

Friendship Street School Fire Code Compliance Waldoboro, Maine

The Town of Waldoboro has retained Pine Tree Engineering to perform a cost analysis to replace two steel fire escapes vs. the installation of a sprinkler system. This request came after growing concerns about the soundness and suitability of the existing steel fire escapes. During our research, we determined that the addition of a sprinkler system does not necessarily eliminate the need for a second exit for each story. Removing the fire escapes without other provisions for egress is not an option for certain occupancy types. We have compiled this report to describe the Town's options relating to fire code compliance.

The Friendship Street School was built in 1857 and expanded in 1941. The building is owned by the Town of Waldoboro which leases three classrooms to the Midcoast Maine Community Action Head Start program. The Head Start program provides preschool services which have been considered **day-care** occupancy but could also be considered an **educational** occupancy by the National Fire Protection Association's (NFPA) Life Safety Code* (section 15.1.4.2, p101-147*).



*LSC in this document refers to the 2009 NFPA Life Safety Code

FINDINGS

- Head Start may be considered day-care or educational occupancy, either use requiring two exits on every story.
- The ground floor requires no fire code related improvements.
- The first floor requires no fire code related improvements.
- The second floor requires a new second exit or must be closed off.
 - The current fire escape location could be reused for an exit since there is a door between the classrooms (LSC 15.2.5.5(2)).
 - Another location for the second exit may be a better choice.
- Unless the State Fire Marshall's Office states otherwise, adding a sprinkler system will make many improvements easier but will not eliminate the need for two exits on each story.

NARRATIVE

The following narrative is the result of a visit to the school with State Fire Marshal Personnel on August 14, 2013 and subsequent research.

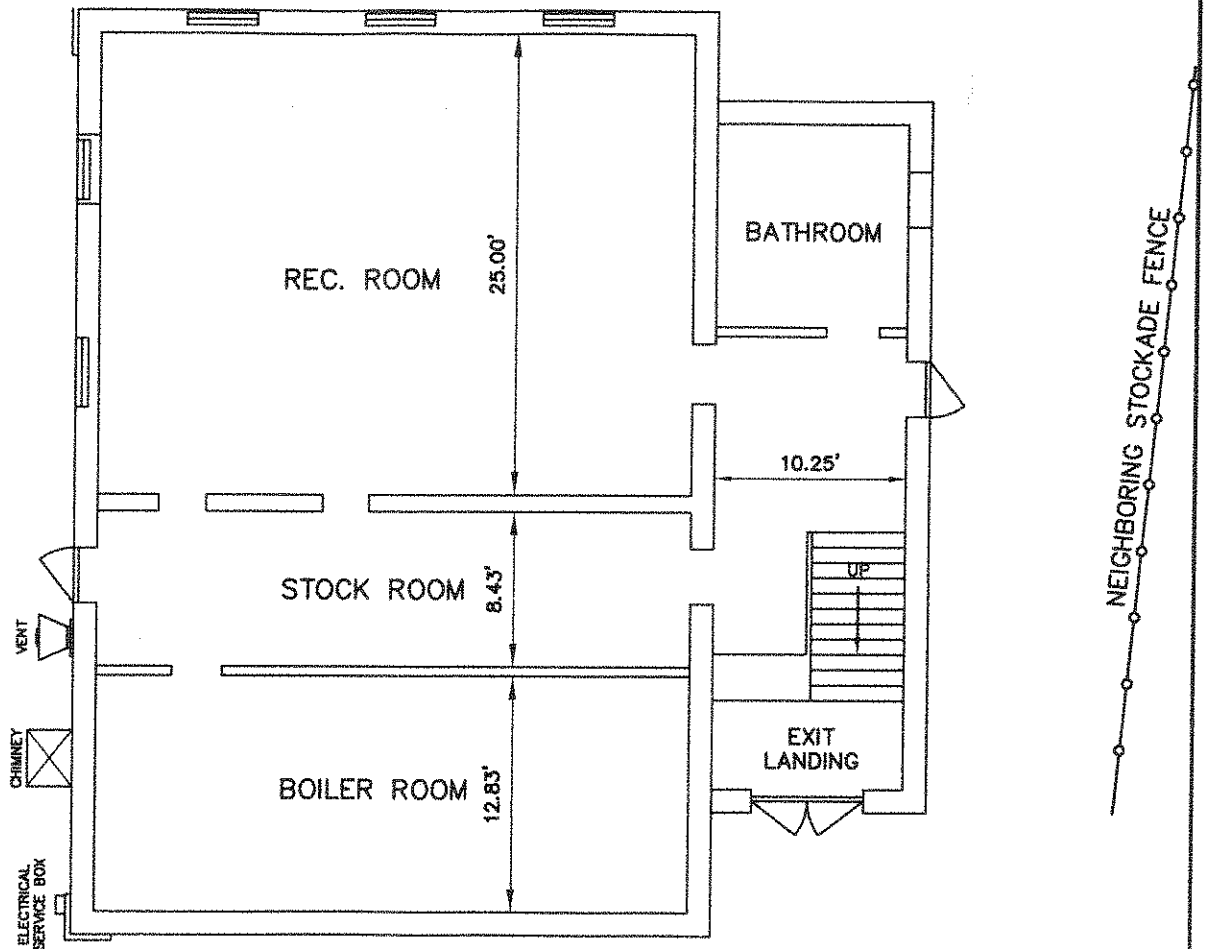
The Friendship Street School is essentially a three-story building consisting of the ground floor (or basement), first floor, and second floor. The exits serving each floor are as follows.

- The ground floor has three exits: two exits to ground level and stairs up to the front entrance (See Figure 1).
- The first floor has three exits: one to an ADA ramp, one exit down four steps to the front entrance and one approved existing fire escape (See Figure 2).
- The second floor has one stair exit to the first floor and one non-compliant fire escape (See Figure 3).

The Friendship Street School is a masonry building with wood frame floors. Because the interior structures (i.e. ceilings/roof) have unknown fire ratings, it is considered a Type III(200) building construction type. Some occupancy categories have restrictions relating to the construction type. For example, day-care occupancy is limited to two stories for construction type III(200) (LSC Table 17.1.6.1). Existing educational occupancy has no minimum construction requirements, which means that educational uses could occur on all stories (LSC 15.1.6 p. 101-1520).

In all cases, however, day-care and educational occupancy require two means of egress (LSC 15.2.4, p101-152).

FRIENDSHIP STREET SCHOOL

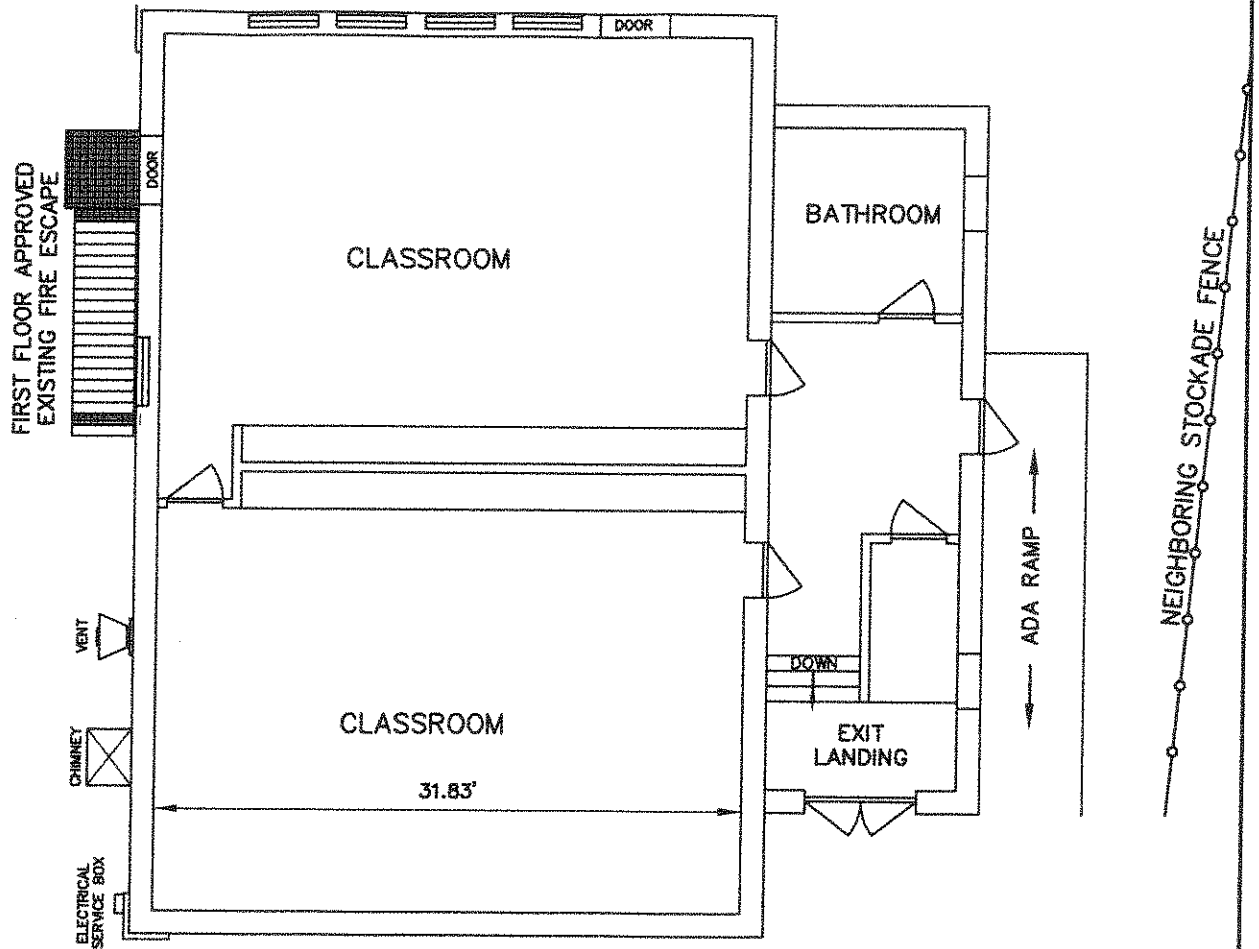


GROUND FLOOR LAYOUT PLAN

SCALE 1"=10'

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FRIENDSHIP STREET SCHOOL

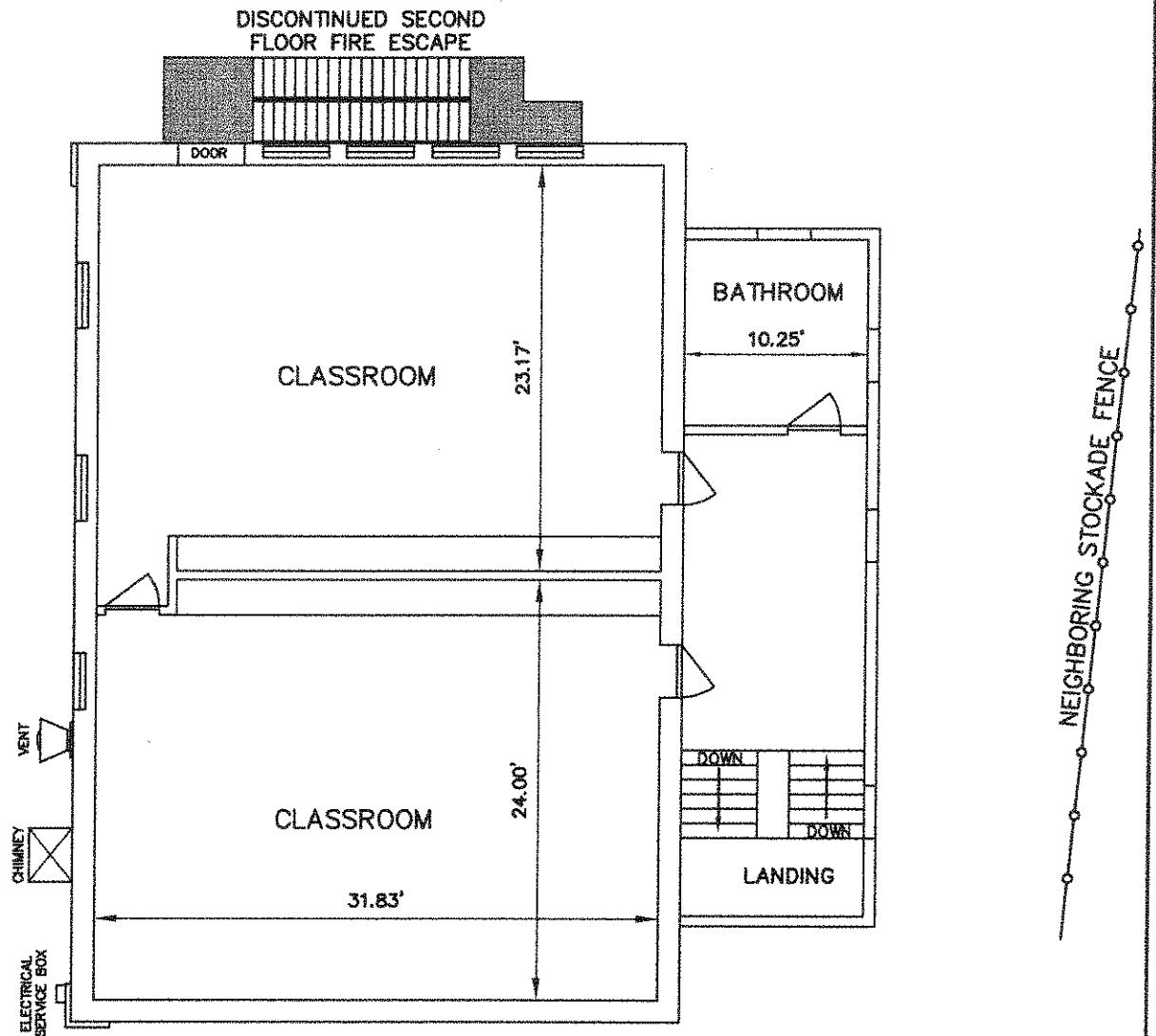


FIRST FLOOR LAYOUT PLAN

SCALE 1"=10'

**Pine Tree
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FRIENDSHIP STREET SCHOOL



SECOND FLOOR LAYOUT PLAN

SCALE 1"=10'

Pine Tree Engineering

The agency having jurisdiction over the school is the State Fire Marshal's Office. Because of the building's age, historical value, and financial constraints, the Fire Marshall's Office has been lenient over the years by limiting its requests to reasonable and affordable improvements. The only time an official fire code review occurs is when a change of occupancy or a building renovation is proposed. At that point, the agency having jurisdiction is allowed to approve certain parts of the building while making requests for improvements to others. So far, the building has been "approved existing" except for the second floor fire escape.

Second Floor

Until recently, both fire escapes serving the first and second floor were considered approved existing fire escapes. Although they didn't meet all the codes in the NFPA Life Safety Code, they were considered compliant because they were "approved existing" by the State Fire Marshal's office. During a more recent visit by State Fire Marshal personnel and Pine Tree Engineering, one of the members supporting the second story fire escape appeared to be structurally compromised (**See Photograph 1**). As a result, the Fire Marshal's office has requested that the Town make the second floor available only for temporary storage until further action is taken.

Photograph 1



Because this fire escape is considered unsuitable for its intended purpose, another exit must replace it. The location of this fire escape can be seen in **Figure 3, The Second Floor Layout Plan**. The new exit must meet several code requirements, including exterior stair dimensions and protection from potential fire from nearby windows. If the Town intends to install a sprinkler system, the stairs do not need to be protected from fire from nearby windows.

The Fire Marshal's Office will allow the second floor to be reused when an adequate second exit is provided. They will allow the use before all the window protection provisions are in place as long as there is a definitive plan for window protection. Window protection could include adding a one-hour rating to the window openings or adding an approved automatic sprinkler system.

A new second exit could be installed in several locations. If the building has a sprinkler system, the second exit needs to be separated from the top of the stairs by **one third** of the total diagonal distance of the building (LSC 7.5.1.3.3). However, if the building is not sprinklered, the exit needs to be separated by **one half** the diagonal distance (LSC 7.5.1.3.2). The longest diagonal distance of the building is approximately 60 feet, so the exit needs to be 20 or 30 feet away from the top of the stairs, depending on the installation of an approved automatic sprinkler system.

Following are three options for replacement of the second floor fire escape:

Option 1 (Figure 4) - The town can install wood stairs in the same location as the existing fire escape. However, this stair system will use a window opening for a doorway and extend 28 feet vertically to ground level. It will also require protection over every window on the west face (11 windows) or an automatic sprinkler system. Even though blocking these windows is less expensive than installing a sprinkler system, the windows' aesthetic value to the classrooms would be lost.

Option 2 (Figure 5) - An opening could be made closer to the ADA ramp for a 13.5-foot vertical descent. This option would require a new opening in the brickwork but less stair construction. It is still remote enough from the stairs to not require a sprinkler system and will require blocking only four windows for one-hour fire rated protection. In addition, all four windows are in bathrooms, so the loss of view would be of little concern.

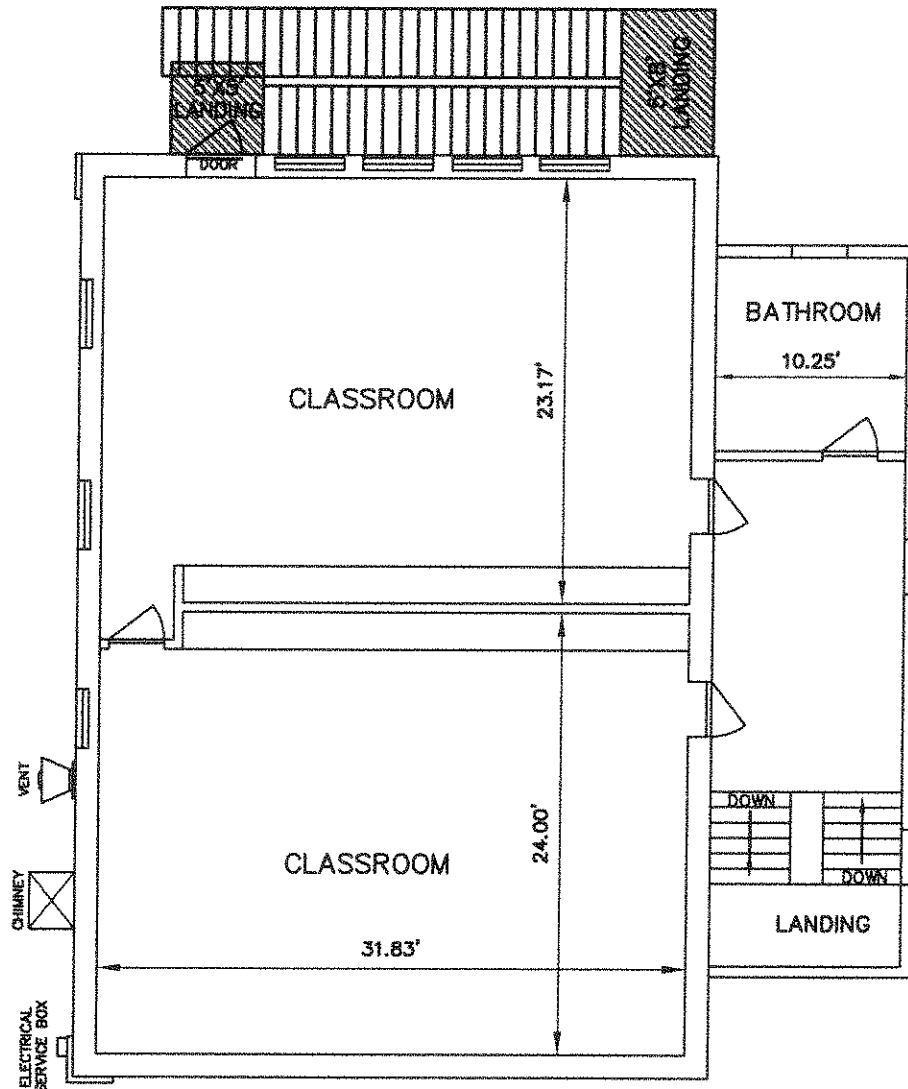
Option 3 (Figure 6) - An exit could be added in the corridor which will require a sprinkler system because it is not remote enough from the stairs (LSC 7.5.1.3.2). Moving the second exit out of the classroom to the corridor will more appropriately match the architectural intent of the building and provide more classroom space. Options 2 and 3 will not block a classroom view of the river like Option 1.

Estimated costs are as follows:

- **Option 1, Existing opening**
 - \$8,500 stairs + \$11,000 block river side windows \$19,500
 - or-----
 - \$8,500 stairs + \$20,000 sprinkler system \$28,500
- **Option 2, New opening**
 - \$4,000 stairs + \$5,000 new door opening + \$4,000 window protection \$13,000
 - or-----
 - \$4,000 stairs + \$5,000 new door opening + \$20,000 sprinkler system \$29,000
- **Option 3, Corridor exit**
 - \$4,500 stairs + \$5,000 new door opening + \$20,000 sprinkler system \$29,500

FIGURE 4

FRIENDSHIP STREET SCHOOL



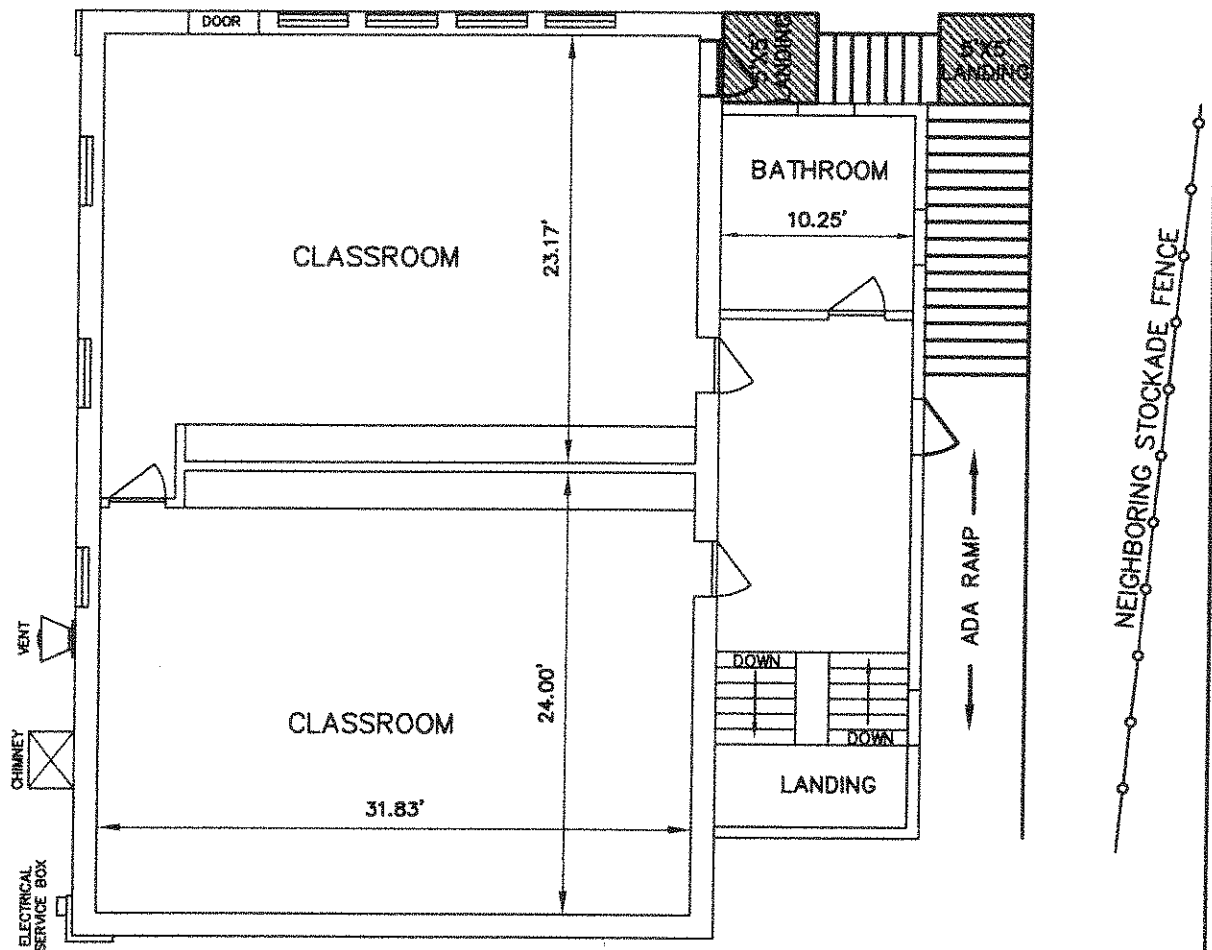
SECOND FLOOR OPTION 1 PLAN

SCALE 1"=10'

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FIGURE 5

FRIENDSHIP STREET SCHOOL



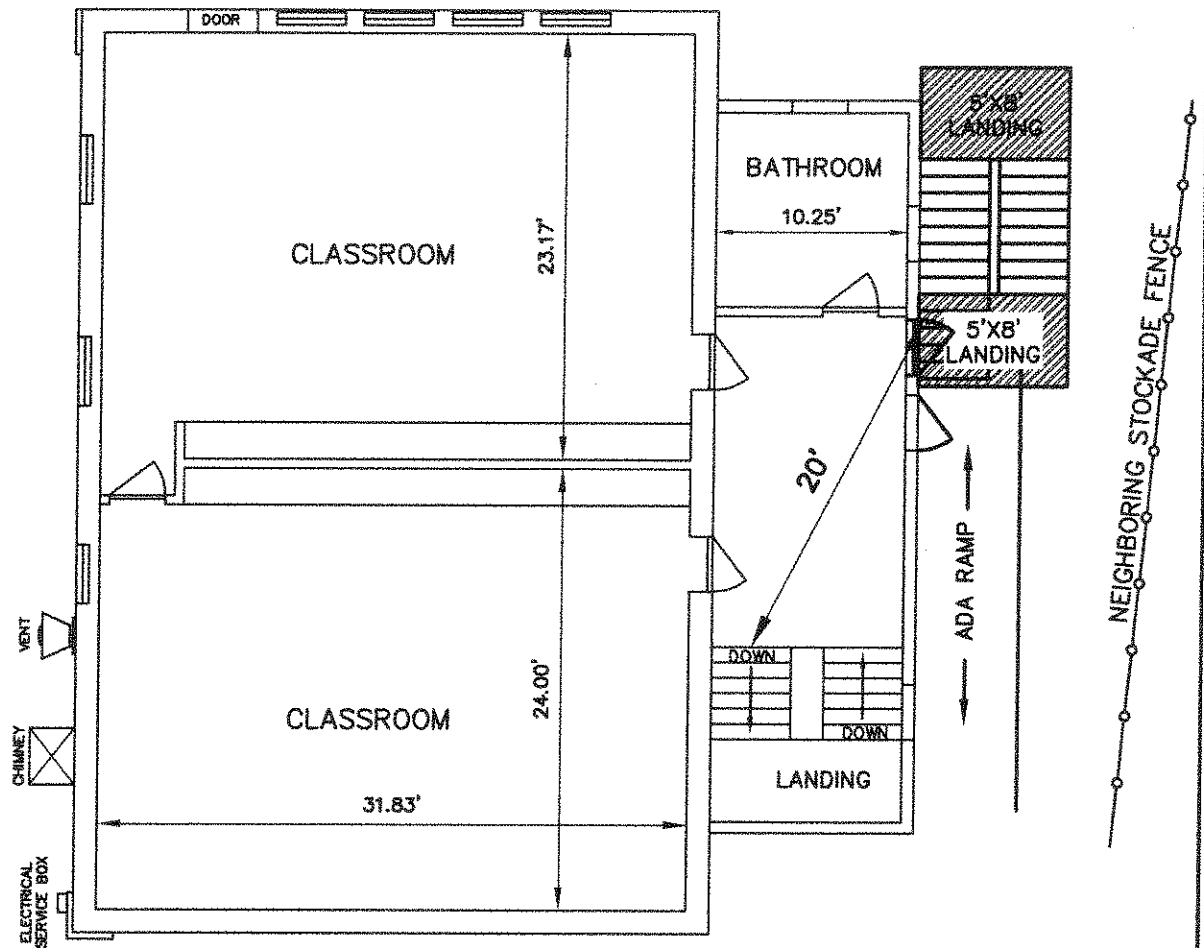
SECOND FLOOR OPTION 2 PLAN

SCALE 1"=10'

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FIGURE 6

FRIENDSHIP STREET SCHOOL



SECOND FLOOR OPTION 3 PLAN

SCALE 1"=10'

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First Floor

Because the existing steel fire escape (**Photograph 3**) is considered an approved existing exit, the first floor does not need improvement for its Head Start occupancy.

Photograph 3



Photograph 4



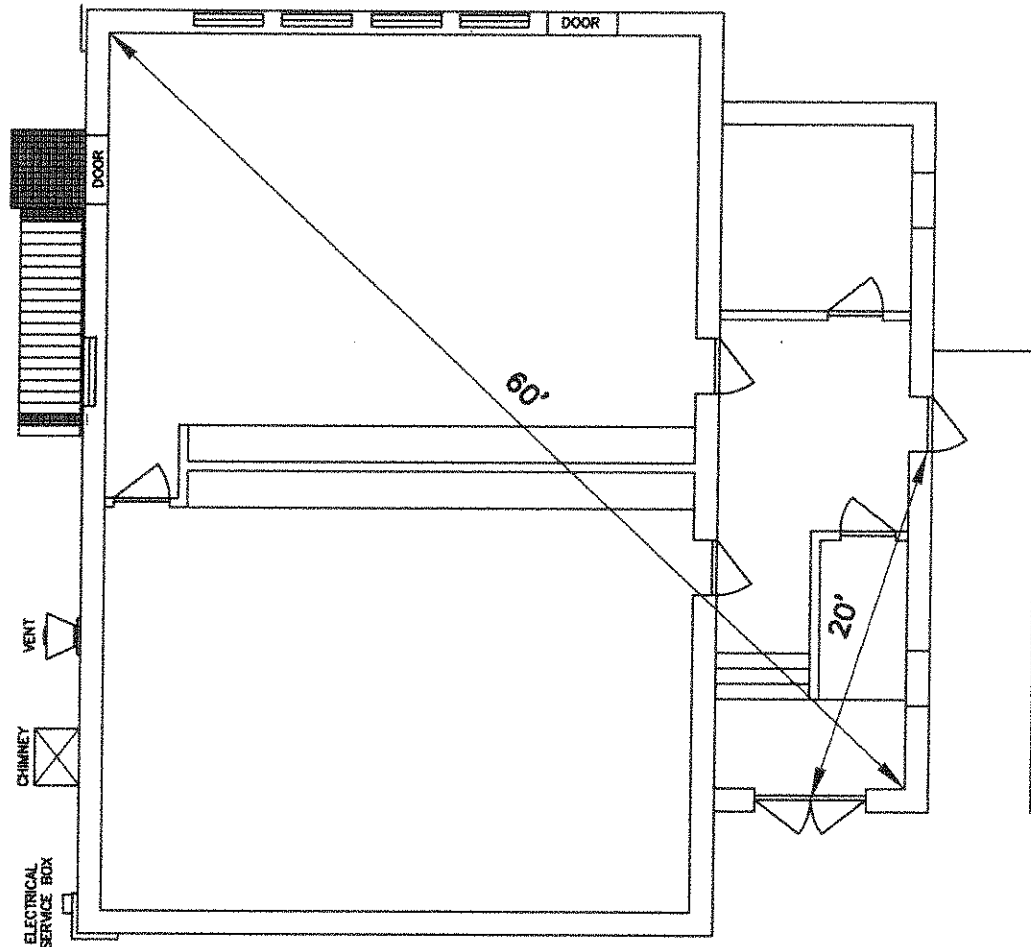
Eventually this fire escape should be discontinued. If the corridor serving both classrooms was a compliant "exit access corridor", this fire escape would not have to be replaced by another exit. To make the corridor a compliant exit access corridor, it will need:

- to be cleaned of all obstructions
- to be separated from the classrooms by the proper fire rated components
- to provide two means of egress with proper arrangement (which means the proper distance from each other)

The corridor has two exits (See **Photograph 4** and **Figure 2, First Floor Layout Plan**), the front entrance and the ADA ramp. The two exits need to be separated by one third the total diagonal distance of a sprinklered building or one half the total diagonal distance of a non-sprinklered building. Since the exits are 20 feet apart (See **Figure 7**) the space could be considered an exit access corridor if the building were sprinklered.

The corridor also needs to be separated from the classrooms and lavatory by 20-minute fire rated doors that will self close and latch. The existing doors may be used, but will need fire rated glass and self closing devices. Door levers may need to be upgraded so the doors latch properly. The door to the stairwell serving the second floor will need to be replaced by a 30-minute door that is self closing and latching (LSC 8.6.5(3), p.101-86).

FRIENDSHIP STREET SCHOOL



FIRST FLOOR DOOR ARRANGEMENT PLAN

SCALE 1"=10'

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Engineering**

Ground Floor

The ground floor has three exits: two exits to ground level (See Photographs 5 and 6) and stairs up to the front entrance. There are no recommendations for the ground floor because the location and number of exits (See Figure 1, Ground Floor Layout Plan) are adequate.

Photograph 5



Photograph 6



Conclusion

The State Fire Marshal's Office feels strongly that the Friendship Street School should be equipped with an approved automatic sprinkler system. Because of the age of the building and the water source, the building would qualify to have a Maine Life Safety sprinkler system which is less expensive than the NFPA 13 sprinkler system.

However, if the town wants to wait before investing in a sprinkler system, they can regain the use of the second floor for less than \$15,000 by constructing Option 2 shown in Figure 3 and described on page 5 of this report. The window protection coverings can be installed in a way that can be fairly easy to disassemble so that use of the windows can be regained inexpensively when a sprinkler system is installed in the future.

No improvements are required for the ground and first floors to continue Head Start use. The fire escape serving the first floor will one day be unsuitable for use. At that time, the Town will need another exit. If the building is sprinklered by then, the corridor can easily be converted into an exit access corridor.

If the town does not wish to make any improvements to the building at this time, they should contact the State Fire Marshal's Office to discuss how to best discontinue use of the second floor from occupancy related to the Head Start Program.