticipated that the new roof will be laid directly on top of the existing roof system.

The ground snow in the Norwich, VT area is 50 pounds per square foot (psf). This snow load is reduced for roofs, and then the load is increased because your building is an essential facility (fire station); which brings the design roof snow load to 42 psf. The existing roofing, insulation and associated equipment is estimated to be 6 psf and the anticipated new roof is estimated to weigh 5 psf.

Our calculations showed that the roof framing will marginally support the load of the existing and new roof with the design snow load of 42 psf; with the building frame being the weakest part of the system. However, simply stated; the new roof system will carry approximately 5 psf less snow load than before the new roof was added. We encourage you to monitor the roof during periods of heavy snow and to remove the snow if the weight becomes excessive.

Should you have any questions on any of the above, do not hesitate to contact us.

Sincerely,

**STANTEC CONSULTING SERVICES INC.**

A handwritten signature in black ink, appearing to read "Gerry Vezina".

Gerry Vezina PE  
Structural Engineer  
Tel: (802) 886-2261  
Fax: (802) 886-2260  
gvezina@stantec.com

**Stephen Leinoff**

---

**From:** Vezina, Gerald [gerry.vezina@stantec.com]  
**Sent:** Monday, October 04, 2010 11:17 AM  
**To:** sleinoff@norwich.vt.us  
**Subject:** RE: firehouse roof

Steve,  
That's great. It does indeed increase the snow load capacity by 4 pounds.  
Gerry

**From:** Stephen Leinoff [mailto:sleinoff@norwich.vt.us]  
**Sent:** Monday, October 04, 2010 10:48 AM  
**To:** Vezina, Gerald  
**Subject:** firehouse roof

Thanks for your report. I have received the quotes from the roofing companies. The actual weight of the proposed systems is just over 1 pound per square foot. Is it a correct assumption that will increase our snow load capacity by about 4 pounds? I believe you used 5 psf in your calculations.

**Steve Leinoff, Chief**  
Norwich Fire Department  
PO Box 376  
Norwich VT 05055  
(802) 649-1133

*"People Serving People Since 1920"*

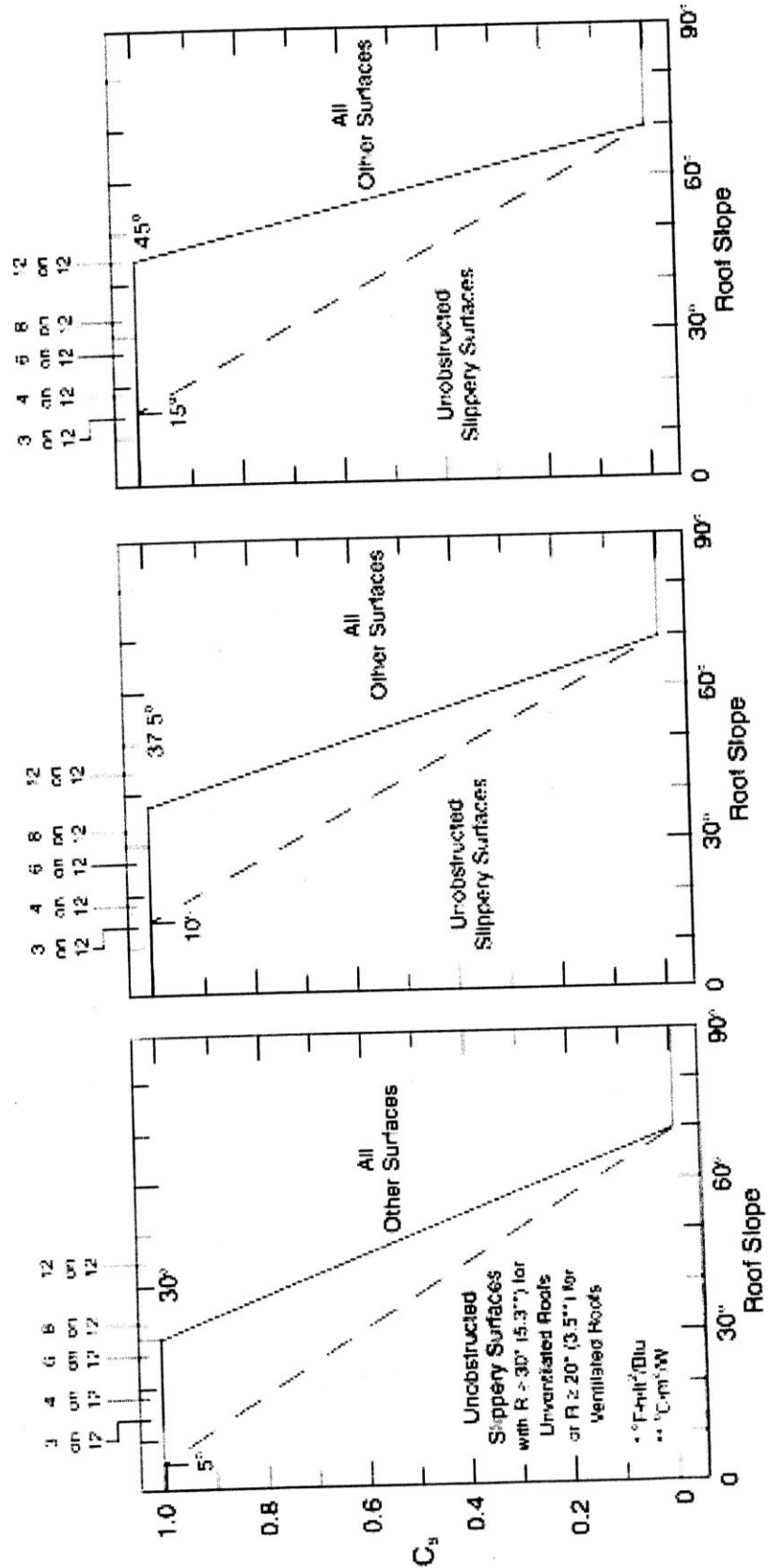


FIGURE 7-2 GRAPHS FOR DETERMINING ROOF SLOPE FACTOR  $C_s$  FOR WARM AND COLD ROOFS (SEE TABLE 7-3 FOR  $C_i$  DEFINITIONS)



The Vermont Secretary of State, Office of Professional Regulation considers the information contained on this website to be a secure, primary source for license verification. The Office certifies this information is current as of the date and time noted below.

For conduct decisions concluded after the year 2000, a scanned copy of the disciplinary action may be viewed online by clicking [here](#). If you require further information, please contact the [docket clerk](#). \*\*If no discipline is listed below, we have no disciplinary records on file.\*\*

**Lookup Detail View****Name and Address**

Name	City/Town	State	Zip Code	Country
Mr. Gerald R Vezina	Windsor	VT	05089	United States

**Licensee Information**

License	License Type	Original Issue Date	Current Effective Date	Expiration Date	Status	Endorsements
018.0003385	Professional Engineer	02/23/1976	08/01/2010	07/31/2012	ACTIVE	Civil Structural I

Generated on: 10/21/2010 11:07:54 AM

May 18, 2012

**Building Owner: (Applicant)**

Town of Norwich  
Attn: Stephen Leinoff  
PO Box 376  
Norwich, VT 05055  
802-649-1133

**CONSTRUCTION PERMIT**

<b>Building:</b> Norwich Fire Department – 11 Firehouse Lane – Norwich
--

<b>Site #:</b> 21510 <b>Project #:</b> 309724 <b>Authorization #:</b> 1342623
---

<b>Project Description:</b> Roof Replacement
--

<b>Occupancy Classification:</b> Business – Storage (vehicle) <b>Construction Type:</b> 5B
--

<b>Square Footage:</b> 4096 <b>Number of Floors:</b> 1
--

The plans for the above-mentioned location were reviewed and approved on December 3, 2010. This approval applies only to the information listed on your drawings and specifications that have been submitted for review and does not apply to any violations that our field inspectors may find on the premises in the course of his inspection. The project may proceed provided the work is done in compliance with the 2006 Vermont Fire and Building Safety Code, the plans and specifications submitted to this office, and the following conditions.

1. Enclosed with this construction permit approval letter is a "Final Construction Valuation Form". This form must be completed and submitted to the Division of Fire Safety regional office prior to the approval for occupancy of your building or project. The final construction valuation must include all change orders.
2. The building must meet or exceed the accessibility standards for new construction and the alterations incorporated in 28 CFR Part 35 and 36, the Americans with Disabilities Act Accessibility Guidelines (ADAAG), as amended in 21 VSA chapter 4 and the Access Board Rules.
3. Snow load calculations provided by engineer are accepted as is. Building shall be monitored during heavy snow conditions as stated in the engineers report.
4. All foamed plastics such as spray applied insulation or ridged foam insulation shall be protected by thermal and ignition barriers in accordance with the International Building Code Section 2603
5. The 2006 International Building Code will apply to this project
6. No more than 2 layers of roofing shall be installed on any roof (IBC)
7. Any wet or damaged material shall be removed or replaced prior to installation of new roof membrane (IBC)



8. An energy efficiency certification, approved by the Department of Public Service, indicating compliance with Guidelines for Energy Efficient Commercial Construction shall be affixed in a visible location inside the building, in the vicinity of the heating or cooling equipment or the electrical service panel, as a condition for a final occupancy permit. 21 VSA 268. [*For additional information contact the Vermont Department of Public Service at 1-888-373-2255.*]

The enclosed Construction Permit must be posted at the job site in a location that is visible from the street. This permit does not include plumbing or electrical work notices, which are required to be submitted by the respective trades. It is your responsibility to see that your subcontractors have their respective work notices for your project.

Prior to occupancy, final inspections must be performed by the Assistant State Fire Marshal. It is the owner's responsibility to coordinate these inspections with the respective trades. Appointments with the inspectors, who are listed below, must be made within fifteen (15) days prior to the completion of the project. At the time of the final inspection and prior to the issuance of a certificate of occupancy, the field inspector will verify that the proper permits and work notices have been obtained.

**To schedule an inspection, please contact:**

Landon Wheeler, Assistant State Fire Marshal                      802-885-8942

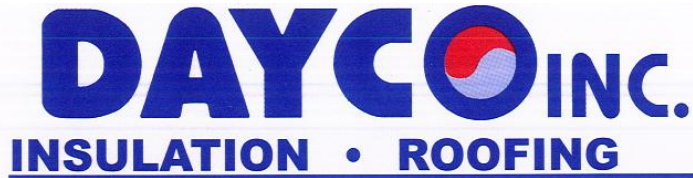
This permit does not satisfy the requirements of local municipalities. You must contact local authorities to determine those requirements. Any change in these plans must be submitted to this department for approval. This permit expires after twelve (12) months unless commencement of the project has begun and remained continuous.

If you have any questions or if I can be of further assistance, please contact me at 802-885-8966

Sincerely,

Paul Spicer  
Assistant State Fire Marshal

## 14. Appendix D Insulation Proposal



Residential • Commercial Contractor

### INSULATION PROPOSAL

Norwich Fire Dept  
P.O. Box 376  
Norwich, VT 05055

Phone: 802.649-4466  
Job: Norwich Fire Dept  
Norwich, VT

8/18/2011  
WO#  
7361

We propose hereby to furnish material and labor - complete in accordance with specifications below, for the sum of: \$4,679.00

Payment to be made as follows: **IN FULL UPON COMPLETION**

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from specifications below involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delay beyond our control. Owner to carry fire, tornado, and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.



Authorized Signature: Jay Miles

Note: This proposal may be withdrawn by us if not accepted within 30 days

### Foamed Areas

Exterior Walls - Metal Building: Install 3" 2 lb. closed cell spray foam insulation NOTE: All fiberglass is to be removed by others.

Exterior Walls - Wood Framed: Install 3" 2 lb. closed cell spray foam insulation

Foundation Walls at Garage: Install 2" 2 lb. closed cell spray foam insulation

Foundation Walls at Crew Room: Install 1.5" 2 lb. closed cell spray foam insulation

Thermal Barrier: Install 2 coats of intumescent paint over exposed foam at exterior walls of metal building and foundation walls of garage

### Dayco will remove all debris, generated by our operations from the job site

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Please sign and return one copy of this proposal.

Signature: \_\_\_\_\_

By

Date: \_\_\_\_\_

## 15. Appendix E Vermont Division of Fire Safety Inspection Report



### Vermont Department of Public Safety DIVISION OF FIRE SAFETY

Office of the State Fire Marshal, State Fire Academy and State Haz-Mat Team

firesafety.vermont.gov



☐ Barre Regional Office  
1311 U.S. Route 302 - Berlin, Suite 500  
Barre, VT 05641  
[phone] 802-479-4434  
[fax] 802-479-4446

☐ Rutland Regional Office  
56 Howe Street, Building A, Suite 200  
Rutland, VT 05701-3449  
[phone] 802-786-5867  
[fax] 802-786-5872

☐ Williston Regional Office  
372 Hurricane Lane, Suite 102  
Williston, VT 05495-2080  
[phone] 802-879-2300  
[fax] 802-879-2312

☒ Springfield Regional Office  
100 Mineral Street, Suite 307  
Springfield, VT 05156-3168  
[phone] 802-885-8883  
[fax] 802-885-8885

#### FIRE INSPECTION RESULTS

Site Id: 21510

##### Structure Information

Name: NORWICH FIRE STATION  
Structure Id: 21510

Address: 11 FIRE HOUSE LANE  
NORWICH, VT 05055

##### Owner Information

Owner: TOWN OF NORWICH (N 7265)  
Phone: 802-649-1419

Address: MAIN STREET  
PO BOX 376  
NORWICH, VT 05055

##### Building Description

Risk Index: M3  
Const Type: 5B  
Occ Type: MX  
Heating: Oil Hot Air

Smoke Det:  
CO Detect:  
Fire Alarm:

Occupants:  
Stand Pipe:  
Sprinkler:

Units:  
Floors:  
Sq Feet:

##### Project Description

Name: Fire Prevention Inspection  
Type: Building Project  
Comment: Requested

Received: 03/23/2012

Workitem Id: 336885

##### Inspection Detail

Insp Date: 03/23/2012  
Comply By: 07/25/2012  
Inspector: LANDON WHEELER (S 79831)

Insp Type: Follow-up  
Occ Granted:

Violations:  
Hazard Index: Level 2

##### Violations and Notes

inspection requested at the fire house met with contractor  
emergency lighting  
exit signs  
gfc  
combustion and make up air.  
exit doors not working  
pull station obstructed  
penetration between bathroom wall and heating plant non permitted as this is a confined space