

RECOMMENDED REPAIRS & RENOVATIONS

After review of the architectural, structural, mechanical, electrical, plumbing, and energy reports, we have created a comprehensive list of recommended renovations and repairs that take into consideration the noted deficiencies and recommended updates. We have made an effort to discuss solutions with the consultants prior to the finalization of their reports. However, there may be some deviations from the recommendations within individual reports, because often conflicting priorities must be reconciled. For example, installation of spray foam insulation along the basement masonry walls would provide the best insulation, air sealing, and vapor control, as noted in the Energy Study. From an architectural perspective, spray foam insulation would permanently alter historic materials and would inhibit repointing masonry walls in the future.

Priority Categories

Our report has been organized into three categories of priority:

Immediate	These items should be addressed as soon as possible because of safety and code implications.	Estimated cost: \$1,809,361
One to five years	These items should be planned for by capital campaign or on a maintenance schedule of tasks to improve the building.	Estimated cost: \$3,786,739
Long term	These items will improve the building but are not critical for immediate attention. They should be carefully considered as part of any building repair, retrofit, or renovation.	Estimated cost: \$1,473,895

Immediate Category & Top Priority Projects

There are a few significant items that require immediate attention for safety of the building occupants as well as longevity of the building:

1. Repair of the dry sprinkler system in the attic; estimated cost \$131,863
2. Code required modifications to the water heater and boiler breaching and combustion air; estimated cost \$7,896; Note: This cost is based on installing a new heat pump water heater which will not require breaching
3. Repair of the 1815 dome structural system, including finishes and insulation; estimated cost \$907,817 (this expense is included in the one to five year total); Note: If the library does not have the funds to execute this project immediately, we recommend installing protective measures and reopening the space for egress; estimated cost \$40,428 (this expense is included in the immediate category total)
4. Structural repairs not directly related to the dome; estimated cost \$1,237,790
5. Repair and rebuilding of the chimneys; estimated cost \$170,971
6. Professional assessment of deteriorated wood structure in the 1815 crawlspace; estimated cost of professional services \$5,000 - \$10,000 (this expense is a soft cost and is not included in the immediate category total)

A number of minor maintenance and repair initiatives are also recommended for immediate action. Some items will have immediate impact, many could be completed by maintenance staff at minimal cost, and several are code compliance updates. Examples of typical tasks include: painting, bathroom floor grout, heating system valve replacement, and an arc flash study. The remainder of the recommended immediate work is estimated at \$220,413.

One To Five Years Category

The tasks recommended for a one-to-five-year period are expected to become a part of the planned maintenance schedule for continual maintenance and improvement. Examples of typical tasks include: cleaning exterior brick, refinishing hardwood floors, replacing major equipment that is near the end of its useful life, and installing tamper-resistant receptacles. The estimated cost includes escalation to 2027 expenses.

Long Term Category

These recommended projects will improve the building to meet modern building standards, but are not considered critical. Examples of typical tasks include: new insulation in the crawlspace, installing a security system, and installation of a mechanical system with ventilation and humidity control. The estimated cost includes escalation to 2029 expenses.

Cost Estimate Limitations

These cost estimates are based on current conditions and perceived future trends. They are built on a general understanding of scopes of work and are not bids or guaranties of exact project costs. Market fluctuations can greatly affect these numbers and considering past experience, it might be wise to proceed with future projects on a construction manager delivery system to balance project scope and costs with real market conditions.

Owner's soft costs are not included in the estimates. Examples of soft costs include: design fees, legal fees, permitting fees, and owner's contingency.

The tables on the following pages outline each recommendation to the level of detail needed for a conceptual cost estimate.

A note about the dome project

The report team generally agrees with the approach recommended by TRW and their team in 2023. We believe that the primary cause of the cracking plaster is the movement of the ceiling and roof structure. The dome is hanging from the roof structure, which appears to move and deflect from wind and snow loads. In addition, the wood structure is subject to expansion and contraction with changing levels of air humidity. We recommend stabilizing the structure as well as selecting a finish that is less likely to crack.

We are recommending adjustments to the project scope as follows:

1. Complete removal of the existing plaster and wood lath. Installation of new metal lath and reinforced plaster.
 - a. An additive option is to install expansion joints in the new plaster. This would not be historically accurate. This option is not included in the cost estimate.
 - b. An alternative approach is the installation of a custom fiberglass dome. The dome would arrive in panels and finished with plaster to conceal the seams. This option is not included in the cost estimate.
2. Move the conditioned envelope of the building so that it contains the wood roof and ceiling structure. This would allow the air around the wood structure to be conditioned in order to minimize expansion and contraction. The insulation plane should be moved to the underside of the roof and increased to R-49. For the purposes of a cost estimate, we have specified 4" of closed cell spray foam at the eaves for insulation and air sealing, and 12" of mineral wool insulation at the rafters, with venting. The best insulation strategy requires careful analysis and design, which has not been completed as part of this report. This preliminary recommendation should be studied further.
3. Add humidity control to the attic in order to fully realize the benefit of the insulation changes noted above.
4. Postpone the new mechanical system and supporting electrical work for the purpose of reducing initial project cost. This assumes that the structural repair work can proceed around the major pieces of HVAC equipment but it is likely that some ducts will have to be removed and replaced.

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PROJECTS BY BUILDING AREA		Proposed work	Urgency
Issue			
Roof and ceiling over the Dome Room (1815 structure)			
The Dome Room is unsafe for occupation due to movement in the ceiling structure and failing plaster finish.	1	A second path of egress should be re-established for the second floor offices. If the project described below cannot be executed immediately, consider the installation of a temporary protective ceiling below the dome to catch any plaster that falls and allow use of the room.	Immediate
	2	Execute the dome project as designed by TRW in 2023, with the following adjustments. The project documents define work including: structural repairs; interior finishes repairs; removal and reconstruction of chimneys; roof flashing repairs; attic insulation, replacement of the second floor air conditioning system, with added dehumidification and ventilation; replacement of the dry sprinkler system in the entire attic. - Structural repairs above the dome: No changes - Removal and reconstruction of chimneys: No changes - Roof and flashing repair: No changes - Interior finishes: The MA Historical Commission has agreed that repair of the plaster ceiling may not be financially feasible. Delete: Restoration and repair of the historic plaster ceiling. Add: Carefully document the historic plaster dome and painted details, as led by a Historic Preservation professional. Remove the plaster ceiling finish and wood lath. Install a new reinforced plaster ceiling with metal lath; this product may be an acrylic fiber reinforced plaster, a plaster with fiberglass mesh, or other reinforced product. Repaint the ceiling to mimic the historic painting. - Insulation: The insulation as proposed in the project documents does not meet Energy Code and does not locate the mechanical equipment within the conditioned space of the building. While Lenox uses the stretch energy code, which does not have prescriptive requirements, the attic insulation should be at least R-49. The best insulation strategy requires detailed design review, however for the purposes of planning, we recommend the following: Delete: 5 1/2" mineral wool installed within the new structural plane. Add: Install 4" closed cell spray foam insulation at the eaves for insulation and air sealing. Install 12" of mineral wool insulation (four 3" layers, R-48) at the rafters.	Immediate

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PROJECTS BY BUILDING AREA		Page 2
Issue	Proposed work	Urgency
Roof and ceiling over the Dome Room (1815 structure) <i>Continued</i>		
2 cont.	- Mechanical: Replacement of major equipment may be delayed as long as structural work can proceed around it. Delete: Replacement of major equipment, including the new ERV and new dehumidifier. Remove existing ductwork to allow room for the structural repairs and install new ductwork after completion of the structural work. - Electrical: The electrical work was solely to support mechanical equipment. Delete: All electrical scope. - Sprinkler: No changes	
Structural issues unrelated to the Dome Room ceiling were discovered in the attic area	3 Structural repairs as outlined in the GNCB Report (2020) Phase 2B: Structural Stabilization for components not related to the dome room ceiling (page 12-13).	Immediate
Crawlspace (1815 structure)		
Insulation has fallen from the joist space and wood structure has deteriorated.	4 Remove and dispose of old insulation at the ceiling joists.	Immediate
	5 Investigate the extend of decayed wood framing at the first floor structure. Repair any critical items.	Immediate
	6 Repair wood structure, as identified by the investigations (less critical items). The scope cannot be defined without further investigation. (See structural report, item #4)	1-5 years
green organic growth on the walls	7 Test and identify green organic growth on the wall . Treat with an appropriate chemical.	Immediate
Uninsulated space, poor energy efficiency	8 Install new insulation within the crawl space. This could be closed cell spray foam or mineral wool, and it could be at the walls (making the crawlspace part of the thermal envelope) or at the ceiling of the crawlspace. Each material and each location have advantages and disadvantages. The best insulation strategy requires detailed design review. Three potential paths include: 1. Install mineral wool insulation in a new framed wall along the existing masonry exterior wall. 2. Install spray foam insulation on the existing masonry exterior wall. 3. Install mineral wool insulation within the floor joists.	Long term

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PROJECTS BY BUILDING AREA		Page 3
Issue	Proposed work	Urgency
Crawlspce (1815 structure) <i>Continued</i>		
	8 For the purposes of planning, we recommend the following: Install mineral wool at the infilled cont. windows. Construct a pressure treated 2x6 wall on the interior of the foundation with a 2" gap. Install foil faced mineral wool within the framing cavity. Tape the edges on the foil side. This strategy is recommended at this time because it will have a minimal impact on the historic structure and allows for future mechanical improvements.	
Attic (1889 structure)		
Dry sprinkler system is in poor condition and may not operate correctly during a fire	9 Install new nitrogen-based dry sprinkler system within the attic area. Install secure catwalks to facilitate maintenance. Redistribute the existing cellulose insulation for even coverage. (Note - Scope overlap with the Dome Room project drawings)	Immediate
Basement (1889 structure)		
Uninsulated space, poor energy efficiency	10 Remove gypsum board wall covering at the perimeter walls, within the stacks and staff areas. Install foil faced mineral wool within the framing cavity. Tape the edges on the foil side. Seal joints with adjacent materials with spray foam insulation where needed.	Long term
Energy Efficiency & Air Sealing		
Significant air infiltration is likely due to the age of the building	11 Air seal the attic eaves with closed cell spray foam insulation. Use infrared imaging to identify additional areas of air infiltration and air seal the building. (Note - Scope overlap with the Dome Room Project drawings)	1-5 years

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EXTERIOR ENVELOPE		Page 4
Issue	Proposed work	Urgency
Exterior Masonry: Brick		
Northwest wall has diagonal cracks	12 Review crack movement monitors to determine if cracks are active (exterior and interior).	Immediate
	13 Based on crack monitor results: If active, repair prior to roof structure alterations. See structural report for scope.	1-5 years
Chimneys have spalling brick and mortar is in poor condition	14 At a minimum repoint all loose brick. Based on the previous (TRW) study remove and reconstruct 6 chimneys from below the roof line. Refer to 2023 TRW drawings and specifications.	Immediate
Brick walls have spalling brick and mortar is in poor condition	15 Restore deteriorated areas where brick is loose, mortar is compromised, brick faces are fractured or chipped. Brick must be compatible in color, size, hardness. Mortar must be compatible for strength and mixture, lime-based mortar is probable.	1-5 years
	16 Clean stained areas with least aggressive application of water mild detergent, etc. following the "Secretary of the Interior's" recommendations.	1-5 years
	17 Investigate potential sealers to protect the brick faces and apply sealer if deemed to protect brick from further degradation.	Long term
	18 Consider painting the brick to restore its historic articulation. New paint should be formulated specifically for masonry application allowing for vapor permeability.	Long term
Exterior Masonry: Marble foundation, window sills and lintels, and door lintels		
Marble has staining, penetrations, and cracks	19 Seal all penetrations left from utility and other lines through walls.	Immediate
	20 Caulk seal all joints around windows, vents, pipes, trim and doors.	Immediate
	21 Restore deteriorated areas where mortar is compromised. Mortar must be compatible for strength and mixture (lime-based mortar).	1-5 years
	22 Clean stained areas with least aggressive application of water mild detergent, etc. following the "Secretary of the Interior's" recommendations.	1-5 years
	23 Investigate potential sealers to protect the stone faces and apply sealer if deemed to protect brick from further degradation.	Long term
Exterior Wood Trim		
Wood trim at windows, columns, pediments, etc. has deteriorated wood and chipping paint	24 Restore areas as part of the ongoing maintenance and painting process.	1-5 years
	25 Set a schedule for painting all building trim on a reoccurring basis. Painting shall include proper caulking and sealing of all wood to wood joints and wood to masonry joints.	1-5 years

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EXTERIOR ENVELOPE		Proposed work	Urgency
Issue			
Roofing			
Roof is in good condition, but needs a regular and proactive maintenance plan			
	26	Engage a trusted roofing contractor to inspect the roof every 1-2 years to identify roof conditions.	1-5 years
	27	Copper: Maintain and monitor flashing. Reflash where chimneys are rebuilt with copper flashing. Reflash at any areas exhibiting leaking as part of standard building maintenance.	1-5 years
	28	Kynar finished standing seam – Reflash at any areas exhibiting leaking as part of standard building maintenance.	1-5 years
	29	Membrane – Monitor and replace at the end of its useful life. Current age appears to be at least 22 years. (located on the south side of the connector near the Sedgwick entrance)	1-5 years
Exterior Doors			
The building does not have a security system and monitoring all of the doors is challenging due to the building layout			
	30	At each door: Add a camera, add opening alert tied to the circulation desk, add electronic locking hardware tied to the circulation desk	Immediate
Front façade entry door			
	31	- Door slab: Scrape, clean, prep and paint - Sills: Replace the sill with sloped exterior to minimize tripping hazard - Trim: Scrape, clean, prep and repaint all. Replace hinges on the book return side panel. Repair sidelight glazing for smooth finish. - Hardware: Adjust, install new closer - Weatherstripping: Provide new weatherstripping around door and between door meeting jambs - Weather protection: N/A - Door is protected by the portico	1-5 years
North façade entry door (accessible)			
	32	- Door slab: Scrape, clean, prep and paint - Sills: Clean - Trim: Scrape, clean, prep and repaint all - Hardware: Adjust - Weatherstripping: Adjust as required - Weather protection: Door and landing would benefit from a covered roof (as would the ramp)	1-5 years

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EXTERIOR ENVELOPE		Page 6	
Issue	Proposed work	Urgency	
<i>Exterior Doors Continued</i>			
Sedgwick Hall entry door	33 - Door slab: Remove doors and rebuild to repair open joints, cracks, and all decay, scrape, clean, prep and paint - Sills: Refinish - Trim: Replace or repair all decayed trim (primarily at the bottom), scrape, clean, prep and repaint all - Hardware: Adjust - Weatherstripping: Provide new weatherstripping around door and between door meeting jambs - Weather protection: N/A - Door is protected by the portico	Immediate	
North façade first level egress door	34 - Door slab: Replace door and frame with new panel door, prep and paint - Sills: New sill - Trim: New trim - Hardware: New hardware - Weatherstripping: Provide new weatherstripping around door and between door meeting jambs - Weather protection: Rebuild stoop, stair and landing with a roof for weather protection	1-5 years	
North façade basement level egress door	35 - Door slab: Replace door and frame with new panel door, prep and paint - Sills: New sill - Trim: New trim - Hardware: New hardware - Weatherstripping: Provide new weatherstripping around door and between door meeting jambs - Weather protection: Build a roof for weather protection	1-5 years	

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EXTERIOR ENVELOPE		Page 7	
Issue	Proposed work	Urgency	
Exterior Doors <i>Continued</i>			
East façade egress door	36 - Door slab: Clean, prep and paint - Sills: No work - Trim: Clean, prep and repaint all - Hardware: Adjust - Weatherstripping: Adjust - Weather protection: No work	1-5 years	
Exterior Windows			
Window Maintenance	37 Sashes, trim, slides, glass to be maintained. Glass to be replaced where cracked or broken. Glazing putty to be monitored and treated where deteriorated and as part of a maintenance schedule for repainting.	1-5 years	
Door and windows at room 113 are not historically compatible	38 Window and door system at Room 113 to be replaced with appropriate window system compatible with the historic building.	1-5 years	
Window at director's office is leaky	39 Install new interior or exterior storm window	1-5 years	
Metal fire shutters have chipping paint	40 Prep and paint.	1-5 years	
The metal fire shutter near stair F is dented & rusted	41 Remove the fire shutter & repair the newly exposed brick as needed.	1-5 years	
Exterior Stairs			
Stair F is in poor condition	42 Demolish existing stair and construction new stair. New platform shall be set level with the interior floor. New handrails shall meet MAAB dimensional requirements.	Immediate	
Stair E requires cleaning	43 Clean and maintain with pressure wash and detergent to remove any plant growth.	1-5 years	

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SITE WORK		Page 8	
Issue	Proposed work	Urgency	
There is no documentation of existing exterior drainage systems and moisture is an issue in the basement	44 Scope and trace existing perimeter footing drains and roof leader drains to confirm they are separate systems and are not damaged or blocked. Check drop inlets and piping for free flow of water, confirm ability to clean out pipes and remove sediment as possible.	Immediate	
Asphalt at the base of the ramp is uneven and cracking	45 Remove asphalt at the base of the ramp and install new asphalt.	Immediate	
The drainage grate is higher than the surrounding asphalt	46 Reset all drop inlets to sit depressed from surrounding grades.	Immediate	
Vegetation is growing in window wells	47 Clean out window wells.	Immediate	
The two lamp posts at the front of the building are tilted	48 Adjust posts or install new concrete lamp post base.	Immediate	
The landscaping slopes towards the building in some areas	49 Reset all grades near the building to slope away from the building for a distance of 10 feet.	1-5 years	
Wood ramp requires regular maintenance	50 Existing wood decking and painted railing to be maintained.	1-5 years	
Some roof leaders are not tied to the drainage system	51 Tie roof leaders to existing below grade drainage system where they are not currently directly piped.	1-5 years	
Exposed mechanical equipment is aesthetically unpleasing	52 Install evergreen vegetation at the east side to screen mechanical equipment.	1-5 years	
Improved drainage and historically sensitive entry	53 Comprehensive re-grading and hardscaping project to slope grades away from the building. Remove the existing entry ramp and stairs at the north and install a landscaped path that brings visitors to the north entry. Set the path slope at less than 1:20 so no handrails will be required.	Long term	
Lighting is not dark sky compliant	54 Develop a long range plan for exterior lighting that meets the requirements for 'Dark Sky' and implement that plan whenever changes are made to the building exterior lighting.	Long term	

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INTERIOR FINISHES		Proposed work		Page 9
Issue			Urgency	
Minor finishes repairs: These are small projects that are relatively affordable and have immediate impact. Many of them can be completed by in-house maintenance staff, OR they are code requirements, and are therefore recommended for immediate execution.	55	Document and observe the crack in the second floor wall in the 1815 Dome Room outside Office 205. (See structural report, summary item #3.) If no additional movement is documented, repair the crack (1-5 years)	Immediate	
	56	Investigate the cause of the wall cracks near the toilet in room 117 and 213. It is suspected that the wall carriers need repairs or replacement. Investigate the other wall hung toilets to ensure they do not have a similar issue.	Immediate	
	57	Paint any unfinished wall patches.	Immediate	
	58	Install a new sheet good floor in Kitchenette 118, Hall 119B, and Storage 120 over the painted plywood.	Immediate	
	59	Sand the wood threshold between rooms 102 and 128 to no more than 1/2" in height, with chamfered edges. Adjust the closer at this door, as it appears to be loose.	Immediate	
	60	Remove the finish floor between rooms 108 and 123 to investigate a potential structural issue. Repair the floor structure and reinstall flooring.	Immediate	
	61	Adjust the sprinkler head covers that are loose or misaligned throughout the finished spaces.	Immediate	
	62	Clean up or cover spray foam insulation under the sink in the Craft Room.	Immediate	
	63	Install a new supply air grill at Office (103) to divert the air.	Immediate	
	64	Relocate supplies and shelving around the electrical panel in Custodial closet (112) to provide clear access to the panel.	Immediate	
	65	Install new grout at the bathroom floor tiles where cracks have formed (001 & 002). Install code required grab bars.	Immediate	
	66	Provide handrails at the short stair in Hall 005.	Immediate	
	67	Stored items in Halls 005, 005A, and 007 and the mechanical crawlspaces present a potential hazard for egress during an emergency. We recommend an organization and decluttering project to improve egress safety.	Immediate	
	68	Replace sections of plywood panels with holes in the compact shelving area (008)	Immediate	
	69	Remove the closer and rated label on the door to the mechanical space 008A, with the consent of the local code official. We do not believe this door is required to be rated, but propping open a fire rated door is a code violation.	Immediate	
	70	Fire caulk any holes or penetrations at Stair D.	Immediate	

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INTERIOR FINISHES		Proposed work	Urgency
Issue			Page 10
Mortar deterioration / regular maintenance	71	Mortar repointing with the crawlspace portion of the basement and the cavity wall area at the perimeter of the basement level stacks. Execute this work prior to or in conjunction with an insulation project.	1-5 years
Floors are showing signs of wear	72	Lightly sand and refinish the hardwood floors throughout the building.	1-5 years
Cracks in concrete floor and removed vinyl baseboard	73	Install sheet flooring over the concrete floor in the basement stacks area. Install 4" vinyl baseboard in all non-mechanical areas.	1-5 years
Expected wear and tear on walls and millwork	74	Start a cycle of interior painting where 20% of the interior spaces are painted each year. This work should include plaster repair, caulk at separated joints including beadboard wainscoting, and removal of any chipping paint prior to repainting. We recommend prioritizing the oval dome, which has visible cracks.	1-5 years
Damaged and stained acoustic ceiling tile	75	Remove any stained or damaged acoustic ceiling tile (typically within bathrooms) and replace it with a matching product.	1-5 years
Marks and damage to the wall covering in the Welles Gallery	76	Remove the wall covering in the Welles Gallery and install new wall covering.	1-5 years
Expected wear and tear on doors	77	Execute a door refurbishment project, including repairs, repainting, and replacement of any aged hardware. Confirm if the glass at the Craft Room door is safety glass.	1-5 years
Expected wear and tear on staff room finishes	78	Minor renovation of the staff break room, including new ceiling tiles, flooring, lighting, and cabinets.	1-5 years
Aged partitions within room 217	79	Replace the partitions in room 217 due to age and appearance. Consider egress safety when designing the new layout.	1-5 years
Periodic radon testing is recommended practice	80	Test for radon every 2 years, in alternate seasons. Alternatively, there are many bluetooth or wireless air quality monitors available for continuous monitoring.	1-5 years
Hazardous materials may be present and may be disturbed with planned renovations	81	Consult and expert and conduct hazardous material testing with each project that disturbs existing materials.	Long term

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MECHANICAL & PLUMBING SYSTEMS			Page 1
Issue	Proposed work	Urgency	
Code compliance issues: Boiler exhaust breaching and water heater exhaust breaching are connected. Combustion air supply is blocked to prevent freezing (See MEP report)	82 The water heater exhaust breaching should be disconnected from the boiler exhaust breaching as they are not compatible appliances. The water heater exhaust breaching should be piped separately to the building exterior based on the water heater manufacturer's requirements. Alternative: Install a new electric heat pump water heater, which will not require breaching. Cost estimate will include this option.	Immediate	
	83 To prevent the boiler room from dropping in temperature due to cold air from combustion air inlet vent, the ducts should be replaced with a combustion air fan. This fan would operate when the boiler or water heater are operating, and would mix cold outside air with room air to temper the airstream. Alternatively, it may be directly ducted.	Immediate	
	84 Install carbon monoxide detectors in the boiler room to alert building occupants in the event of flue vent spillage.	Immediate	
	85 Replace hot water pumps with a variable speed electronically communicated motor.	Immediate	
	88 Assess all valves in the heating system for repair or replacement.	Immediate	
The heating system does not have effective distribution, resulting in some spaces that are too hot and others that are too cold	89 Adjust the zoning and thermostat locations to ensure efficient operation.	Immediate	
	90 The settings of the boiler controller should be reviewed by the Library's heating contractor to confirm proper operation and implement hot water reset control to save energy.	Immediate	
Maximize efficiency with controls	91 The controls contractor CTC Inc should provide training on controls upgrades provided in 2020 to ensure proper operation.	Immediate	
Humid air in the basement crawlspace	92 Install several dehumidifiers with drains within the crawlspace for humidity control.	Immediate	
Elevator fan appears to be always running	93 Assess the controls for the elevator fan to ensure it is operating correctly.	Immediate	
Energy efficiency improvements for the existing mechanical equipment	94 Replace boiler with high efficiency boiler & lower water set point, at the end of the existing equipment's useful life.	1-5 years	
	95 Replace air handler with one with a variable speed fan and pressure sensor, at the end of the existing equipment's useful life.	1-5 years	

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MECHANICAL & PLUMBING SYSTEMS			Page 12
Issue	Proposed work	Urgency	
Reduction in fossil fuel use	96 Install new air-source heat pump heating and cooling throughout the building. This work can be accomplished in multiple phases. Assume four ducted systems with backup heating coils, ventilation, and humidity control in the following locations: (1) supplying the second floor of the 1815 building and 1854 east ell addition via attic spaces, (2) supplying the Sedgwick Hall second floor via attic spaces; (3) supplying the main level within the 1815 structure from the basement crawl space; (4) supplying the main level and basement level of Sedgwick Hall via the basement perimeter cavity space*. Remove existing mini-split systems as new systems are installed. Evaluate the size of the electrical service to ensure it can handle the demand. Assume the gas-fired boiler will remain as a backup heat source. *Note: This work should be executed in conjunction with the basement insulation project described elsewhere. Note: If the library decides not to pursue a conversion to heat pumps, mechanical ventilation should be added with new air-to-air heat exchangers. Currently ventilation is only supplied in the basement stacks area. (Not to be included in the cost estimate.)	Long term	
Exposed heat pump conduit impacts the façade	97 Relocate heat pump conduits surface mounted on the east and south side of the building to be run within the building in concealed spaces.	Long term	

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ELECTRICAL SYSTEMS		Proposed work		Page 13
Issue			Urgency	
Circuits are not labeled	98	Circuit tracing and relabeling of existing circuits.	Immediate	
	99	Conduct an arc flash and short circuit coordination study.	Immediate	
Arc flash certification is required by code	100	Replace basement receptacles with GFCI devices or circuits	1-5 years	
	101	Replace public area receptacles with tamper-resistant devices.	1-5 years	
There are inadequate receptacles in the data room	102	Provide additional circuits and receptables in the data room to support existing equipment.	1-5 years	
Improvement in energy efficiency for lighting	103	Replace light bulbs with LED light bulbs. Prioritize refurbishment of the integral stacks lights in room 210.	1-5 years	
The lightning protection system does not meet current standards.	104	Provide an enhanced lightning protection system with more roof points, down leads, and ground rods.	Long term	
There is no security system	105	Install a new security system with door access points and cameras. Assume a wireless system to reduce installation costs.	Long term	
Crawlspace and storage areas are dimly lit	106	Install new utility lighting throughout the crawlspace and basement storage areas.	Long term	