

CODE RED

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Fire Protection/Life Safety Building Code Report Schematic Design

Project:

South Kingstown High School
215 Columbia St.
South Kingstown, RI 02879

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Prepared for:

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CODE CONSULTING - FIRE PROTECTION ENGINEERING
CONSTRUCTION ADMINISTRATION - PERFORMANCE-BASED DESIGN

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1. Introduction

The S/L/A/M Collaborative has retained Code Red Consultants to provide fire protection and life safety code consulting services for the South Kingstown High School Building in South Kingstown, RI.

The project includes the construction of a new three-story building with a maximum footprint of ~99,000 square feet and aggregate area of ~218,000 gross square feet. The building includes classrooms/laboratories, a cafeteria with a kitchen/servery space, gymnasium, auditorium, administrative offices, and additional support spaces.

2. Applicable Codes

The current codes adopted in the state of Rhode Island are identified below.

Building	SBC-1 – Rhode Island Building State Code 13th Edition, which is an amended version of the 2018 International Building Code (IBC).
Fire	Rhode Island Fire Safety Code (RIFSC), which includes an amended version of the 2018 Edition of NFPA 1, Fire Code, and the Rhode Island Life Safety Code (RILSC) which is an amended version of the 2018 Edition of NFPA 101, Life Safety Code.
Accessibility	ANSI A117.1-2009 as amended by the Rhode Island State Building Code 2010 ADA Standards for Accessible Design
Plumbing	SBC-3 – Rhode Island State Plumbing Code, which incorporates the 2018 International Plumbing Code (IPC)
Mechanical	SBC-4 – Rhode Island Mechanical Code, which is an amended version of the 2018 International Mechanical Code (IMC)
Electrical	SBC-5 – Rhode Island Electrical Code, which incorporates the 2020 Edition of NFPA 70, National Electrical Code
Energy	SBC-8 – Rhode Island State Energy Conservation Code, which incorporates the 2018 International Energy Conservation Code (IECC)
Elevator	Elevator Safety Code, which adopts the 2016 ASME A17.1
Other	National Fire Protection Association (NFPA) Standards, as referenced by the above codes, including the following: <ul style="list-style-type: none">- 2018 NFPA 10: <i>Standard for Portable Fire Extinguishers</i>- 2016 NFPA 13: <i>Standard for the Installation of Sprinkler Systems</i>- 2016 NFPA 20: <i>Standard for the Installation of Stationary Pumps for Fire Protection</i>- 2019 NFPA 72: <i>National Fire Alarm and Signaling Code</i>

3. Fire Protection / Life Safety Code Analysis

The following describes the building code compliance approach.

3.1 Use and Occupancy Classifications

3.1.1 Primary Occupancies

The following table includes the primary occupancy classifications and their locations within the proposed building.

TABLE 1: PRIMARY OCCUPANCY GROUPS

Description	Classification	Location
Cafeteria/Kitchen	Group A-2, Assembly	First Floor
Offices	Group B, Business	First Floor
Auditorium	Group A-1, Assembly	First - Second Floor
Media Center/ Gymnasium	Group A-3, Assembly	First - Second Floor
Classrooms/ Vocational Tech Rooms	Group E, Educational	First - Third Floor

The building contains non-separated mixed occupancies (SBC-1, 508.3 & RILSC 6.14.1.1). Assembly spaces in the building are intended to serve functions and organizations outside of normal operating hours and are therefore classified based on their specific function (SBC-1, 303.1.3).

3.1.2 Accessory/Incidental Occupancies

Small storage, MEP spaces, and other building support areas are classified as accessory/incidental Group S-1/S-2, Storage areas since they are less than 10% of the floor where they are located (SBC-1, 508.2.3 & RILSC 6.1.14.1.3).

3.1.3 Platform

The auditorium on the First Floor includes a 2,500 square foot platform used for presentations, lectures, entertainment, etc. The design of the platform will not include horizontal sliding curtains, overhead hanging curtains, drops, sceneries, or stage effects other than lighting or sound, and therefore is not defined as a stage (SBC-1, 202 and RILSC, 3.3.218). Platforms are required to be designed in accordance with SBC-1 Section 410 and RILSC Section 12.4.6.

3.2 Building Height, Area, and Construction Type

3.2.1 Construction Classification

The proposed building is three (3) stories in height with a footprint area of approximately 99,200 square feet and aggregate area of approximately 218,300 gross square feet.

The minimum construction type required for the building is Type IB (Type II(222)) construction. The height and area limitations of a fully sprinklered, Type IB (Type II (222)) building based on the proposed occupancies are outlined in Table 2. The height and area limitations include increases for 100% open frontage.

TABLE 2: HEIGHT LIMITATIONS (SBC-1, 504.3, 504.4 & 506.2 AND RILSC 12.1.6)

Group	Allowable Height		Allowable Footprint Area	Allowable Aggregate Area
	Stories	Height		
A-1, Assembly	6 Stories	180 ft	Unlimited	Unlimited
A-2/ A-3, Assembly	12 Stories	180 ft	Unlimited	Unlimited
B, Business	12 Stories	180 ft	Unlimited	Unlimited
E, Educational	6 Stories	180 ft	Unlimited	Unlimited

The building complies with the height and area limitations outlined above. Note that the application of a separated, mixed occupancy approach does not allow for a lesser construction type than Type IB (Type II(222)).

3.2.2 Fire Resistance Rating of Building Elements

Table 3 indicates the minimum fire-resistance ratings required based on construction type (SBC-1, 601 and RILSC, 8.2.1).

TABLE 3: FIRE RESISTANCE RATINGS OF BUILDING ELEMENTS

Building Element	Type IB (II(222))
Primary Structural Frame	2 Hours
Interior Bearing Walls	2 Hours
Exterior Bearing Walls	2 Hours
Exterior Nonbearing Walls	See 'Exterior Walls' Section
Floor construction and secondary members	2 Hours
Roof construction and secondary members	1 Hour ¹

1. Fire protection of roof construction and associated secondary members is not required, including protection of roof framing and decking, where every part of the roof construction is 20 feet or more above any floor immediately below (SBC-1 Table 601(b) & RILSC 12.1.6(c)).

All supporting construction for fire-rated assemblies is required to be supported by structure that affords the same required fire resistance rating of the supported horizontal assembly or fire barrier (SBC-1, 707.5.1 & 711.2.3 and RILSC 8.2.3.3).

Platforms are required to be constructed of noncombustible materials as required for Type IB (Type II(222)) construction. The platform is permitted to be constructed of fire-retardant treated wood where all of the following conditions are met (SBC-1, 410.3 & RILSC 12.4.6.2.3):

- The height of the platform is not more than 30 inches above the main floor
- The area of the platform is not more than one-third of the room floor area; and
- The area of the platform not more than 3,000 sf in area.

Where the space beneath the platform is used for storage or any purpose other than equipment wiring or plumbing, the floor assembly is required to have a 1-hour fire resistance rating (SBC-1, 410.3 & RILSC 12.4.6.2.4).

3.3 Interior Partitions

3.3.1 Fire/Smoke Resistive Assemblies

Table 4 identifies the interior walls and partitions which are required to be composed of fire/smoke resistive assemblies.

TABLE 4: FIRE/SMOKE RESISTIVE ASSEMBLIES

Type of Assembly	Construction	Code Reference
Corridors ¹	Smoke partition	RILSC, 14.3.6 (2)
Janitor Closets ²	Smoke partition	RILSC, 14.3.2.1(1)(d)
Elevator Machine Room ³	1-hour fire barrier	SBC-1, 3005.4
Furnace room where any equipment is > 400,000 BTU per hour input	Wall capable of resisting the passage of smoke ⁴	SBC-1, 509 RILSC, 14.3.2.1
Boiler room where the largest piece of equipment is > 15 psi and 10 horsepower	Wall capable of resisting the passage of smoke ⁴	SBC-1, 509 RILSC, 14.3.2.1
Woodworking/Painting areas	1-hour fire barrier	SBC-1, 509 RILSC, 14.3.2.1
Laboratories and Vocational Shops	Wall capable of resisting the passage of smoke ⁴	SBC-1, 509
Fire Pump Room (if provided)	1-hour fire barrier	SBC-1, 913.2.1 Ex. 1 NFPA 20, 4.13.1.1.2
Shafts Penetrating 2-Hour Horizontal Assembly	2-hour fire barrier	SBC-1, 713.4 RILSC, 8.6.5

1. Lavatories are not required to be separated from corridors, provided the building is sprinklered throughout and the walls separating the lavatory from other rooms consist of smoke partitions (RILSC 14.3.6(5)).
2. Where janitor closets are protected with sprinklers, the janitor closet doors are permitted to have ventilating louvers (RILSC 14.3.2.1(4)).
3. A rating is not required where the elevator machine room does not abut and has no openings into the elevator hoistway (SBC-1, 3005.4 Exception 2).
4. Walls must extend from the top of the foundation or floor to the underside of a fire-resistance rated floor/roof assembly or to the underside of the floor or roof sheathing, deck, or slab above.

3.3.2 Doors and Fire Shutters

Doors, fire shutters, and their corresponding components are required to have fire-resistance ratings and meet the required testing standards as specified in Table 5. All doors and fire shutters required to be fire-resistance-rated must be designed, installed, and labeled in accordance with NFPA 80 (SBC-1, 716.1 & RILSC Table 8.3.3.2.2).

TABLE 5: FIRE & SMOKE DOOR RATING SUMMARY TABLE

Wall Type	Required Wall Rating	Minimum Fire Door Rating	Performance Criteria for Doors/Shutters ¹	Code Reference
Fire barriers	2-hours	1½-hours	NFPA 252 or UL 10C / NFPA 252 or UL 10B	SBC-1, 716.5 & 509.4.2 RILSC Table 8.3.4.2
	1-hour	¾-hour		
Smoke Partition	No rating	No rating	No air transfer openings, max 3/4" undercut	
Wall capable of resisting the passage of smoke	No rating	No rating		

1. All doors are required to be self- or automatic closing and provided with an active latch bolt that will secure the door when it is closed (SBC-1, 716.2.6). Normally occupied classrooms are exempt (RILSC 14.3.6(2)(b)).

3.3.3 Penetrations

Through and membrane penetrations of fire-resistance-rated walls and fire-resistance-rated horizontal assemblies are required to be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (SBC-1, 714.4 & 714.5 and RILSC, 8.3.4). Penetrations of fire-resistance-rated walls must have an F rating of not less than the required fire-resistance rating of the wall penetrated (SBC-1, 714.4.1.2 & RILSC, 8.3.4.2). Penetrations of fire-resistance rated horizontal assemblies must have an F rating/T rating of not less than 1 hour but not less than the required rating of the floor penetrated (SBC-1, 714.5.1.2 & RILSC, 8.3.4.2). Where floor penetrations are contained and located within the cavity of a wall above or below a floor a T rating is not required (SBC-1 714.5.1.2(1)).

3.3.4 Ducts and Air Transfer Openings

Fire and smoke dampers are required where ducts and air transfer openings penetrate walls as specified in the table below.

TABLE 6: PROTECTION OF DUCT AND AIR TRANSFER OPENINGS

Type of Assembly ¹	Damper	Reference
Fire Barriers	Fire Dampers	SBC-1, 717.5.2
Fire Barriers used as part of Horizontal Exits	Smoke Damper	SBC-1, 717.5.2.1
Shaft Enclosures	Fire & Smoke Dampers	SBC-1, 717.5.3 RILSC, 8.3.4.8
Walls Capable of Resisting the Passage of Smoke	Smoke Dampers in air transfer openings	SBC-1, 509.4.2 RILSC, 8.5.5.2

1. Refer to SBC-1, 717.5 & RILSC Section 8.5.5.3 which provide multiple exceptions for the use of smoke dampers.

Smoke damper leakage ratings must be Class I or II. Elevated temperature ratings must not be less than 250°F (SBC-1, 717.3.2.2 & RILSC, 8.4.6.3). Combination fire/smoke dampers must comply with both rating requirements (SBC-1, 717.3.2.3 & RILSC, 8.5.5.2.2). Refer to SBC-1, 717.3.3 for required damper actuation methods.

Fire, smoke, and fire/smoke dampers are required to be provided with an approved means of access that permits inspection and maintenance of the damper and its operating parts (SBC-1, 717.4 & RILSC 8.5.5.5.2). Access points are required to have permanent labels with letters that are not less than ½ inch in height that reads "FIRE/SMOKE DAMPER, SMOKE DAMPER, or

FIRE DAMPER” (SBC-1, 717.4 & RILSC 8.5.5.3). Fire dampers must be tested in accordance with UL 555 and smoke dampers must be tested in accordance with UL 555S. Combination fire/smoke dampers must comply with both test standards.

3.4 Exterior Walls

The opening limitations and ratings for exterior walls are based on the fire separation distance for each wall, measured from the building face to the closest interior lot line, the centerline of a street, alley, or public way, or to an imaginary lot line between two buildings (SBC-1, 202). The table below indicates the opening limitations and ratings required for the exterior walls based on fire separation distance of a fully sprinklered building (SBC-1, 705.5 & 705.8).

TABLE 7: EXTERIOR WALL RATINGS & OPENING LIMITATIONS

Fire Separation Distance (ft)	Rating	Allowable Area
$0 \leq X < 3$	1 Hour	Not Permitted
$3 \leq X < 5$	1 Hour	15%
$5 \leq X < 10$	1 Hour	25%
$10 \leq X < 15$	1 Hour	45%
$15 \leq X < 20$	1 Hour	75%
$X \geq 20$	0 Hours	Unlimited

3.5 Vertical Openings

3.5.1 Shaft Enclosures

Vertical openings are required to be enclosed in fire rated construction in accordance with Table 4 unless otherwise permitted by SBC-1, 712 & RILSC 8.6 & 14.3 to be unenclosed.

Shafts that do not extend to the bottom of the building are required to comply with one of the following (SBC-1, 713.11 & RILSC 8.6.4):

- Be enclosed at the lowest level with construction of the same fire-resistance rating as the lowest floor through which the shaft passes, but not less than the rating required for the shaft enclosure.
- Terminate in a room having a use related to the purpose of the shaft. The room is required to be separated from the remainder of the building by a fire-resistance rating at least equal to the protection required for the shaft enclosure.
- Be protected by fire dampers installed at the lowest floor level within the shaft enclosure.

A shaft that does not extend to the underside of the roof sheathing, deck or slab is required to be enclosed at the top with construction of the same fire-resistance rating as the topmost floor penetrated by the shaft, but not less than the fire-resistance rating required for the shaft enclosure (SBC-1, 713.12 & RILSC, 8.6.4.4).

3.5.2 Unenclosed Vertical Openings

Unenclosed vertical openings within the proposed building include a two-story cafeteria space with an open stair to the Second Floor, an upper-level track and fitness area open to the gym

below, and an auditorium with a viewing space on the Second Floor. All openings connect only the First and Second Floors of the building. These two story openings are permitted to be constructed as convenience openings or partially enclosed openings as detailed below.

Convenience Openings

Unenclosed convenience openings are required to comply with the most restrictive requirements of the RILSC and SBC-1 for convenience and two-story openings. The proposed unenclosed vertical openings in the building are required to be designed in accordance with the following (SBC-1, 712.1.9 & RILSC 12.3.1, 14.3.1.1, & 8.6.9.1):

- Connects not more than two adjacent stories (one floor pierced).
- Separated from unprotected openings serving other floors with shaft construction.
- Separated from corridors (smoke partitions) on both levels.
- Separated from other fire or smoke compartments on the floor.
- Does not serve as a required means of egress.

Partial Enclosure

Two story openings which do not have occupiable space on one of the two levels are permitted to be constructed as two-story openings with partial enclosures in accordance with RILSC 8.6.8. Each vertical opening is required to be enclosed with 1-hour rated construction at the upper floor that is penetrated. Glazing in the 1-hour fire barrier separation is required to be 45-minute rated (RILSC Table 8.3.3.2.2). The total combined area of glazing through the separation walls are not permitted to exceed 25 percent of the fire barrier that is common with the respective rooms in which the vertical openings are located (RILSC, 8.3.3.6.10).

3.6 Interior Finishes

3.6.1 Wall and Ceiling Finishes

Interior wall and ceiling finish ratings are classified in accordance with ASTM E 84 or UL 723 based on flame spread and smoke-developed indices (SBC-1, 803.13 and RILSC 14.3.3.2, 12.3.3.2, & 10.2.8). Interior finish classifications are minimally required to be in accordance with those specified in Table 8 based on the occupancy classifications.

TABLE 8: INTERIOR WALL & CEILING FINISH REQUIREMENTS ¹

Occupancy Classification	Exit Enclosures	Corridors, Lobbies, Exit Access Stairways/Ramps	Rooms and Enclosed Spaces
Group A-1/A-2/A-3, Assembly	Class A or B	Class A or B	Class A, B or C
Group E, Education	Class A or B	Class A, B or C	Class A, B or C
Group B, Business	Class A or B	Class A, B or C	Class A, B or C
Group S-1/S-2, Storage	Class A, B, or C	Class A, B or C	Class A, B, or C

1. Interior finishes are grouped in the following classes: Class A - flame spread index 0-25, Class B - flame spread index 26-75, Class C - flame spread index 76-200. All classes must have a smoke-developed index that does not exceed 450.

3.6.2 Interior Floor Finish

In all areas, interior floor covering materials are required to comply with the requirements of the DOC FF-1 “pill test” (CPSC 16 CFR Part 1630) (SBC-1, 804.4.1 and RILSC 10.2.7.1). Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers are not subject to compliance with the “pill test” (SBC-1, 804.1(1)).

3.7 Fire Protection Systems

3.7.1 Automatic Sprinkler Systems

The building is required to be sprinklered throughout in accordance with NFPA 13 (SBC-1, 903.2 and RILSC, 14.3.5.1).

If a fire pump is being installed, it is required to be in accordance with NFPA 20 to provide the necessary pressure and flow of water to meet the hydraulic requirements of NFPA 13. The fire pump room is required to be directly accessible from the outside at the First Floor and enclosed in 1-hour rated construction (NFPA 20, 4.13.2.1.1).

3.7.2 Standpipe Systems

All stairs in buildings where the floor level of the highest story is more than 30 feet above the lowest level of fire department vehicle access are required to be provided with a Class I standpipe system in accordance with NFPA 14 (SBC-1, 905.3.1 Exception 1).

3.7.3 Fire Extinguishers

Portable fire extinguishers are required in all occupancies within the building and must be selected and installed in accordance with the Rhode Island Uniform Fire Code and NFPA 10 (SBC-1, 906.1).

3.8 Fire Alarm and Detection Systems

The building is required to be provided with a fire alarm system throughout (RILSC 14.3.4.1.1). The fire alarm system is also required to have emergency voice/alarm capabilities (RILSC 14.3.4.3.1.2). Automatic smoke detection and carbon monoxide detection is required to be installed in accordance with the Rhode Island Fire Code and RILSC Section 14.3.4.4 & 14.3.4.5.

3.9 Emergency Responder Radio Coverage

Emergency responder radio coverage is required for the building in accordance with SBC-1 Section 918 unless the fire code official determines the radio coverage system is not needed.

3.10 Means of Egress

3.10.1 Occupant Load

The number of occupants is computed at the rate of one occupant per unit of area as prescribed in Table 9 (SBC-1, 1004.5 and RILSC 7.3.1.2). The occupant load is permitted to be increased from

the occupant load established for the given use where all other requirements of SBC-1 and the RILSC are met (SBC-1, 1004.5.1 and RILSC 7.3.1.3).

TABLE 9: OCCUPANT LOAD FACTORS

Function of Space	Occupant Load Factor
Assembly (Fixed Seating)	# of Seats
Assembly (Bench/Bleacher Seating)	18" per occupant
Assembly, Unconcentrated (Tables and Chairs)	15 net
Classrooms	20 net
Shops, Laboratories, & Vocational Spaces	50 net
Gymnasiums, Exercise Rooms, & Locker Rooms	50 gross
Commercial Kitchens	200 gross
Offices	150 gross
Storage, Building Service Areas	300 gross

3.10.2 Egress Width Factors

The required egress capacity for any means of egress component is based on the following capacity factors (SBC-1, 1005.3.1 & 1005.3.2 and RILSC 7.3.3.1):

TABLE 10: EGRESS WIDTH FACTORS

Stairways (inches of width per person)	All Other Components (inches of width per person)
0.3	0.2

For stairways wider than 44" and subject to the 0.3 in width per person capacity factor, the capacity is permitted to be increased using the following equation (RILSC 7.3.3.2):

$$C = 146.7 + \left(\frac{W_n - 44}{0.218} \right)$$

C = Capacity, in persons, rounded to the nearest integer
W_n = Nominal width of the stair as permitted by RILSC 7.3.2.2

3.10.3 Assembly and Educational Spaces

Where assembly space egress leads through a corridor also serving as egress for other parts of the building, the egress capacity is required to be sufficient to allow simultaneous egress for classroom sections (RILSC, 14.1.3.3.1).

3.10.4 Main Entrance

Group A occupancies that have an occupant load greater than 300 are required to be provided with a main exit of sufficient width to accommodate not less than one-half (1/2) of the occupant load. Such width must not be less than the total required width of all means of egress leading to the exit (SBC-1, 1029.2 and RILSC 12.2.3.6).

Where multiple main entrances are provided, the exits are required to be distributed around the perimeter of the building at the level of exit discharge. The exits are to be sized so that the width of egress is not less than 100 percent of the required width (SBC-1, 1029.2 and RILSC 12.2.3.6.6).

3.10.5 Number of Exits

The number of exits required from every story cannot be less than that specified in Table 11 (SBC-1, 1006.3.2 and RILSC 7.4.1.2), unless otherwise noted within this report.

TABLE 11: MINIMUM NUMBER OF EXITS REQUIRED

Occupant Load	Number of Exits Required
1 - 500	2
501 - 1,000	3
> 1,000	4

Two exits or exit access doorways are also required to be provided where the occupant load or common path of travel distances in the following table are exceeded (SBC-1, 1006.2.1 and RILSC 7.4.1.1):

TABLE 12: SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

Occupancy	Maximum Occupant Load	Maximum Common Path of Travel Distance
A/E ¹	49	75 feet
B	49	100 feet
S	29	100 feet

1. Every room or space larger than 1,000 sf or with an occupant load of more than 50 is required to be provided with two exit access doors that provide access to separate exits (RILSC 14.2.5.4).

Where two exits or exit access doorways are required from any portion of the exit access as outlined above, the exit doors or exit access doorways are required to be placed a distance apart equal to not less than 1/3 of the length of the maximum overall diagonal dimension of the building or area served (SBC-1, 1007.1.1 Exception 2 and RILSC 7.5.1.3.3).

Two exit access doorways are required in boiler, incinerator and furnace rooms where the area is over 500 SF and any fuel-fired equipment exceeds 400,000 BTU input capacity. Where more than one exit or exit access doorway is required, the exit access is required to be arranged such that any dead ends in the corridor do not exceed that specified in Table 14 (SBC-1, 1020.4 and RILSC Table A.7.6). Where two exit access doorways are required, one is permitted to be a fixed ladder or an alternating tread device. Exit access doorways are required to be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room (SBC-1, 1006.2.2.1).

Every room that is normally subject to student occupancy is required to have an exit access door leading directly to an exit access corridor or exit (RILSC 14.2.5.5). One room is permitted to intervene between a normally occupied student room and an exit access corridor, provided all of the following criteria are met:

- The travel from a room served by an intervening room to the corridor door or exit does not exceed 75 ft.
- The building is protected by an approved supervised automatic sprinkler system in accordance with NFPA 13.

3.10.6 Assembly

Exit access from Group A occupancies that contain seats, tables, displays or other material are required to be arranged in accordance with SBC-1 Chapter 1029 and RILSC Chapter 12. The following are some of the major requirements:

- Bleachers are required to comply with ICC 300 (SBC-1, 1029.1.1).
- Every occupied portion of the assembly space is required to be provided with aisles leading to exits or exit access doorways (SBC-1, 1029.9). The minimum aisle width is required to be 48 inches for aisles having seating on each side, and 36 inches where the aisle has seating on one side.
- Each end of an aisle is required to terminate at a cross aisle, foyer, doorway, or concourse having access to an exit (SBC-1, 1029.9.5).
- Aisle stairs are required to be provided with handrails located at the side or within the aisle width (SBC-1, 1029.13).
- Where seating is located at a table or counter and is adjacent to an aisle or aisle accessway, the measurement of required clear width of the aisle or aisle accessway is required to be made to a line 19 inches away from and parallel to the edge of the table or counter (SBC-1, 1029.13.1).
- Aisle accessways serving arrangements of seating at tables or counters is required to have not less than 12 inches of width plus ½ inch of width for each additional 1 foot or fraction thereof, beyond 12 feet of aisle accessway length measured from the center of the seat farthest from the aisle (SBC-1, 1029.13.1.1).

3.10.7 Corridors

The width of corridors is not permitted to be less than that specified in the table below or as determined using the egress factors in Table 10 based on the occupant load served (SBC-1, 1020.2, RILSC 12.2.3.8 & 14.2.3.2).

TABLE 13: MINIMUM CORRIDOR WIDTH

Occupancy	Minimum Width
Access to and utilization of MEP equipment	24 inches
With a required occupancy capacity < 50 people	36 inches
Group E with an occupant load of less than 100	44 inches
Group E with an occupant load of 100 or more	72 inches
Any areas not listed above	44 inches

TABLE 14: MAXIMUM DEAD END CORRIDOR LENGTH

Occupancy	Maximum Dead End Length ¹
A, Assembly	20 feet
B, Business, E, Educational, & S, Storage	50 feet

1. A dead-end corridor is not limited in length where the length of the dead end corridor is less than 2.5 times the least width of the dead end corridor (SBC-1, 1020.4(3)).

3.10.8 Exit Access Travel Distance

Exit access travel distances are not permitted to exceed the maximum values specified in the table below (SBC-1, 1017.2 and RILSC 12.2.6.2, 14.2.6.3, 38.2.6.3, & 42.2.6).

TABLE 15: EXIT ACCESS TRAVEL DISTANCES

Occupancy	Maximum Exit Access Travel Distance
E, Educational	200 feet
A, Assembly	250 feet
B, Business	300 feet
S-2, Storage	400 feet

3.10.9 Doors

Doors are required to comply with SBC-1, 1010 and RILSC 7.2.1. Major requirements include:

- **Width.** Doors are required to be a minimum of 32 inches in clear width and are not permitted to have a swinging door leaf greater than 48 inches in nominal width (SBC-1, 1010.1.1 and RILSC 7.2.1.2.3).
- **Landings.** Level landings are required to be provided on each side of the door (SBC-1, 1010.1.5 & 1010.1.6 and RILSC 7.2.1.3).
- **Panic Hardware.** Doors that serve more than 49 assembly occupants are required to have panic hardware if the doors latch or lock (SBC-1, 1010.1.10). Panic hardware is required to be provided along the entire path of travel, including the exit discharge.
- **Door Swing.** Egress doors are required to be of the pivoted or side-swinging type and are required to swing in the direction of egress travel where serving an occupant load of 50 or more persons (SBC-1, 1010.1.2 and RILSC 7.2.1.4).
- **Locking.** Except as specifically permitted by SBC-1, Section 1010.1.9 or 1010.1.4.4, doors are required to be readily operable in the direction of egress travel. In Group E occupancies, doors in classrooms are permitted to be provided with locking arrangements designed to keep intruders from entering the room where such arrangements comply with the RIFSC (SBC-1, 1010.1.4.4).
- **Classroom Locking.** Egress from classrooms, offices, and other occupied rooms are permitted to be provided with locking arrangements designed to keep intruders from entering the room where the criteria outlined in RILSC Section 14.2.2.2.4 are met.
- **Doors in Series.** Space between two doors in series is required to be a minimum of 48 inches plus the width of the door swinging into the space. Doors in series are required to swing either in the same direction or away from the space between the doors (SBC-1, 1010.1.8).
- **Electrical Rooms.** Electrical rooms with equipment rated over 800 amperes or more and over 6 feet in width that contain overcurrent devices, switching devices, or control devices with exit or exit access doors are required to be equipped with panic hardware or fire exit hardware and swing in the direction of egress travel (SBC-1, 1010.1.10).

3.10.10 Stairs

Stairways are required to be constructed in accordance with SBC-1, 1011 and RILSC, 7.2.2.2. Major requirements include:

- Minimum clear width of 44" (SBC-1, 1011.2 and RILSC 7.2.2.2.1.2)
- Minimum headroom of 80" (SBC-1, 1011.3 and RILSC 7.2.2.1.1)
- Maximum 7" riser height (SBC-1, 1011.5.2 and RILSC 7.2.2.1.1)
- Minimum 11" riser depth (SBC-1, 1011.5.2 and RILSC 7.2.2.1.1)
- Compliant landings at the top and bottom of runs (SBC-1, 1011.6 and RILSC 7.2.2.3.2)
- Maximum 12-foot vertical rise between landings (SBC-1, 1011.8 and RILSC 7.2.2.2.1.1)
- Handrails within 30" of required egress width (SBC-1, 1011.11, 1014.9 and RILSC 7.2.2.4.1)

3.10.11 Exit Enclosures

Exit enclosures are not permitted to be used for any purpose other than means of egress (SBC-1, 1023.1). Openings through an exit enclosure are prohibited except for required exit doors from normally occupied spaces and for egress from the enclosure (SBC-1, 1023.4). Penetrations into and openings through an exit enclosure are limited to the equipment serving the stair in accordance with SBC-1, 1023.5.

Where nonrated exterior walls or unprotected openings of the stair enclosure are exposed by other part of the building at an angle of less than 180 degrees, the building exterior walls within 10 feet are required to have a 1-hour fire resistance rating with ¾-hour rated openings (SBC-1, 1023.7 & RILSC 7.2.2.5.2.1).

3.10.12 Exit Discharge

A maximum of 50 percent of the number and capacity of exit enclosures are permitted to egress through areas on the level of exit discharge (SBC-1, 1028.1 Exception 1 and RILSC 7.7.2(1)). All other exits are required to discharge directly to the exterior. Where exit enclosures egress through areas on the level of exit discharge, the following must be met:

- Occupants are provided with a free and unobstructed path of travel to an exterior egress door and such exits are readily visible and identifiable from the point of termination of the exit enclosure.
- The entire area of the level of exit discharge is separated from areas below by construction having a fire rating equivalent to the exit enclosure served.
- All portions of the egress path are sprinkler-protected.

3.10.13 Accessible Means of Egress

Accessible means of egress are required to be provided from all accessible spaces within each structure. Where more than one means of egress is required from any accessible space, the space is required to be serviced by not less than two accessible means of egress (SBC-1, 1009.1 & RILSC 7.5.4.1).

Exit stairways are permitted to serve as the accessible means of egress from the stories located above the level of exit discharge. Note that elevators are not required to serve as an accessible means of egress, since the building does not have occupiable levels four or more stories above the level of exit discharge (SBC-1, 1009.2.1 & RILSC 7.5.4.7).

A two-way communication system is required to be provided at the elevator landing serving each elevator or bank of elevators in accordance with SBC-1, 1009.8 and RILSC 7.2.12.1.1 on each accessible floor that is one or more story above or below the story of exit discharge.

3.10.14 Exit Signage

Exit and exit access doors are required to be marked by an approved exit sign readily visible from any direction of egress travel (SBC-1, 1013.1 and RILSC 7.10). The path of egress travel to exits and within exits must be marked by readily visible exit signs to clearly indicate the direction of egress travel where the exit or path of travel is not immediately visible. Exit signs within corridors and exit passageways must be placed such that no point is more than 100 feet or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign. Exit signs are not required in rooms or areas that require only one exit or means of exit access.

3.10.15 Egress Illumination

The means of egress, including the exit discharge, is required to be illuminated at all times the building served by the means of egress is occupied (SBC-1, 1008.1 and RILSC 7.8, 12.2.8, & 14.2.8). The illumination level is not permitted to be less than 10 foot-candle at the walking surface in stairways in use, and 1 foot-candle at all other walking surfaces (SBC-1, 1008.2.1 and RILSC 7.8.1.3). In the event of power supply failure, an emergency electrical system is required to automatically illuminate all of the following areas (SBC-1, 1008.3 and RILSC 7.9.1.2, 12.2.9, & 14.2.9):

- Spaces that require two or more means of egress.
- Corridors and interior exit stairways.
- Interior exit discharge elements.
- Exterior landings for exit discharge doorways.
- Public restrooms greater than 300 square feet
- Electrical equipment rooms
- Generator room (if provided)
- Fire pump room (if provided)

The emergency power system must provide power for a duration of not less than 90 minutes (SBC-1, 1008.3.4). The initial illumination must be an average of 1 foot-candle and a minimum at any point of 0.1 foot-candle measured along the path of egress at the floor level. Illumination levels are permitted to decline to 0.6 foot-candle average and a minimum of 0.06 foot-candle at the end of the emergency lighting time duration (SBC-1, 1008.3.5).

3.11 Standby/Emergency Power Systems

The standby and emergency power systems are required to be installed in accordance with SCB-1, 2702. The standby power system is required to be provided for the emergency responder radio coverage system (SBC-1, 2702.2). The emergency power system is required to be provided for the following building features (SBC-1, 2702.2):

- Emergency voice/alarm communication systems.
- Exit signage in accordance with SBC-1 Section 1013.6.3.

- Means of egress illumination in accordance with SBC Section 1008.3.
- Automatic fire detection systems.
- Fire alarm systems.

3.12 Fire Department Access Roads

Approved fire department access roads are required to be provided for every facility, building, or portion of a building in accordance with the Rhode Island Fire Safety Code.

3.13 Elevator Code

Elevators are required to be installed in accordance with the Rhode Island Elevator Safety Code (260-RICR-30-10-1), which adopts and the 2017 ASME A17.1.

3.14 Accessibility

The building is subject to compliance with SBC-1, Chapter 11, the 2009 ICC/ANSI A117.1, and the 2010 ADA Standards.

3.15 Plumbing Fixtures

The minimum number of plumbing fixtures are based upon the use and occupancy classification of the building or space. The actual number of fixtures are calculated using the calculated occupant load in accordance with SBC-1 Section 1004.1.2 unless approved by the code official (SBC-3, 403.1). Occupants are permitted to travel one story above or below in order to reach the required fixtures provided that the travel distance does not exceed 500 ft. (SBC-3, 403.3.3). The following table outlines the plumbing fixture requirements for the building.

TABLE 16: PLUMBING FIXTURE FACTORS

Use Group	Toilets		Urinals	Lavatories		Drinking Fountain	Service Sink
	F	M		F	M		
Assembly	1 per 65	1 per 125	67% substitution	1 per 200	1 per 200	1 per 500	1 per floor
Education	1 per 50	1 per 50	67% substitution	1 per 50	1 per 50	1 per 100	1 per floor

Table 17 outlines the maximum number of occupants the proposed plumbing fixtures support.

TABLE 17: PLUMBING FIXTURE CALCULATIONS – NORMAL HOURS

Floor	Maximum Occupant Load	Classification	Water Closets		Male Urinal Substitution ^A	Lavatories (Per Sex)
			Female	Male		
First Floor	1400	Education: Student	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	17	17	0	14F/14M
	200	Education: Staff	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	2	2	0	2F/2M
Second Floor	400	Education: Student	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	5	5	0	4F/4M
	100	Education: Staff	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	1	1	0	1F/1M
Third Floor	300	Education: Student	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	4	4	0	3F/3M
	100	Education: Staff	1 per 50	1 per 50	0.67	1 per 50
		Provided fixtures	1	1	0	1F/1M

A. Permitted to be substituted for male water closets.

TABLE 18: PLUMBING FIXTURE CALCULATIONS – AFTER HOURS ^A

Floor	Maximum Occupant Load	Classification	Water Closets		Male Urinal Substitution ^B	Lavatories (Per Sex)
			Female	Male		
First Floor	520	Assembly (After Hours)	1 per 65	1 per 125	0.67	1 per 200
		Provided fixtures	4	4	0	3F/3M

A. It is assumed that occupants in the assembly spaces after hours are not provided with other restrooms on the floor, due to security arrangements. If the core restroom near the main entrance is available for use after hours, the maximum supported occupant load would be 1040.

B. Permitted to be substituted for male water closets.