



WPI

REEVALUATING WPI CAMPUS ACCESSIBILITY

*A Major Qualifying Project Submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE*

in partial fulfillment of the requirements for the Degree of Bachelor of Science

By

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This report represents work of a WPI Undergraduate student submitted to faculty as evidence of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the WPI Projects program, see <https://www.wpi.edu/Academic/Projects>.

ABSTRACT

This project evaluated accessible features and elements on the Worcester Polytechnic Institute campus for compliance with applicable accessibility codes and regulations. Surveys were conducted in Stratton Hall and Unity Hall and 229 non-accessible elements were identified and compared to code requirements. This project also included the proposed design of an ADA-accessible ramp on the Alden-Memorial entrance to Earle Bridge. Design criterion was based on both building and accessibility codes and loading calculations were performed for handrails.

ACKNOWLEDGEMENTS

The completion of my Major Qualifying Project would not have been possible without the support from several different members of the WPI Community. I would like to thank my advisor, Professor Nima Rahbar, for taking on this project and providing me with support and feedback along the way. Additionally, I would like to thank the Office of Accessibility Services for encouraging me to create this project and make a meaningful impact on the WPI campus as I end my time as an undergraduate student.

EXECUTIVE SUMMARY

INTRODUCTION

Worcester Polytechnic Institute (WPI) is a higher education institution that values respect, community, inclusion, innovation, and achievement. The University's Strategic Plan, Lead with Purpose, is an initiative for 2021-2026 that prioritizes the following three areas:

1. Student Well-Being, Access, and Affordability
2. Purpose-Driven Education and Research
3. Inclusive Community

A specific goal outlined in the WPI Strategic Plan, under focus area one (1), Student Well-Being, Access, and Affordability is to "Enhance the outcomes and experience of minoritized and underrepresented student populations at WPI" (WPI Strategic Plan, 2021). This Major Qualifying Project aimed to support the current WPI Strategic Plan by evaluating buildings and areas within campus for compliance with the applicable accessibility codes and regulations.

PROJECT GOALS AND OBJECTIVES

The goal of this project was to conduct a holistic evaluation of accessible elements at Worcester Polytechnic Institute by identifying spaces and areas that do not conform with applicable accessibility codes and standards. Additionally, the project aimed to provide design solutions and recommendations to better improve physical access within the WPI community. This was achieved through the following steps:

1. Surveys were conducted for different buildings and locations with a focus on accessible elements in accordance with the 2010 ADA Standards for Accessible Design (ADAS) and 521 CMR, the Massachusetts State Accessibility code. Surveys within each building focused on areas including, but not limited to the following:
 - a. Entrances
 - b. Accessible Routes, Stairways, and Elevators
 - c. Toilet Rooms
 - d. Public Use Areas (such as offices and assembly areas).
2. Accessible elements and areas that do not conform with either or both of the applicable accessibility codes were identified by comparing measurements and survey records to the

standards. Compile findings into reports containing observed deficiencies, proposed solutions to conform with applicable codes, code references to both 521 CMR and 2010 ADAS, as well as photos of the documented deficiencies.

3. Conclusions were made about common trends within the observed findings. Analysis provided information on the following:
 - a. The most frequently noted deficiencies overall and within each building.
 - b. Overall accessibility of new spaces in comparison to outdated areas of campus.
4. Designed a ramp for the West Entrance to Earle Bridge. Loading conditions were analyzed on the handrails.
5. Formalized recommendations for the current state of accessibility throughout the Worcester Polytechnic Institute Campus. In addition, developed suggestions for future updates and construction to ensure that the University propels forward in designing spaces that people of all abilities can easily maneuver and comfortably occupy.

RESULTS

DESIGN OF ADA ACCESSIBLE RAMP FOR EARLE BRIDGE

Using the 2010 ADA Standards for Accessible Design, 521 CMR, the 2021 International Building Code, and ASCE 7, the ramp shown in Figure 1 below was designed. The turning ramp provides an accessible route to the West Entrance of Earle Bridge.



Figure 1: Proposed Ramp Design for Earle Bridge

ANALYSIS OF BUILDING SURVEY DATA

Surveys of Stratton Hall and Unity Hall identified a total of 229 deficiencies, or elements that do not conform with applicable codes. Findings tables were created documenting the identified deficiency, the code requirement, a code reference, and a photo. Additionally, conclusions were made about the current state of accessibility at WPI and the difference between physical access in an older building versus a newly constructed space.

CONCLUSIONS & RECOMMENDATIONS

Overall, there has been progress made in regard to physical accessibility with the construction of Unity Hall, however there are definitely improvements that can be further made to prioritize physical access on the Worcester Polytechnic Institute campus. The following recommendations were made:

1. Perform a formal accessibility plan review and on-site survey by a professional, reputable accessibility consultant for each building to identify all deficiencies during each phase of construction.
2. Create a WPI Accessibility Advisory Board that can head initiatives to renovate inaccessible spaces. It is recommended that this Advisory Board focuses not only on physical accessibility, but also other types of disabilities that may be present on the campus.

It is recommended that further analysis be done of Earle Bridge itself as well as the Eastern Entrance. The existing conditions of both are inaccessible, with slopes exceeding the limit for walking surfaces and ramps.

Capstone Design Statement

Receiving a Professional Engineering license requires that first a degree is obtained from an ABET-accredited, four year college or university. Specifically, the ABET accreditation Criterion 5 requires that students complete a capstone design project that incorporates the following (ABET, 2022):

1. Appropriate engineering standards and multiple constraints,
2. Based on the knowledge and skills acquired in earlier coursework.

This Major Qualifying Project was completed to fulfill the capstone design requirement by proposing an ADA-accessible ramp design for the West Entrance to Earle Bridge on the Worcester Polytechnic Institute campus. Design criterion was taken from applicable accessibility codes and standards as well as the International Building Code and ASCE 7. Real world constraints and considerations included the existing site conditions and lack of space, the design criterion outlined by accessibility codes, and the required structural loading conditions necessary for the handrails. This design also addresses ethics, health and safety, society, and politics by its focus on accessible design and ensuring that individuals with disabilities are not discriminated against.

Professional Licensure Statement

Receiving a Professional Licensure verifies that an individual is well versed in their engineering field and allows Civil Engineers to create, sign, and seal plans and drawings. Professional licensure is required for many private consultants. In order to become a licensed Professional Engineer through the National Council of Examiners for Engineering and Surveying (NCEES), the following prerequisite requirements must be met.

1. The individual must earn a four-year degree from an ABET-accredited college or university program.
2. The individual must sit for and pass the Fundamentals of Engineering exam.
3. The individual must complete at least four years of professional experience in industry.
4. The individual must sit for and pass the Principles and Practice of Engineering (PE) exam.

This Major Qualifying Project proposed a design for an ADA-accessible ramp taking real-world constraints and limitations into account. If this ramp design is constructed, a Professional Engineer must prepare, sign, and seal the final design.

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INTRODUCTION

Worcester Polytechnic Institute (WPI) is a higher education institution that values respect, community, inclusion, innovation, and achievement. The University's Strategic Plan, Lead with Purpose, is an initiative for 2021-2026 that prioritizes the following three areas:

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A specific goal outlined in the WPI Strategic Plan, under focus area one (1), Student Well-Being, Access, and Affordability is to “Enhance the outcomes and experience of minoritized and underrepresented student populations at WPI” (WPI Strategic Plan, 2021). This Major Qualifying Project aimed to support the current WPI Strategic Plan by evaluating buildings and areas within campus for compliance with the applicable accessibility codes and regulations. Surveys were conducted within Stratton Hall and Unity Hall to identify accessible elements that do not conform with the 2010 American with Disabilities Act Standards for Accessible Design and 521 CMR, the Massachusetts State Building Code. This project also included a proposed ramp design for the West Entrance of WPI's Earle Bridge, an area of campus full of tradition and history.



Figure 2: Existing Conditions, Earle Bridge. Photo courtesy of Worcester Polytechnic Institute (WPI, 2019).

BACKGROUND

History of WPI Campus Buildings & Spaces

Worcester Polytechnic Institute is located in Worcester, Massachusetts. The university was founded in 1865 (WPI, 2023) meaning the campus is full of rich history and tradition. In the recent years, the institution has grown not only in class sizes, but also in infrastructure. This section discusses the background of the different areas surveyed for this Major Qualifying Project including Earle Bridge, Stratton Hall, and Unity Hall.

Earle Bridge

Earle Bridge is a pedestrian footbridge located above the West Street entrance to the WPI Campus. The bridge was originally built in the 1930s after construction of Alden Memorial Hall and Higgins Laboratory (WPI, 2023). Earle bridge holds great significance within the WPI student population. One of the oldest campus traditions is Earle Bridge Crossing, which takes place twice in a student's time at WPI. The first is during New Student Orientation, where the entire first-year class crosses the Bridge in the direction of Boynton Hall to begin their journey. The second takes place annually on Commencement, where students walk across the bridge together, one last time in the opposite direction to begin their journey outside of WPI (WPI Tech Bible, 2018). The footbridge also serves as a means of travelling between different sections of campus and is used every day by many members of the community.

Stratton Hall

Stratton Hall is an academic building located near the center of the WPI campus. The building was originally built in 1894 to home the Mechanical Engineering Department (WPI, 2023). Currently, this building serves as the hub for the Department of Mathematical Sciences. The building houses student lounges for students within the Math Department, computer labs for many introductory and high-level mathematics course, and previously housed the Math Tutoring Center. Stratton Hall is scheduled to be renovated in the near future to outfit the building with an elevator.

Unity Hall

Unity Hall is the most recently constructed, new academic building on the Worcester Polytechnic Institute campus. After construction was completed, the building was open to the community in

January of 2022. The building currently houses countless classrooms, laboratory spaces, offices, and study rooms. Additionally, the Career Development Center, Office of Accessibility Services, the Academic Resource Center, the Office of Academic Advising, and the Office of the Registrar are all located within the new space. The building also contains two elevator cars that serve as a means of connecting the buildings on the main campus and lower campus.

Applicable Codes and Standards

Codes and regulations are developed by different agencies to outline basic requirements for design. This project deals with two main accessibility codes: the American with Disabilities Act Standards for Accessible Design and 521 CMR, the Massachusetts State Accessibility Code. Both of these applicable regulations provide information that can be used in any phase of design development to “provide persons with disabilities full, free, and safe use of all buildings and facilities so that all such persons may have the educational, living, and recreational opportunities necessary to be as self-sufficient as possible and to assume full responsibilities as citizens” (521 CMR §2.2). The 2021 International Building Code was also referenced for the design of the Earle Bridge Ramp. This section discusses the history of the accessibility codes and regulations and their applicability to this project.

2010 ADA Standards for Accessible Design

The Americans with Disabilities Act is a Civil Rights law that protects people with disabilities from discrimination. The Department of Justice further created the 2010 American with Disabilities Act Standards for Accessible Design (ADAS). These standards fall under Title II and Title III of the ADA as it pertains to state and local government as well as public accommodations (ADA National Network, 2023).

521 CMR, Massachusetts Accessibility Code

521 CMR is the Massachusetts State Accessibility Code. It consists of regulations from the Massachusetts Architectural Access Board (MAAB) who oversees variances and physical accessibility in design and construction.

Both of these applicable regulations provide information that can be used in any phase of design development to “provide persons with disabilities full, free, and safe use of all buildings and facilities so that all such persons may have the educational, living, and recreational opportunities

necessary to be as self-sufficient as possible and to assume full responsibilities as citizens” (521 CMR §2.2).

METHODOLOGY

The goal of this project was to conduct a holistic evaluation of accessible elements at Worcester Polytechnic Institute by identifying spaces and areas that do not conform with applicable accessibility codes and standards. Additionally, the project aimed to provide design solutions and recommendations to better improve physical access within the WPI community.

PROJECT OBJECTIVES

In order to achieve the goal above, the following five objectives were developed:

1. Survey buildings and spaces.
2. Identify nonconforming elements.
3. Analyze trends within survey findings.
4. Design a ramp for Earle Bridge to make the West Entrance accessible in conformance with applicable codes and standards.
5. Formalize conclusions and recommendations for the current state of accessibility throughout the Worcester Polytechnic Institute Campus.

This section describes the methods used for each of the objectives listed above.

Objective 1: Conduct Surveys

The first objective was to conduct surveys for different buildings and locations with a focus on accessible elements in accordance with the 2010 ADA Standards for Accessible Design (ADAS) and 521 CMR, the Massachusetts State Accessibility Code. For the purposes of this project, two buildings on campus were chosen to be fully surveyed: Stratton Hall and Unity Hall. Stratton Hall was surveyed in hopes of understanding the level of accessibility in an older academic building on campus while Unity Hall is the newest fully constructed building at WPI. These buildings were chosen in order to make conclusions about the state of accessibility on campus over time, which is further discussed in Objective 3.

While Unity Hall should be a fully accessible space in compliance with the most up-to-date accessibility standards, there are preliminary plans to update Stratton Hall in the near future. This update would include an elevator, therefore accessibility is already a priority for the renovation.

Depending on the scope of the proposed renovation to Stratton Hall, 521 CMR may require that the whole building (entrances, toilet rooms, telephone, drinking fountains) be made accessible if the work exceeds 30% of the building's full and fair cash value (521 CMR §3.3).

The surveys conducted in Objective 1 focused on toilet rooms and accessible routes (including stairs, elevators, entrances, door maneuvering clearance, etc.). Steel tape measure, a digital level, and a door pressure guage were used on site to take measurements of existing conditions.

Detailed survey notes were recorded for every measurement taken, and photos were captured of every identified deficiency.

Objective 2: Identifying Nonconforming Elements (Deficiencies) & Produce Findings Report

In the second objective, accessible elements or areas that do not conform with the applicable accessibility code(s) were identified by comparing survey notes and photos to the code requirements in ADAS and 521 CMR. It was important to acknowledge that both accessibility codes allow tolerance on certain dimensions. When identifying nonconforming elements (referred to as deficiencies within this report), the tolerances outlined in 521 CMR §2.4.4 were considered. These tolerances can be seen in Figure 3 below.

2.4.4 Tolerances on all dimensions, unless otherwise noted, shall not exceed the following:

- a. Dimensions between zero and two inches, (0" and 2" = 0mm and 51mm) inclusive, shall have a maximum tolerance of plus or minus one-eighth inch ($1/8" = 3\text{mm}$).
- b. Dimensions more than two inches and less than 36 inches ($>2"$ and $<36" = >51\text{mm}$ and $<914\text{mm}$) shall have a maximum tolerance of plus or minus one-half inch ($1/2" = 13\text{mm}$).
- c. Dimensions 36 inches or greater ($36"$ or $> = 914\text{mm}$ or $>$) shall have a maximum tolerance of plus or minus one inch ($1" = 25\text{mm}$).
- d. Slopes may not exceed maximums. Slopes shall be measured in two-foot increments.

Note: Tolerances do not apply to minimums or maximums.

Figure 3: Tolerances Outlined in 521 CMR, the Massachusetts Accessibility Code

Once all deficiencies were identified, the findings were compiled into reports containing observed deficiencies, proposed solutions to conform with applicable codes, code references, and photos of documented nonconforming elements.

Objective 3: Trend Analysis of Survey Data

After deficiencies were compiled in Objective 2, a simple trend analysis was performed on the findings. The number of toilet room deficiencies, accessible route deficiencies, and total deficiencies were compared for Unity Hall and Stratton Hall. This project aimed to assess the state of accessibility on the WPI campus and part of that is identifying whether or not there is evidence that newer buildings are more accessible. The data collected was analyzed and conclusions were drawn about the differences between overall physical accessibility in Stratton Hall and Unity Hall.

Objective 4: Earle Bridge Ramp Design

The fourth objective involved designing a ramp for the West Entrance to Earle Bridge on the Worcester Polytechnic Institute campus. The current entrance consists of a staircase to the bridge surface, making it inaccessible for someone using a mobility aid. In order to complete this objective, the site was first analyzed. Measurements were taken to understand the space surrounding the West Entrance to the bridge (including landscaping, topography, other buildings, etc.) and the rise the proposed ramp would need to meet. After analyzing the site conditions, it was clear there were few ramp designs that could possibly comply with the codes, provide an adequate accessible route to the bridge, and fit in the existing space adjacent to the entrance.

Design criterion for the ramp was taken from all the applicable codes and standards including 521 CMR, 2010 ADA Standards for Accessible Design, the International Building Code, and ASCE 7. The standards provided information pertaining to the maximum possible slope, maximum ramp run lengths, required landing sizes, and handrail heights, diameters, and shapes. Once materials were chosen for both the ramp surface and the handrails, calculations were performed for the shear force and bending moments of the handrails. It was imperative that the proposed ramp meets the minimum loading conditions outlined in ASCE 7 in order to adequately support the weight of someone using the handrail.

Objective 5: Provide Recommendations

The last objective involved formalizing conclusions and recommendations for the current state of accessibility at WPI. In addition, suggestions were developed for future updates and construction to ensure that the University propels forward in designing spaces that people of all abilities can easily maneuver and comfortably occupy.

RESULTS

This chapter discusses the final proposed ramp design for Earle Bridge as well as the findings from data collected in building surveys.

DESIGN OF ADA ACCESSIBLE RAMP FOR EARLE BRIDGE

Existing Site Conditions & Ramp Location

The West Entrance of Earle Bridge was surveyed in order to better understand the space available to construct an accessible ramp. As shown in Figure 4 below, the current entrance consists of a six-step staircase. The total rise from the ground surface to the bridge entrance was measured to be 46 inches. The clear space perpendicular to the bridge, before running into the Alden Memorial Hall entrance is only 23 feet. Therefore, using the maximum slope of 1:12, a straight ramp is not suitable for the West Entrance to Earle Bridge. A turning ramp design was chosen to be located parallel with West Street. To maintain a direct path of travel over the bridge, a set of stairs was also designed in accordance with applicable codes and standards.



Figure 4: Existing West Entrance to Earle Bridge

Design Criteria

Design criteria were established by reading through all applicable codes and standards. Table 1 below outlines specific considerations and requirements that were established for the accessible ramp design as well as the adjacent stairs.

Table 1: Design Criteria

Element	Item	Code Requirement	Code Reference
Ramp	Slope	The maximum slope of a ramp shall be 1:12 (8.3%). There is no tolerance on slope.	521 CMR §24.2.1, ADAS §405.2
	Maximum Rise	The maximum rise for any run shall be 30 inches.	521 CMR §24.2.2, ADAS §405.6
	Clear Width	The minimum clear width of a ramp shall be 48 inches, measured between the railings.	521 CMR §24.3, ADAS §405.5
	Maximum Ramp Run	The maximum length of a ramp run between landings shall not exceed 30 feet.	521 CMR §24.4
	Landing Dimensions	The landing shall be at least as wide as the ramp run leading to it and the landing length shall be a minimum of 60 inches clear. If ramps change directions at the landings, a minimum landing size shall be 60 by 60 inches.	521 CMR §24.4.2, §24.4.3, §24.4.5, ADAS §405.7
	Handrail Locations	Handrails shall be provided along both sides of ramp segments.	521 CMR §24.5.1, ADAS §405.8
	Handrail Height	Handrails shall be provided in pairs, one at a height between 34 and 38 inches and a lower one at a height between 18 and 20	521 CMR §24.5.2

		inches, measured vertically from the surface of the ramp to the top of the handrail.	
	Handrail Extensions	Handrails shall extend at least 12 inches beyond the top and bottom of the ramp and shall be parallel with the floor or ground surface, except where the extension would cause a safety hazard.	521 CMR §24.5.4
	Handrail Size and Shape	Handrails shall have a circular cross section with a diameter of between 1.25 and 2 inches.	521 CMR §24.5.5
	Handrail Clearance	The clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §24.5.8
	Edge Protection	Ramps and landings with drop-offs shall have edge curbs a minimum of 2 inches high.	521 CMR §24.8, ADAS §405.9
	Handrail Structural Loading Conditions	Handrails and guards shall be designed to resist a linear load of 50 pounds per linear foot and a concentrated load of 200 pounds.	IBC §1607.9.1, ASCE 7 §4.5.1
Stairway	Treads and Risers	All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be between 4 and 7 inches high. Treads shall be 11 inches deep minimum.	ADAS §504.2, 521 CMR §27.2
	Nosings	The undersides of nosings shall not be abrupt. The radius of curvature at the leading edge of the tread shall	521 CMR §27.3

		be no greater than 0.5 inch.	
	Handrail Location	Stairways shall have continuous handrails at both sides of all stairs.	521 CMR §27.4.1
	Handrail Height	The top of gripping surface shall be mounted between 34 and 38 inches above stair nosings. Handrails shall be measured vertically from the top of the gripping surface to the stair nosing.	521 CMR §27.4.2
	Handrail Extensions	Where handrails terminate at the top and bottom of a stair run, they shall have extensions unless it would cause a safety hazard or if space does not permit.	521 CMR §27.4.2
	Handrail Size and Shape	Handrails shall have a circular cross section with an outside diameter of 1.25 inches minimum and 2 inches maximum.	521 CMR §27.4.4
	Handrail Clearance	The clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §27.4.7
	Handrail End Condition	Ends of handrails shall either be rounded or returned smoothly to floor, wall, or post. Extensions on handrails which are not attached to walls shall be returned smoothly to a floor or post.	

As mentioned in the Background Chapter, there are many instances where the ADA Standards and 521 CMR differ in requirements. The most stringent requirement was referenced in these cases in order to adhere with both sets of regulations.

Final Design

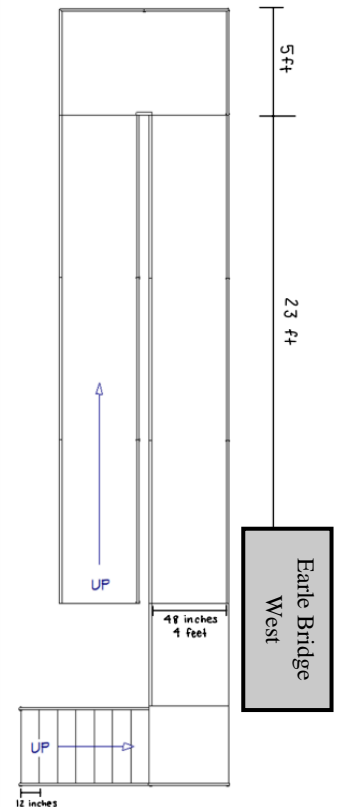


Figure 5: Proposed Ramp Design

To achieve the total rise of 46 inches, two concrete ramp runs are provided, each 23 feet in length and 48 inches in clear width (measured between the handrails). Level landings are provided at the top and bottom of each ramp run and the stair run. The landing located at the turn of the ramp is 5 feet by 9.5 feet; all other landings are 5 feet in length and 48 inches wide.

The slope of the ramp is designed at 1:12 (8.3%). While this is the maximum tolerated slope under 521 CMR, it is also the ADA recommended slope for business and public use applications similar to this (ADA Compliance, 2023). For each 23-foot ramp run, there is a rise of 23 inches. Handrails are included in the design on both sides of the ramp run. The top and bottom rails are designed at heights of 36 inches and 18 inches, respectively, measured from the ramp surface. The rails were designed to be Aluminum 6061 1.5-inch diameter circular handrails. Intermediate rail posts are designed to be located halfway through each ramp run. Lastly, handrail extensions (not shown in Figure 5) are provided at the top and bottom of each ramp run.

Loading conditions were analyzed on the handrails to meet the IBC and ASCE 7 requirement of the ability of the rails to resist a linear load of 50 pounds per linear foot and a concentrated load of 200 pounds. Refer to Appendix B for calculations.

The stairs were included in the design to maintain a direct route across Earle Bridge. The stairs were designed in accordance with the criteria in Table 1 above. The stairs were designed to be 44 inches in clear width (measured between the handrails), have a tread depth of 12 inches and 7-inch risers. The landing at the top and bottom of the stairs is 44 feet wide. Handrails are provided on both sides of the stairs at a height of 36 inches.

RESULTS OF BUILDING SURVEYS

Surveys were conducted in Stratton Hall and Unity Hall to identify elements and spaces that do not conform with 521 CMR and the 2010 ADA Standards for Accessible Design (deficiencies). In total, 229 deficiencies were identified by comparing survey notes, measurements, and photos to the applicable code. As shown in Table 2 below, deficiencies were categorized into toilet room deficiencies and accessible route deficiencies (stairs, elevators, entrances, doors, etc.). Full findings tables were created for both Stratton Hall and Unity Hall identifying the nonconforming element, the code requirement, code reference, and a documented photo of each deficiency. These tables can be found in Appendix A.1 (Stratton Hall Findings) and Appendix A.2 (Unity Hall Findings).

Table 2: Identified Deficiencies (Nonconforming Elements)

Building	Number of Toilet Room Deficiencies	Number of Accessible Route Deficiencies	Total Number of Deficiencies
Stratton Hall	68	33	101
Unity Hall	119	9	128
	187	42	229

In total, 101 deficiencies were identified in Stratton Hall and 128 in Unity Hall. On average, Stratton Hall had about 11 deficiencies in each toilet room while Unity Hall had an average of 5 per toilet room. The most common deficiencies in both buildings, with regard to toilet rooms, were the mounting heights of various dispensers, coat hooks, locks, etc. These are generally easy to fix and make accessible, as they likely would not require any structural changes. Most of these elements are located just shy of the minimum, maximum, or tolerated dimension. In Stratton Hall, the most observed accessible route deficiency was door maneuvering clearance.

Maneuvering clearance allows someone using a wheelchair or other mobility aid to easily open a door from either a front approach, latch approach, or hinge approach.

In comparing the number and nature of deficiencies found within the two buildings, it is apparent that there has been significant progress in physical accessibility in the new Unity Hall academic building, especially in regard to the accessible routes through the building, however the identified deficiencies should be addressed as soon as possible.

CONCLUSIONS & RECOMMENDATIONS

Overall, WPI is improving physical access on campus slowly, however, there are many steps that need to be taken to ensure that these priorities and designs are implemented correctly. The following recommendations were made to ensure that Worcester Polytechnic Institute propels forward in designing spaces that people of all abilities can easily maneuver and comfortably occupy.





1. Hire a professional, reputable accessibility consultant to perform formal plan reviews and on-site surveys for each building on campus. Consultants are often used for many other disciplines when designing and constructing new spaces, and an accessibility consultant specifically can ensure that accessibility is being achieved from the very first stages of design. Building plan reviews of newer, existing buildings will also indicate whether deficiencies are present from early in the design development or if most are a result of incorrect construction and/or installation.
2. Create a WPI Accessibility Advisory Board that can head initiatives to renovate inaccessible spaces. The University would greatly benefit from a long-term plan that addresses each building on campus, its level of accessibility, the feasibility of making it accessible, and if possible, a plan to do so. It is recommended, however, that this Advisory Board focuses not only on physical accessibility in conformance with codes and standards; the team shall also prioritize all other types of disabilities that may be present on our campus including developmental, behavioral/emotional, and sensory impaired disabilities. The Board should consist of students, faculty, staff, alumni, and alike to make sure that all perspectives are heard when understanding the needs of our community.
3. Further analyze Earle Bridge itself and the East Entrance. While the scope of this project only included a design for the West Entrance, the Bridge and opposite entrance are not currently accessible. While the proposed ramp design included in this Major Qualifying Project would add a great deal of physical access to those with physical disabilities, the bridge in its entirety should be analyzed with greater detail.





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APPENDIX A.1 STRATTON HALL FINDINGS TABLES




Appendix A.1 includes all the identified deficiencies in Stratton Hall.

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
TOILET ROOM DEFICIENCIES				
Ground Floor Single User				
Pull Side Door Maneuvering Clearance	Door maneuvering clearance is not provided on the pull side of the door.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	
Door Lock Height	The door lock is located 40 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 41 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 44 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 44.5 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Protruding Object	The counter in the toilet room 43.75 inches high and protrudes 12 inches into the clear space.	Objects with leading edges more than 27 inches and not more than 80 inches above the finish floor or ground shall protrude 4 inches maximum horizontally into the circulation path.	ADAS §307.2	
Counter Height	The counter in the toilet room is at a height of 43.75 inches.	The tops of accessible tables and counters shall be between 28 inches and 34 inches above the finish floor or ground.	521 CMR §35.6	
Coat Hook Mounting Height	The coat hook is mounted too high at 57 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Toilet Centerline	The centerline of the toilet is measured 17 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Grab Bar Clearance	The grab bar is located too close (1.25 inches) from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Outlet Location	The outlet is located 12.5 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Ground Floor Gender Neutral				
Door Maneuvering Clearance	Maneuvering clearance is not provided on either side of the door to the toilet room.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	No photo.



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 41 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 44 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 43 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 4.5 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Coat Hook Mounting Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Accessible Stall Door Lock Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Toilet Paper Dispenser Distance from Toilet	The toilet paper dispenser is mounted with the center of the dispenser too far from the front edge of the toilet.	Toilet paper dispensers shall comply with ADAS 309.4 and shall be between 7 inches and 9 inches maximum in front of the water closet measured to the centerline of the dispenser.	ADAS §604.7	No photo.
Grab Bar Clearance	The grab bar is located too close (1.25 inches) from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	

First Floor Women's Room




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Pipe Protection	No pipe protection is provided underneath the sink.	Sink traps and drains shall be located as close to rear walls as possible. Hot water and drainpipes exposed under sinks shall be recessed, insulated, or guarded. There shall be no sharp or abrasive surfaces under sinks.	521 CMR §30.9.5	
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 54 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Outlet Location	The outlet is located 11 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 4.75 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Pull Handles	Pull handles are not provided on the push side of the accessible stall door.	The accessible stall door shall have a pull device on both sides of the door to assist in closing and opening the door.	521 CMR §30.6.1(b)	No photo.
Accessible Stall Door Location	The stall door is not opposite to the toilet.	Doors shall be located in the front partition or in the side wall or partition farthest from the water closet.	ADAS §604.8.1.2	No photo
Coat Hook Mounting Height	The coat hook is mounted too high at 53 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Accessible Stall Door Lock Height	The door lock is located 41 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Width	The accessible stall is less than 60 inches wide.	The standard accessible toilet stall shall be at least 60 inches wide and 72 inches deep.	521 CMR §30.6.1	
Toilet Centerline	The centerline of the toilet is measured 16 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Toilet Clearance	There is only 32 inches of clear space in front of the toilet.	There shall be at least 42 inches clearance between the front edge of the water closet and the nearest wall or fixture.	521 CMR §30.7.2	
Female Product Dispenser Height	The feminine product dispenser is mounted too high with the highest operable part 50 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Grab Bar Diameter	The grab bar is less than 1.25 inches in diameter.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter, have a 1.5 inch clearance between the bar and the wall.	521 CMR §30.8.3	





Second Floor Men's Room




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 43 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Urinal Mounting Height	The urinal is mounted with the elongated rim 19 inches above the finish floor.	Accessible urinals shall be stall-type or wall-hung with an elongated rim at a maximum of 17 inches above the finish floor.	521 CMR §30.10.1	
Smooth Door Bottom	The bottom of the door is not smooth for 10 inches above the floor.	Swinging door and gate surfaces within 10 inches of the finish floor or ground measured vertically shall have a smooth surface on the push side extending the full width of the door or gate.	ADAS §404.2.10	No photo.
Urinal Flush Controls	The urinal flush valves are mounted 46 inches above the floor.	Flush controls shall be hand operated or automatic shall be mounted no more than 44 inches above the finish floor.		





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 6.5 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Coat Hook Height	The coat hook is mounted too high at 53 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Accessible Stall Door Lock Height	The door lock is located 43 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Width	The accessible stall is less than 60 inches wide.	The standard accessible toilet stall shall be at least 60 inches wide and 72 inches deep.	521 CMR §30.6.1	
Toilet Paper Distance from Toilet	The toilet paper dispenser is mounted with the center of the dispenser too far from the front edge of the toilet.	Toilet paper dispensers shall comply with ADAS 309.4 and shall be between 7 inches and 9 inches maximum in front of the water closet measured to the centerline of the dispenser.	ADAS §604.7	No photo.
Outlet Location	The outlet is located less than 18 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	





Third Floor Men's Room





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Pull Side Door Maneuvering Clearance	Door maneuvering clearance is not provided on the pull side of the door.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 5.5 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Accessible Stall Door Pull Handles	Pull handles are not provided on either side of the accessible stall door.	The accessible stall door shall have a pull device on both sides of the door to assist in closing and opening the door.	521 CMR §30.6.1(b)	No photo.
Coat Hook Height	The coat hook is mounted too high at 53 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Accessible Stall Door Lock Height	The door lock is located 43 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Toilet Centerline	The centerline of the toilet is measured 18.75 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Toilet Paper Dispenser Distance from Toilet	The toilet paper dispenser is mounted with the center of the dispenser too far from the front edge of the toilet.	Toilet paper dispensers shall comply with ADAS 309.4 and shall be between 7 inches and 9 inches maximum in front of the water closet measured to the centerline of the dispenser.	ADAS §604.7	No photo.
Outlet Location	The outlet is located less than 11 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Pipe Protection	No pipe protection is provided underneath the sink.	Sink traps and drains shall be located as close to rear walls as possible. Hot water and drainpipes exposed under sinks shall be recessed, insulated, or guarded. There shall be no sharp or abrasive surfaces under sinks.	521 CMR §30.9.5	
Third Floor Women's Room				
Accessible Stall	An accessible stall is not provided within the toilet room.	If toilet stalls are provided, then at least one shall be a standard accessible toilet stall.	521 CMR §30.6	No photo.



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Coat Hook Height	The coat hook is mounted too high at 63 inches above the finish floor.	Where six or more stalls are provided in a toilet room, at least one alternate accessible toilet stall shall be provided. Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 41 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 44 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 44 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Pull Handles	Pull handles are not provided on either side of the accessible stall door.	The accessible stall door shall have a pull device on both sides of the door to assist in closing and opening the door.	521 CMR §30.6.1(b)	
Accessible Stall Coat Hook Height	The coat hook is mounted too high at 51 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Accessible Stall Door Lock Height	The door lock is located 43 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.
Accessible Stall Width	The accessible stall is less than 60 inches wide.	The standard accessible toilet stall shall be at least 60 inches wide and 72 inches deep.	521 CMR §30.6.1	No photo.
Grab Bars	Grab bars are not provided.	The standard accessible toilet shall have two grab bars 42 long, one on the wall in back of the water closet and one on the side wall closest to the water closet.	521 CMR §30.8	
Toilet Paper Dispenser Distance from Toilet	The toilet paper dispenser is mounted with the center of the dispenser too far from the front edge of the toilet.	Toilet paper dispensers shall comply with ADAS 309.4 and shall be between 7 inches and 9 inches maximum in front of the water closet measured to the centerline of the dispenser.	ADAS §604.7	No photo.



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
ACCESSIBLE ROUTE DEFICIENCIES				
Front Stair				
Outside Handrail Shape	The handrail provided on the outside of the stairs is not round or oval.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches. The handgrip portion of the handrail shall be round or oval in cross-section.	521 CMR §27.4.4, §27.4.5	
Inside Handrail Continuity	The inside handrail does not continue along the entire staircase.	The gripping surface shall be continuous so that a hand can move from end to end without interruption by newel posts or other obstructions.	521 CMR §27.4.6	
Handrail Clearance	The clearance between the grab bar and the wall is too big at 2 inches.	When a handrail is mounted adjacent to a wall, the clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §27.4.7	
Handrail Extensions	Handrail extensions are not provided for the front stair.	Where handrails terminate at the top and bottom of a stair run, they shall have extensions complying with 521 CMR §27.4.3.	521 CMR §27.4.3	



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Push Side Door Maneuvering Clearance	Push side door maneuvering clearance is not provided at the stairwell door on the ground floor.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	
Loose Carpet	There is loose carpet in the stairwell.	Carpet shall be adhered directly to the floor or shall be stretched tautly and securely fastened to floor surfaces at all edges.	521 CMR §29.3.2	
Exterior Door Push Side Door Maneuvering Clearance	Push side door maneuvering clearance is not provided at the exterior door.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	
Smooth Door Bottom	The bottom of the door is not smooth for 10 inches above the finish floor.	Swinging door and gate surfaces within 10 inches of the finish floor or ground measured vertically shall have a smooth surface on the push side extending the full width of the door or gate.	ADAS §404.2.10	

Center Stair

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Outside Handrail Shape	The handrail provided on the outside of the stairs is not round or oval.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches. The handgrip portion of the handrail shall be round or oval in cross-section.	521 CMR §27.4.4, §27.4.5	No photo.
Inside Handrail Diameter	The handrail diameter is larger than 2 inches.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches.	521 CMR §27.4.4, §27.4.5	No photo.
Handrail Height	The handrail is mounted too high with the top of the gripping surface 39 inches above the stair nosing.	The handrail shall be mounted between 34 and 38 inches above the stair nosing, measured to the top of the gripping surface.	521 CMR §27.4.2	
Inside Handrail Continuity	The inside handrail does not continue along the entire staircase.	The gripping surface shall be continuous so that a hand can move from end to end without interruption by newel posts or other obstructions.	521 CMR §27.4.6	No photo.
Handrail Clearance	The clearance between the grab bar and the wall is too big at 2 inches.	When a handrail is mounted adjacent to a wall, the clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §27.4.7	No photo.
Handrail Extensions	Handrail extensions are not provided for center stair.	Where handrails terminate at the top and bottom of a stair run, they shall have extensions complying with 521 CMR §27.4.3.	521 CMR §27.4.3	





Back Stair




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Handrail Extensions	Handrail extensions are not provided for back stair.	Where handrails terminate at the top and bottom of a stair run, they shall have extensions complying with 521 CMR §27.4.3.	521 CMR §27.4.3	No photo.
Handrail Shape	The handrail provided is not round or oval in cross section.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches. The handgrip portion of the handrail shall be round or oval in cross-section.	521 CMR §27.4.4, §27.4.5	No photo.
Handrail Diameter	The handrail diameter is larger than 2 inches.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches.	521 CMR §27.4.4, §27.4.5	No photo.
Student Lounge				
Pull Side Door Maneuvering Clearance	Pull side door maneuvering clearance is not provided to the student lounge	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	
Sloped Surface	There is a sloped floor surface before entering the Stratton Hall student lounge that exceeds 5% slope (at 9.63%).	Any part of an accessible route with a slope greater than 5% shall be considered a ramp and comply with 521 CMR Chapter 24.	521 CMR §24.1	
Room 106				
Push Side Door Maneuvering Clearance	Push side door maneuvering clearance is not provided.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	No photo.


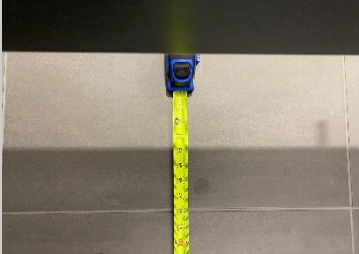


Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Room 203				
Door Maneuvering Clearance	Door maneuvering clearance is not provided.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	No photo.
Door Hardware	The door has knob hardware that requires tight grasping and twisting of the wrist to operate.	Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to operate with one hand and that does not require tight grasping, pinching, or twisting of the wrist.	521 CMR §26.11.1	
Room 308				
Pull Side Door Maneuvering Clearance	Pull side door maneuvering clearance is not provided.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	No photo.
Door Hardware	The door has knob hardware that requires tight grasping and twisting of the wrist to operate.	Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to operate with one hand and that does not require tight grasping, pinching, or twisting of the wrist.	521 CMR §26.11.1	
Room 309				
Pull Side Door Maneuvering Clearance	Pull side door maneuvering clearance is not provided.	Door maneuvering clearance must be provided and comply with 521 CMR §26.6.	521 CMR §26.6	No photo.
Door Hardware	The door has knob hardware that requires tight grasping and twisting of the wrist to operate.	Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to operate with one hand and that does not require tight grasping, pinching, or twisting of the wrist.	521 CMR §26.11.1	No photo.





APPENDIX A.2 UNITY HALL FINDINGS TABLES





Appendix A.2 includes all the identified deficiencies in Stratton Hall.

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
TOILET ROOM DEFICIENCIES				
First Floor Women's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 5.25 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Outlet Location	The outlet is located only 9 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches	521 CMR §9.5.6	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
		or greater in depth, they shall be no higher than 44 inches.		
First Floor Men's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Accessible Stall Door Maneuvering Clearance	Door maneuvering clearance is not provided perpendicular to the pull side of the accessible stall door.	Door maneuvering clearance must be provided and comply with 521 CMR Section 26.6	521 CMR §26.6	No photo.
Coat Hook Mounting Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finish floor per ADAS 308.	ADAS §604.8.1.2	

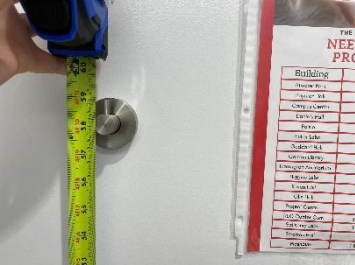


Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Accessible Stall Depth	The accessible stall is only 71.5 inches deep.	Standard accessible toilet stalls shall be at least 60 inches wide and 72 inches deep.	521 CMR §30.6.1	
Toilet Centerline	The centerline of the toilet is measured 19 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Outlet Location	The outlet is located only 9 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
First Floor Single User 1 (Left)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 40.75 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Location	The paper towel dispenser is not located within reach of someone using the accessible sink.	At least one towel dispenser shall be within the zone of reach of a person using the accessible sink and shall comply with 521 CMR 39.5.	521 CMR §30.12	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	
Coat Hook Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Grab Bar Mounting Heights	Both the side and rear grab bars are mounted higher than 36 inches above the finish floor.	Grab bars shall be set at a height of 33 to 36 inches above and parallel to the floor.	521 CMR §30.8.2	
Toilet Centerline	The centerline of the toilet is measured 19 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	




First Floor Single User 2 (Right)




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	
Paper Towel Dispenser Location	The paper towel dispenser is not located within reach of someone using the accessible sink.	At least one towel dispenser shall be within the zone of reach of a person using the accessible sink and shall comply with 521 CMR 39.5.	521 CMR §30.12	No photo.
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 51 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Coat Hook Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Outlet Location	The outlet is located only 14.5 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Second Floor Women's Room				
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 51 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 6 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Accessible Stall Door Lock Height	The door lock is located 41 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Grab Bar Clearance	The grab bar is less than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Second Floor Men's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Coat Hook Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finish floor per ADAS 308.	ADAS §604.8.1.2	
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Toilet Centerline	The centerline of the toilet is measured 19 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Outlet Location	The outlet is located less than 18 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor,	521 CMR §9.5.6	No photo.




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
		measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.		
Second Floor Single User 1 (Left)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Coat Hook Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finish floor per ADAS 308.	ADAS §604.8.1.2	
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 40.75 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Paper Towel Dispenser Location	The paper towel dispenser is not located within reach of someone using the accessible sink.	At least one towel dispenser shall be within the zone of reach of a person using the accessible sink and shall comply with 521 CMR 39.5.	521 CMR §30.12	
Second Floor Single User 2 (Right)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 40.75 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Location	The paper towel dispenser is not located within reach of someone using the accessible sink.	At least one towel dispenser shall be within the zone of reach of a person using the accessible sink and shall comply with 521 CMR 39.5.	521 CMR §30.12	No photo.
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	
Coat Hook Mounting Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Toilet Centerline	The centerline of the toilet is measured 19 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Third Floor Women's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	No photo.
Accessible Stall Door	The accessible stall door is not self-closing.	The stall door shall have a door that has an automatic self-closing hinge device, a pull device on both sides of the door to assist in closing and opening the door, and a lock located approximately 36 inches above the	521 CMR §30.6.1(a)	No photo.





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	<p>floor that does not require tight grasping, pinching, or twisting of the wrist to operate.</p> <p>The door lock shall be located approximately 36 inches above the finish floor.</p>	521 CMR §30.6.1(b)	
Outlet Location	The outlet is located only 4.5 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Third Floor Men's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	No photo.

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Coat Hook Mounting Height	The coat hook is mounted too high at 48.75 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Grab Bar Clearance	The grab bar is greater than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Outlet Location	The outlet is located only 5 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Third Floor Single User 1 (Left)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Coat Hook Mounting Height	The coat hook is mounted too high at 48.75 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	





Third Floor Single User 2 (Right)




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 40.5 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 49 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Coat Hook Mounting Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	





Fourth Floor Women's Room


Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	No photo.
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 6 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Accessible Stall Door Maneuvering Clearance	Door maneuvering clearance is not provided perpendicular to the pull side of the accessible stall door.	Door maneuvering clearance must be provided and comply with 521 CMR Section 26.6	521 CMR §26.6	



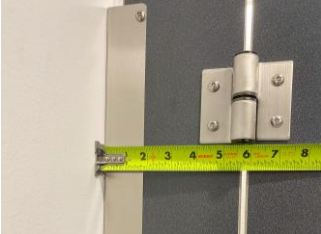

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Lock Height	The door lock is located 40.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Toilet Centerline	The centerline of the toilet is measured 17 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	No photo.
Grab Bar Clearance	The grab bar is greater than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Fourth Floor Men's Room				
Paper Towel Dispenser Location	The paper towel dispenser is not mounted within reach of the accessible sink.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	No photo.




Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Toilet Centerline	The centerline of the toilet is measured 17 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Grab Bar Clearance	The grab bar is greater than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Accessible Stall Door Lock Height	The door lock is located 41.5 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Coat Hook Mounting Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Outlet Location	The outlet is located only 14.5 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Fourth Floor Single User 1 (Left)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Mirror Mounting Height	The mirror is mounted too high with the bottom edge of the reflective surface 40.5 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 49.5 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	
Coat Hook Mounting Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	





Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Grab Bar Clearance	The grab bar is greater than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	
Fourth Floor Single User 2 (Right)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	No photo.
Paper Towel Dispenser Mounting Height	The paper towel dispenser is mounted too high at 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR 39.5.	521 CMR §30.12	No photo.
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	No photo.
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	521 CMR §30.12	No photo.
Coat Hook Mounting Height	The coat hook is mounted too high at 48.75 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	No photo.
Grab Bar Clearance	The grab bar is greater than 1.5 inches from the wall.	Grab bars shall be between 1.25 and 1.5 inches in outside diameter and have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	No photo.
Fifth Floor Women's Room				



Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Paper Towel Dispenser Location	The paper towel dispenser is not located within reach of someone using the accessible sink.	At least one towel dispenser shall be within the zone of reach of a person using the accessible sink and shall comply with 521 CMR 39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 47 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	
Accessible Stall Door Opening Distance from Wall	The accessible stall door opening is located more than 4 inches from the side wall at 5-5/8 inches.	Toilet compartment doors, when located in the side partition, shall have four inches or less between the front partition/wall and the door opening.	ADAS §604.8.1.2	
Accessible Stall Door Lock Mounting Height	The door lock is located 41 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Coat Hook Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Grab Bar Clearance	The grab bars are located 1.75 inches from the wall.	Grab bars shall have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	No photo.
Outlet Location	The outlet is located only 9 inches from the interior corner.	Electrical outlets shall be located between 15 inches and 48 inches above the floor, measured at the centerline of the lowest receptacle. All outlets shall be located no less than 18 inches from interior corners. When outlets are located on walls above counters or other fixtures that are 22 inches or greater in depth, they shall be no higher than 44 inches.	521 CMR §9.5.6	
Fifth Floor Men's Room				
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Accessible Stall Door Lock Mounting Height	The door lock is located 41 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	
Accessible Stall Coat Hook Height	The coat hook is mounted too high at 49 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Toilet Centerline	The centerline of the toilet is measured 19 inches from the side wall.	The centerline of the water closet shall be located 18 inches from the nearest sidewall and at least 42 inches from the farthest side wall or the closest edge of an adjacent fixture.	521 CMR §30.7.2	
Fifth Floor Single User 1 (Left)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	


Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Paper Towel Dispenser Height and Location	The paper towel dispenser is not located at the sink and is mounted too high with the highest operable part 51 inches above the finish floor.	Towel dispensers, drying devices, or other types of devices and dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR §39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	
Coat Hook Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Fifth Floor Single User 2 (Right)				
Door Lock Mounting Height	The door lock is located 38 inches above the finish floor.	The door lock shall be located approximately 36 inches above the finish floor.	521 CMR §30.6.1(b)	

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Sink Height	The sink is mounted with the highest edge 34.5 inches above the finish floor.	Sinks shall be mounted with the rim no higher than 34 inches above the finish floor.	521 CMR §30.9.2	
Mirror Height	The mirror is mounted too high with the bottom edge of the reflective surface more than 40 inches above the finish floor.	The bottom of any mirror that is provided above a sink shall be set with the bottom edge of the reflecting surface no higher than 40 inches above the finish floor.	521 CMR §30.11	
Paper Towel Dispenser Height and Location	The paper towel dispenser is not located at the sink and is mounted too high with the highest operable part 51 inches above the finish floor.	Towel dispensers, drying devices, or other types of devices and dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches). At least one of each device shall be located within the reach of a person using the accessible sink and comply with 521 CMR §39.5.	521 CMR §30.12	
Soap Dispenser Mounting Height	The soap dispenser is mounted too high with the highest operable part 48 inches above the finish floor.	Towel dispensers, drying devices, or other types of dispensers shall have at least one of each device mounted within the zone of reach (under 42 inches).	520 CMR §39.5	


Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Coat Hook Height	The coat hook is mounted too high at 58 inches above the finish floor.	Coat hooks shall be located within 48 inches of the finished floor per ADAS 308.	ADAS §604.8.3	
Grab Bar Clearance	The grab bars are located 1.75 inches from the wall.	Grab bars shall have a 1.5-inch clearance between the bar and the wall.	521 CMR §30.8.3	

STAIRWAYS

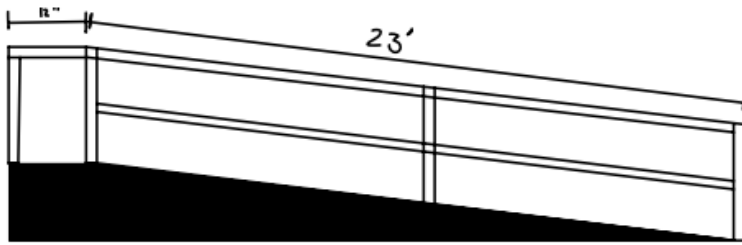
Stair A

Handrail Clearance	The handrail is located 1.75 inches from the wall.	When a handrail is mounted adjacent to a wall, the clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §27.4.7	No photo.
Handrail Shape	The handrail provided is not round or oval in cross section.	Handrails shall have a circular cross section with an outside diameter of between 1.25 and 2 inches. The handgrip portion of the handrail shall be round or oval in cross-section.	521 CMR §27.4.4, §27.4.5	

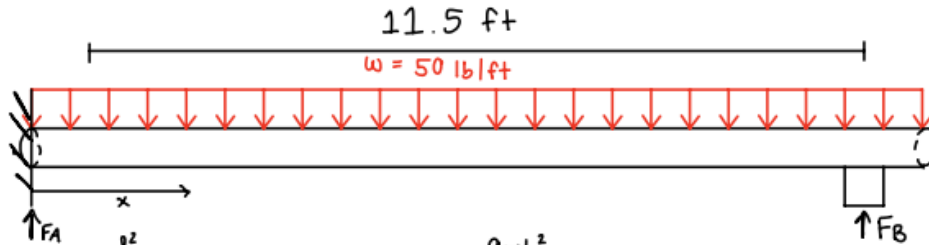
Stair B

Element	Noncompliance Description	Code Requirement(s)	Code Reference	Photo
Handrail Clearance	The clearance between the grab bar and the wall is too big at 2 inches.	When a handrail is mounted adjacent to a wall, the clear space between the handrail and the wall shall be 1.5 inches.	521 CMR §27.4.7	

APPENDIX B. LOAD CALCULATIONS



Handrail Diameter = 1.25" outside
 Top Rail 36" above ramp surface
 Bottom Rail 18" above ramp surface
 Edge Protection 2" high above ramp surface



$d = 1.5$ inches
 $= 0.125$ feet

$$M = \frac{wL^2}{8}$$

$$M = \frac{50 \text{ lb/ft} (11.5 \text{ ft})^2}{8}$$

$$M = 826.56 \text{ ft-lb}$$

↳ at $x = 0$

$$I = \frac{\pi d^4}{64}$$

$$I = \frac{\pi (0.125)^4}{64}$$

$$I = 1.1984 \times 10^{-5}$$

$$\sigma = 0.71 \sigma_y = \frac{Mc}{I}$$

$$\frac{I}{c} = S = \frac{M}{0.71 F_y}$$

$$S = \frac{826.56 \text{ ft-lb}}{0.71 (70 \text{ ksi}) \left(\frac{149000 \text{ lb/ft}^2}{1 \text{ ksi}} \right)}$$

$$S = 1.1549 \times 10^{-4} \text{ feet}$$

$$S = \frac{\pi D^3}{36} = \frac{\pi (0.125)^3}{36}$$

$$S = 1.70 \times 10^{-4} \text{ cubic feet}$$

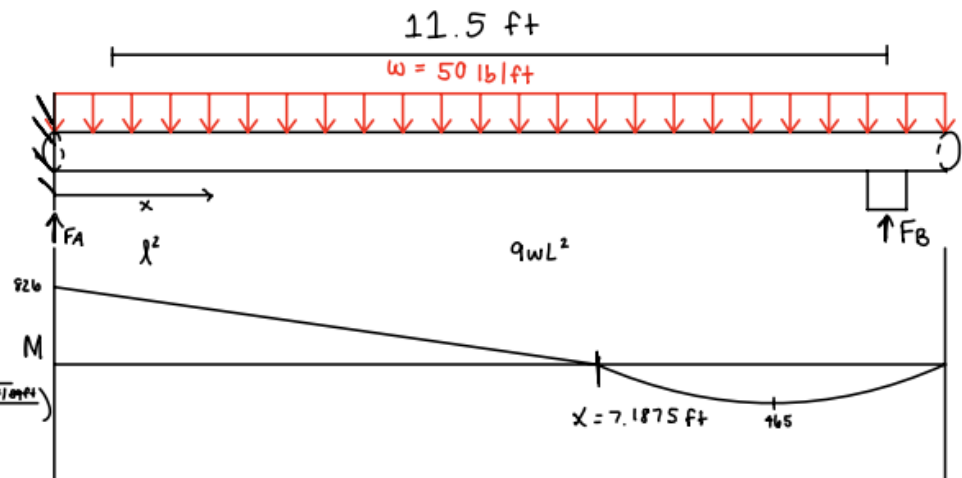
$$M_{\max} = \frac{9wL^2}{128}$$

$$M_{\max} = \frac{9(50 \text{ lb/ft})(11.5 \text{ ft})^2}{128}$$

$$M_{\max} = 469.94 \text{ ft-lb}$$

$$\text{↳ at } x = 0.625(11.5 \text{ ft})$$

$$\text{at } x = 7.1875 \text{ ft}$$



The section is much smaller than the maximum.