Palatine Public Library District
Main Library
2022 Capital Maintenance Plan

As Approved
Updated with Allowances for Water Infiltration
May 31, 2022

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The primary product of this study is an active workbook. This report is a simplified set of filtered data to summarize findings, frame major conclusions and illustrate the ways in which the workbook can be used to plan for care of the facility.

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Process, General Context, & Limitations

Process

The Palatine Public Library commissioned this study to

- Better understand the condition of the building,
- Prioritize needed repairs or replacements,
- Coordinate capital maintenance projects with service-based improvements to the building and
- Identify appropriate funding levels to replace those building systems or components using designated reserve funds.

A multi-step process was used to address these goals.

- In preparation for the systems evaluations, we reviewed the available documentation provided by the Library. This consisted of the 2016 Capital Repairs Study, updates to that study, and documents form the renovation project.
- Next, we convened a group of engineers and architects familiar with library building systems for a one-day walk-through of the facility. Consulting engineers were engaged for the mechanical and electrical engineering assessment as well as civil/site elements. As part of this session, we met with building maintenance personnel and management staff to identify areas of known or suspected issues related to building performance.
- The results of these conversations and the walk-through became the basis for development of specific life-expectancy and replacement cost schedules included in the workbook.
    - General notes relating to abnormal wear or deterioration in the condition of the components were included for each line.
    - Each component or system occurs once in the tracking file. This is typically not an issue with long-lived systems or components. Shorter-lived components or parts are typically not considered a capital expense. For systems that fall in between, painting as an example (with a lifespan of 3 to 5 years) are tallied at their first occurrence only. Depending on the timing and nature of the action taken at that first occurrence, the interval to the next scheduled action could vary. Maintenance efforts and fiscal planning requires keeping the workbook current.
    - A snapshot of a representative section of the workbook is shown at the end of this section.
- These schedules were constructed from established industry standards, consultation with system or component vendors/suppliers, and our individual experience.
- Any discernable violations of life safety, plumbing, mechanical or electrical codes were identified to the Library. This does not constitute a whole building code review or accessibility review.
- Building systems that appear to warrant more intensive investigation or inspection are identified in this report.
- Furnishings and Information technology systems were not be included in the evaluation.
- The replacement schedules were submitted to the Library in draft form for review and comment. A final version included modifications as the Library deemed appropriate.

This narrative summarizes the findings.

Context

This Capital Maintenance Plan is one element of a comprehensive evaluation and planning process necessary to maintain the facility in proper condition and tuned to the service needs of the community. Major maintenance and renewal/replacement are part of a series of maintenance programs and budgets associated with long term stewardship of the facility. A full range of building related maintenance programs consists of:

- Custodial Care: Day to day periodic cleaning, painting and replacement of disposable supplies to keep the facility in safe, clean and orderly condition. Such efforts, while essential to the smooth operation and long-term care of the facility are not part of this study and are addressed by other means by the Library.

- Preventative Maintenance: Regularly scheduled activities that carry out the diagnostic and corrective actions necessary to prevent premature failure or maximize or extend the useful life of a facility or its components. This includes a program of inspection, servicing, testing and replacement of systems and components that is cost effective on a life-cycle basis. Annual service agreements and testing regimens are not included in the study.

- Major Maintenance: Larger repair or rehabilitation efforts to protect the building and correct building code deficiencies. Major Maintenance is differentiated from Capital Repairs by the scale of the repair or replacement. Major Maintenance consists of activities less than $10,000 in aggregate expense or with product life cycles less than 10 years.

- Capital Repair or Replacement: Scheduled and anticipated systematic upgrading of a system or component to a renewed functioning standard.

Unlike most plans, this is not a static document. The chief product of this study is a series of interconnected detailed schedules provided as an excel workbook for the Library's use. The schedules include opinions of both anticipated repair or replacement dates and probable cost. Entries related to condition are the result of the observations made by the review team and are an overview of wear at the time of the observation. Each item requires ongoing monitoring to assess the impact of continued building use, maintenance procedures, exposure and other factors that will influence the longevity of products and assemblies.

Within the workbook, Major Maintenance is differentiated from Capital Repairs by the scale of the repair or replacement. Capital Repairs consists of items greater than $10,000 in aggregate expense or with product life cycles greater than 10 years. Because the schedule offers a finer level of differentiation than most studies, many of the individual items by their extent will fall below the "Capital Repair" threshold. Aggregation of the individual items into likely groups shifts the activity into the capital category. As an example, resealing the perimeter of a window is a small expense. Resealing all the soft joints on a building is a major endeavor and has a capital scale cost.

In the course of development, the schedule has evolved to include a number of items that the library may deem to be more appropriately scheduled as preventative maintenance or custodial care (painting is an example). In the interest of being inclusive, such items are included in the schedule and can be reassigned as appropriate to the library's management and budgeting model.

Other items may be deemed to be facility renewal to keep the building effective in its ability to support modern library service (upgrades to power and data networks and furnishings systems are an example).

Prioritization

A second layer of definition is added to each evaluation. Items are designated for repair or replacement based on a priority basis:

- Priority 1: Life Safety or Building Code. Repairs or replacements are needed to meet the requirements of applicable code codes.

- Priority 2: Building Enclosure. Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.

- Priority 3: Building Systems. Functionality is at risk. This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

  This group is divided into multiple subsets:

  3H relates to the ongoing replacement of heat pumps though out the building. This is a current need and is significant to maintaining the comfort of occupants.

  Priority 3 are repairs that should be made on schedule because they protect the integrity of the building systems. This includes items that are not part of 3H, or anticipated projects to:

  - Priority 3L Finishing the first floor renovations at the south entry **lobby** to the building;

  - Priority 3M Updating finishes and other items in the **Meeting Room**, adjacent spaces, Friend's Room and connecting corridor;

  - Priority 3.S Updates to outdated and or low use **staff spaces** on the 2nd floor, primarily the staff lounge (outdated) and locker room (under used).

  - Priority 3A Improving the **acoustics** in the board room.

- Priority 4: Obsolescence. This is wear to the point that the item or system in question is diminishing the effectiveness of the building but has not yet become a safety or code issue.

The priority rating for an item is not static. Carpet, as an example, can move from priority 4 because of its worn look, to priority 1 because the edges have deteriorated to the point where repairs can no longer prevent edges from becoming a tripping hazard.

It is important to note that a priority 1 item scheduled for repairs in 2030 is not a life safety or code related issue until the it wears past the condition predicted for 2030.

Notes Related to the Covid-19 Pandemic

Because this study is premised on a "replace in kind" repair or replacement approach, it does not consider changes the Library may want to consider in response to the on-going COVID-19 pandemic. Some of the building systems or materials may in some instances fall short of improvements or changes needed within the building to be better able to respond to similar public health crises.

Systematic evaluation of ventilation, indoor air quality, pathogen resistant or maintenance-friendly materials and cleaning processes is appropriate as part of any projects that develop from this study. Determining any changes in the Library's expectations and obligations with respect to occupant comfort and health and the ability of existing systems or materials to meet those standards can shift the focus of those projects from replacement to enhancement. If such shifts are deemed necessary, budgets will need to be adjusted based on those decisions.

Given the extent to which the current crisis has impacted society at large (as well as library service) and the advice of public health officials citing the importance of ventilation, physical separation, and aggressive cleaning in mitigating the spread and impact of various pathogens, we recommend that the Library contemplate allocating funds above those recommended in this study until such time as a more detailed assessment of the COVID-related aspects of the general layout, staff and public seating arrangements, indoor air distribution / quality and materials can be addressed.

Fit within Service Evaluations and Strategic Planning

The projected costs are based on the current service models and delivery methodology. These are aspects of the building other than general wear and particular use that need to be considered in order to assure that the building is supporting the library's efforts in serving the community. Repairs or replacements are typically one for one unless there has been a service or other paradigm described that suggests a different approach is required. An example is the replacement of large fixed service desks with smaller, more interactive staff/public service points. This report does not replace a Strategic Plan, Facilities Plan, or Space/Needs Assessment. Aesthetic quality, fit with programmatic requirements, and comparisons with other facilities in the Library's peer group are outside the scope of this study.

Code Violations

The handicap painted parking spaces in the drop-off lane are non-compliant. Parking spaces in this configuration should be at least 13 feet wide. See the section on paving for suggested remedies.

Limitations

The appended schedules include opinions of both anticipated repair or replacement dates and probable cost. All costs have a subjective component and require ongoing monitoring to assess the impact of continued building use, maintenance procedures, weather and other factors that will influence the longevity of products and assemblies.

All costs and anticipated budgets are based on 2021Q4 data and escalated at a rate of 3% per annum. Cost data is assembled from Library records, industry standards and current construction cost review by local construction and construction management firms. Unit costs include allowances for installation, removal of existing components or material, preparation of substrates, overhead and labor expenses (such as prevailing wage rates) associated with public sector projects, engineering or architectural design costs, permitting and other "ancillary" expenses. With these components added to the basic cost of the material, many unit costs will appear to be higher than many observers might expect. This is intentional.

Within this framework, it is important to remember that:

- No unit cost can anticipate all of the circumstances associated with procuring a specific repair or replacement.
- Many decisions regarding material selection, system development and project parameters have yet to be defined.
- Market conditions, as always, are beyond the control of the architect or estimator and will vary over time.

Thus, no guarantee can be given nor inferred that costs will not vary from these schedules. In order to ensure conformance with projected costs it is imperative that additional estimates are prepared, or specific proposals sought from potential vendors or contractors as the projected replacement or repair date nears.

Finally, the Library should review projected replacement dates based on both condition and reasonable financial planning parameters. Structuring repairs and replacements to coincide with major strategic planning initiatives, building renovations or replacements and revenue streams will maximize the community's return on its investment.

The Planning Context

While the context described in the previous section normally suffices, the age, character, and arrangement of the existing building and many of its more fixed components is more intertwined with the evaluation process than in a typical building. While it is not the purpose of a Capital Maintenance Plan to address space effectiveness or define space needs, a number of observations are offered here to help the library consider the timing, nature and extent of any investment in maintaining the physical condition of the building so that it does not inadvertently invest in an repair or replacement that is counter to desired or needed changes to the current underlying operations/service model.

2020 Projects

- Many building issues were addressed by a series of improvements including a renovation project that addressed many of the aging finishes and lighting systems in public spaces on the first and second floors, provided a more convenient accessible entry closer to accessible parking spaces, and reorganized the public spaces to provide more utility and improved acoustics.
- Other building issues were addressed by separate library projects to address
    - Masonry joints;
    - Lighting in many staff areas;
    - Lighting on the parking levels of the building;
    - Painting of staff areas, parking levels and exterior railings;
    - Heat pump replacements;
    - Removal of vines growing on retaining walls adjacent to the parking levels of the building; and
    - Repair of concrete slab at the upper parking level.

Even with these efforts, there are portions of the existing building that are still in need of repair or replacement including:

- Completion of updates to public spaces in the building including
    - Vestibule, lobby, copy center, and elevator finishes at the south entry to the building;
    - Acoustics in the Board Room;
    - Meeting Room suite finishes
- Replacement of deteriorating flooring in staff spaces.

Additionally there are underutilized spaces on the second floor of the building that could be used to address overcrowded or oddly placed staff functions that limit staff effectiveness.

Water at Electrical Switchgear

On Thursday, February 3, 2022 the library identified an active water infiltration at the main electrical feed conduit entrance to the building. The condition was discussed with the building committee later that same afternoon, with primary concerns being immediate safety and understanding the scope required for major repairs. In review with engineers familiar with the systems and the building, and in library discussions with the utility, it was determined that water being in the conduit is not an immediate risk. Water infiltration

in conduits of this type of installation is a fairly common phenomenon. The way the conduit stubs up from below at the switchboard is intentionally designed to offset the primary risks of water through the conduit. In short, any infiltration will spill over the top onto the floor, as opposed to dripping down onto switchboard bus (if the conduit feed were to be overhead.) Further, the wire insulation is protective to wire itself. The main safety issue is monitoring and verifying the integrity of the switchboard.

While the existence of water in underground conduits is "normal", the sudden appearance and/or increase of water in the conduit is a concern. Some investigation should be made to determine what is causing the change in amount of water. The path from the transformer to the switchboard runs underneath an area well into the upper level parking, where the switchboard is located. The area well is flanked by receiving dock ramp to the south and parking garage access to the north.

As water has infiltrated the conduit, it can be assumed that the conduit is compromised. As stated above, minor infiltration is not a major cause for concern. Whether this is a recent compromise event or has been compromised for a longer period is unclear. Scoping the existing conduit is not feasible. This would require pulling all the wires and risk major damage at major cost with little benefit to the library.

The amount of observed water is excessive for general groundwater infiltration into the conduit. While it is possible the conduit has recently become damaged, it is likely the conduit has been compromised for some time, but an adjacent drain pipe has also become compromised. This would better explain the amount of water suddenly coming through the conduit during a snowmelt event.

- Recommendations to scope existing drain line(s) in the area well have been followed. No discernable breach in a drain line has been found. Another line is in the area and is yet to be scoped.
- Another recommendation to observe conditions for 4-6 weeks is in progress. If the amount of water remains constant or increases, then the issue is more severe. If it tapers off or ebbs and flows with weather conditions, the condition is less an immediate concern. If a pipe break is discovered, correcting this issue could short term resolve the issue with the conduit. i.e. the amount of water infiltration will return to a negligible quantity.

If the amount of water does not recede, and/or pipe scoping and repair does not remedy the issue, we can then conclude that the integrity of the conduit is damaged to an extent that requires repair.

The existing switchgear is about 30 years old, and expected lifespan is about 40 years. Further, it uses 2 feeds/mains to distinguish electric heat from the rest of the building. This is an outdated approach and could be a more efficient design based on current best practices. If the compromised conduit needs to be addressed, switchboard replacement may make long-term sense and do a complete redesign of the building feed. This exercise could also evaluate installing a parallel system to minimize downtime to the facility in lieu of extended use of a generator. Overall, the approach would need to be fully evaluated by the design team for the best, long term approach to remedy the issue.

An assumed scope to pull the 10 sets of feed wiring, new conduit and replace switchboard and reconnect existing branch loads is a budget cost of $350,000 to $500,000. Design would work to avoid affecting the chiller and find an alternate path for the feed to help mitigate costs.

These costs are not included. We recommend completing the observation process and determining a course of action thereafter.

Sample Worksheet

The primary product of this study is an active workbook. Because the workbook is an active file, it provides the Library with a "living document" that can be kept current as repairs are made and used for future planning. This report presents a set of filtered data to summarize major conclusions and illustrate the ways in which the workbook can be used to assess the building and plan for future investments. The excerpt on this page and the next are offered to illustrate the level of detail in the "living document."

Capital Maintenance Plan | Palatine Public Library

Palatine Public Library
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Clear | Top | End

Filter CR by Year: 2022 | 2023 | 2024 | 2025 | 2026 | 2022-2026 | 2027-2031 | 2032-2036
Filter by Priority: 1 | 2 | 2S/E | 3 | 3HP | 3A | 3L | 3M | 3S | 4

KEY:		
CR	Capital Repair	
M	Major	
1	Life Safety, Code	1
2	Building Enclosure	2
2S/E	West Site/Elec	2S/E
3	System Integrity	3
3A	Acoustics	3A
3L	Lobby Entry	3L
3M	Meeting Rooms	3M
3S	Staff Lounge	3L
3HP	Heat Pumps	3HP
4	General Obsolescence	4

ZONES

Envelope | Masonry | Ext Windows | Roof | Elevator | Finishes
Roof | Fire | Plumbing | HVAC & Heat | Electrical | Security
Public-2nd Flr | Parking Structure | Parking - Surface
Public-1st Flr
Staff-2nd Flr
Staff-2nd Flr, Admin
Staff-1st Flr
Parking-LL
Parking-UL
Parking-Surface
FP P HVAC E
Site
Restrooms
Stair
Storage
Common

BUILDING YEAR KEY, Column F:

1992	Original Building
2009	Renovation
2013	Renovation
2021	Renovation
-	Future
-	Future
-	Future
-	Future
-	Future

2005 — Repaired, replaced, or remodeled since Original Construction

-1 — Number of years to replacement date

2022 — Compared to normal predicted wear,
System is Better
System is Normal
System is Wearing
System is Used Up

Ref	Key Sort Criteria		Location & Category						Product Data/Life Expectancy				Evaluated Cond	
1	2	3	4	5	6	7	8	9	10	15	16	17	18	19	20
0	Budget Integrity	Priority	Zone	Room Number or Area / Zone	Building Year	CSI#	System	System Location	Component	Installed Date	Planned Service Life	Replace Year - Theory	Remaining Life - Theory	Evaluation Year	Condition
1	CR	2	Parking-UL	Scattered	1992	03	Concrete	Drive Lanes	Reseal Concrete Traffic Zones - spot repair	2021	5	2026	4	2022	Normal
2	CR	2	Parking-LL	Whole Building	1992	03	Concrete		Reseal Concrete Traffic Zones - Drive Lanes	2005	10	2015	-7	2022	Better
3	CR	2	Parking-LL	Whole Building	1992	03	Concrete		Reseal Concrete Traffic Zones - spot repair	2005	5	2010	-12	2022	Used Up
4	CR	2	Parking-UL	Scattered	1992	03	Concrete	Parking	Reseal Concrete Traffic Zones - Drive Lanes	2021	10	2031	9	2022	Normal
5	M	2	Envelope	Scattered	1992	04	Masonry		Brick - clean and repoint	1992	25	2017	-5	2022	Used Up
6	M	2	Envelope	Garage	1992	04	Masonry		Brick - clean and repoint	1992	25	2017	-5	2022	Used Up
7	M	2	Envelope	Scattered	1992	04	Masonry		Brick - clean and repoint	1992	25	2017	-5	2022	Used Up
8	M	2	Envelope	Scattered	1992	04	Masonry		Brick - clean and repoint	1992	25	2017	-5	2022	Used Up
9	M	2	Envelope	Scattered	1992	04	Masonry		Stone & Brick - reseal joints	1992	20	2012	-10	2022	Used Up
10	M	2	Envelope	Whole Building	1992	04	Masonry		Stone & Brick - reseal joints	1992	20	2012	-10	2022	Used Up
11	M	2	Envelope	Scattered	1992	04	Masonry		Stone - stabilize	1992	25	2017	-5	2022	Used Up
12	M	2	Envelope	Scattered	1992	04	Masonry		Stone - stabilize	1992	25	2017	-5	2022	Better
13	M	2	Envelope	Scattered	1992	04	Masonry		Stone - stabilize	1992	25	2017	-5	2022	Better
14	M	2	Envelope	Scattered	1992	04	Masonry		Stone - stabilize	1992	25	2017	-5	2022	Better
15	M	2	Envelope	Pump Room	1992	04	Masonry		Stone - stabilize	1992	25	2017	-5	2022	Better
16	M	2	Envelope	Mechanical/ Storage	1992	04	Masonry		Stone & Brick - reseal joints	2019	20	2039	17	2022	Normal
17	M	2	Envelope	Scattered	1992	04	Masonry		Stone & Brick - reseal joints	2020	20	2040	18	2022	Normal
18	M	3	Site	Scattered	1992	05	Metals		Railings - repaint	2019	10	2029	7	2022	Normal

	2022						2022	2022	2022		
↓		######					$ 12,123,136	$ 12,119,642	#########		M Project Num
Evaluated =											
Evaluated ≠							Approximate cost in Evaluation Year	Approximate cost in a particular year by entering year above.			
than normal											
, matching predicted wear											
faster than normal											
and needs replacing											
	2022								3A	Acoustics related work (3.1-A)	
	2024								3L	Lobby/Entry related work (3.1-L)	
	2025								3M	Meeting Rm related work (3.1-M)	
	2023								3S	Staff Lounge/Locker related work (3.1-S)	

tion	Opinion of Estimated Cost Data										Comments
21	25	26	27	28	29	30	31	32	5 33		34
Remain'g Life - Evaluated	Budget Year - Plan	Qty	Units	Pro Ration	Base Unit Cost	Purchase Price	Adjusted Installed Cost	Adjusted Cost Selected Year (enter above)	Escalated Cost at Budget Year - Plan		
4	2026	1,000	SF	100%	$ 9	$ 9,000	$ 10,440	$ 10,440	$ 11,800	PPLD	12/21 Western Specialties completed concrete repairs and traffic coating.
5	2027	44,111	SF	100%	$ 2	$ 88,222	$ 102,338	$ 102,338	$ 118,600	PPLD	
-12	2030	1,000	SF	100%	$ 9	$ 9,000	$ 10,440	$ 10,400	$ 13,200	PPLD	
9	2031	38,228	SF	100%	$ 2	$ 76,456	$ 88,689	$ 88,689	$ 115,700	PPLD	12/21 Western Specialties completed concrete repairs and traffic coating.
-5	2022	3,493	SF	5%	$ 14	$ 2,445	$ 2,836	$ 2,800	$ 2,800		
-5	2022	4,316	SF	5%	$ 14	$ 3,021	$ 3,505	$ 3,500	$ 3,500		
-5	2022	2,526	SF	5%	$ 14	$ 1,768	$ 2,051	$ 2,100	$ 2,100		
-5	2022	4,804	SF	5%	$ 14	$ 3,363	$ 3,901	$ 3,900	$ 3,900		
-10	2022	857	SF	75%	$ 5	$ 2,892	$ 3,355	$ 3,400	$ 3,400	PPLD	Holton Bros. tuckpointing East elevation 09/19
-10	2022	554	SF	75%	$ 5	$ 1,870	$ 2,169	$ 2,200	$ 2,200	PPLD	Holton Bros. tuckpointing East elevation 09/19
-5	2022	1,400	SF	10%	$ 25	$ 3,500	$ 8,120	$ 8,100	$ 8,100	PPLD	Added sealer to stabilize surface 10/17
10	2032	1,060	SF	2%	$ 25	$ 530	$ 1,230	$ 1,200	$ 1,700	PPLD	
10	2032	1,080	SF	4%	$ 25	$ 1,080	$ 1,253	$ 1,300	$ 1,700	PPLD	
10	2032	1,400	SF	2%	$ 25	$ 700	$ 1,624	$ 1,600	$ 2,200	PPLD	
10	2032	1,060	SF	2%	$ 25	$ 530	$ 1,230	$ 1,200	$ 1,700	PPLD	
17	2039	463	SF	100%	$ 5	$ 2,084	$ 2,417	$ 2,400	$ 4,000	PPLD	Holton Bros. tuckpointing East elevation 09/19
18	2040	322	SF	100%	$ 5	$ 1,449	$ 1,681	$ 1,700	$ 2,300	PPLD	Holton Bros. tuckpointing East elevation 10/20
7	2029	60	LF	100%	$ 3	$ 180	$ 418	$ 400	$ 500	PPLD	9/19 DES Painting of railings

Anticipated Annual Capital Repair & Major Maintenance (CR & M) Costs, 2022 - 2041

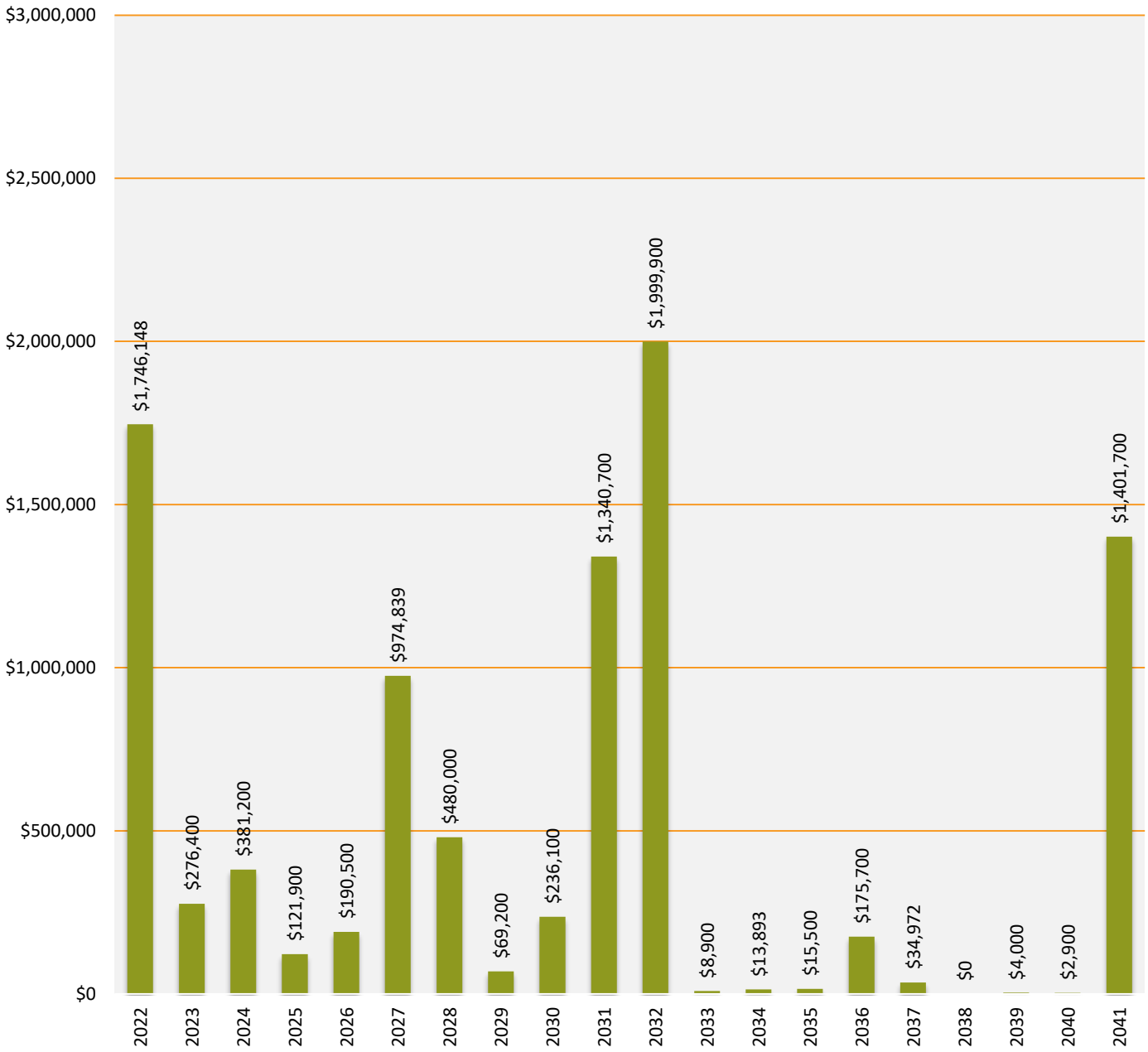
	1	2	3	3HP	3A	3L
	Life Safety	Building Enclosure	Near Term System Integrity	Heat Pump Replacements	Near Term Acoustics	Near Term Lobby
2022	$44,000	$56,200	$747,870	$78,700	$113,800	$0
2023	$0	$0	$0	$85,600	$0	$0
2024	$0	$0	$0	$78,000	$0	$366,900
2025	$1,300	$0	$10,000	$78,700	$0	$0
2026	$0	$11,800	$6,000	$72,600	$0	$0
5 Year Group	**$45,300**	**$68,000**	**$763,870**	**$393,600**	**$113,800**	**$366,900**
2027	$117,500	$132,300	$626,739	$73,700	$0	$0
2028	$9,700	$38,200	$432,100	$95,600	$0	$0
2029	$0	$12,000	$57,200	$75,600	$0	$0
2030	$0	$26,600	$209,500	$0	$0	$0
2031	$0	$115,700	$244,800	$43,600	$0	$0
5 Year Group	**$127,200**	**$324,800**	**$1,570,339**	**$288,500**	**$0**	**$0**
2032	$375,300	$1,096,500	$523,400	$11,200	$0	$0
2033	$0	$0	$8,900	$45,700	$0	$0
2034	$0	$0	$13,893	$75,900	$0	$0
2035	$0	$0	$15,500	$17,600	$0	$0
2036	$70,600	$0	$105,100	$69,000	$0	$0
5 Year Group	**$445,900**	**$1,096,500**	**$666,793**	**$219,400**	**$0**	**$0**
2037	$0	$0	$34,972	$67,100	$0	$0
2038	$0	$0	$0	$214,000	$0	$0
2039	$0	$4,000	$0	$252,500	$0	$0
2040	$0	$2,900	$0	$0	$0	$0
2041	$0	$0	$822,300	$116,800	$0	$0
5 Year Group	$0	$6,900	$857,272	$650,400	$0	$0
TOTAL	***$618,400***	***$1,496,200***	***$3,858,274***	***$1,551,900***	***$113,800***	***$366,900***

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.
Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.

	3M	3S	2S/E	4		
	Near Term Meeting Rooms	Near Term Staff Area	Near Term Site/Electric	Obsolescent Finishes	Sum 1-4	Average per year in 5-year grouping
2022	$0	$3,100	$248,778	$532,400	$1,824,848	
2023	$0	$259,100	$0	$17,300	$362,000	
2024	$0	$0	$0	$14,300	$459,200	**$621,950**
2025	$71,400	$0	$0	$39,200	$200,600	
2026	$0	$0	$0	$172,700	$263,100	
5 Year Group	**$71,400**	**$262,200**	**$248,778**	**$775,900**	**$3,109,748**	
2027	$0	$0	$0	$100,600	$1,050,839	
2028	$0	$0	$0	$0	$575,600	
2029	$0	$0	$0	$0	$144,800	**$678,328**
2030	$0	$0	$0	$0	$236,100	
2031	$0	$0	$0	$980,200	$1,384,300	
5 Year Group	**$0**	**$0**	**$0**	**$1,080,800**	**$3,391,639**	
2032	$0	$0	$4,700	$0	$2,011,100	
2033	$0	$0	$0	$0	$54,600	
2034	$0	$0	$0	$0	$89,793	**$486,659**
2035	$0	$0	$0	$0	$33,100	
2036	$0	$0	$0	$0	$244,700	
5 Year Group	**$0**	**$0**	**$4,700**	**$0**	**$2,433,293**	
2037	$0	$0	$0	$0	$102,072	
2038	$0	$0	$0	$0	$214,000	
2039	$0	$0	$0	$0	$256,500	**$418,794**
2040	$0	$0	$0	$0	$2,900	
2041	$0	$0	$0	$579,400	$1,518,500	
5 Year Group	**$0**	**$0**	**$0**	**$579,400**	**$2,093,972**	
TOTAL	***$71,400***	***$262,200***	***$253,478***	***$2,436,100***	***$11,028,653***	

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.
Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.

20-Year Anticipated CR & M Costs by Year



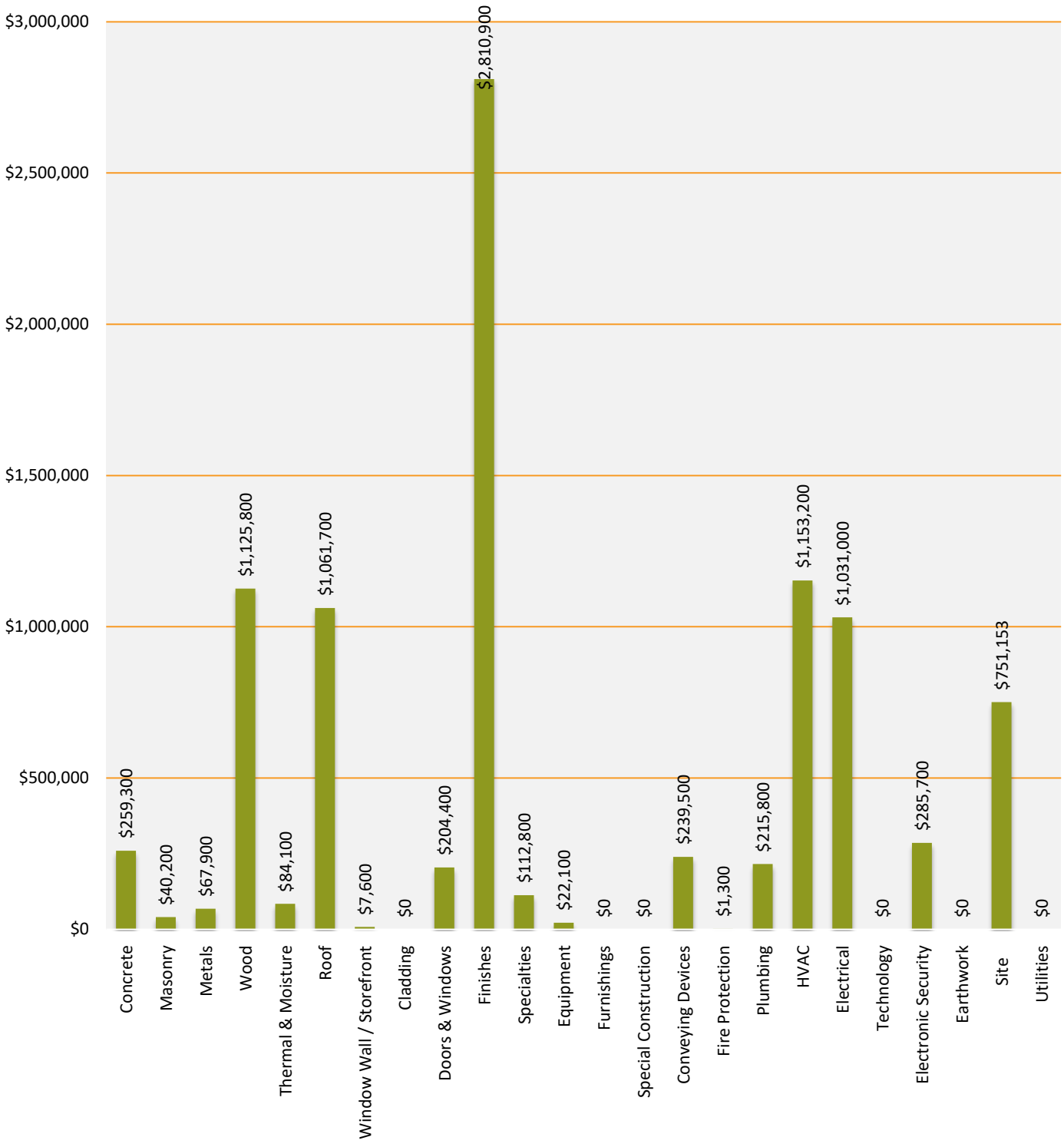
Major expenses occur in predictable patterns. Near term expenses (2022) are reflective of the age of the building and the Library's efforts to scale maintenance to the strategic space need of the district: Deferred maintenance is building up. Mid-term expenses (2032) and longer term expenses (2037, 2038) reflect the aging of systems installed or repaired in recent renovations, many of which will have 10-, 20- and 25-year lifespans.

Notes:

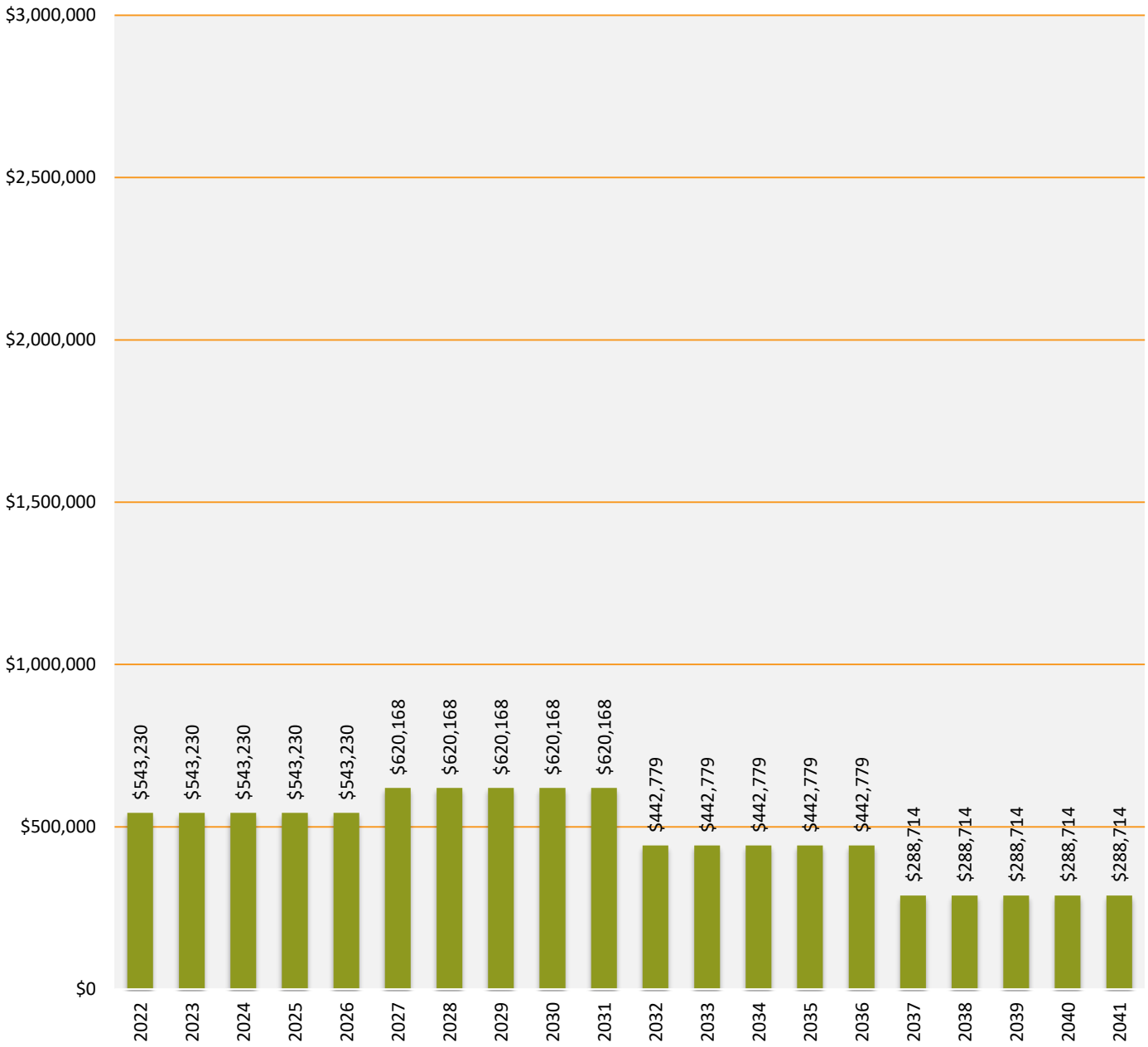
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.

Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.

20-Year Anticipated CR & M Costs by Category



CR & M Costs Averaged Over 5 Year Periods



Spikes in the repair / replacement costs can be mitigated by budgeting and expenditure strategies that look at 5 year planning periods. While there is merit in grouping as many repairs as practical into a single larger project (lower cost, less interference with public use of the building) there is value in separating the budgeting process from these larger expenditures. Setting aside smaller more manageable reserves over a series of years can be arranged to fund a major repair project. This graph illustrates the Capital Repair & Maintenance expenses averaged over a series of 5-year planning periods.

5-Year Anticipated Costs by Priority 2022-2026

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

Priority 1: Life Safety or Building Code. Repairs or replacements are needed to meet the requirements of applicable code codes.

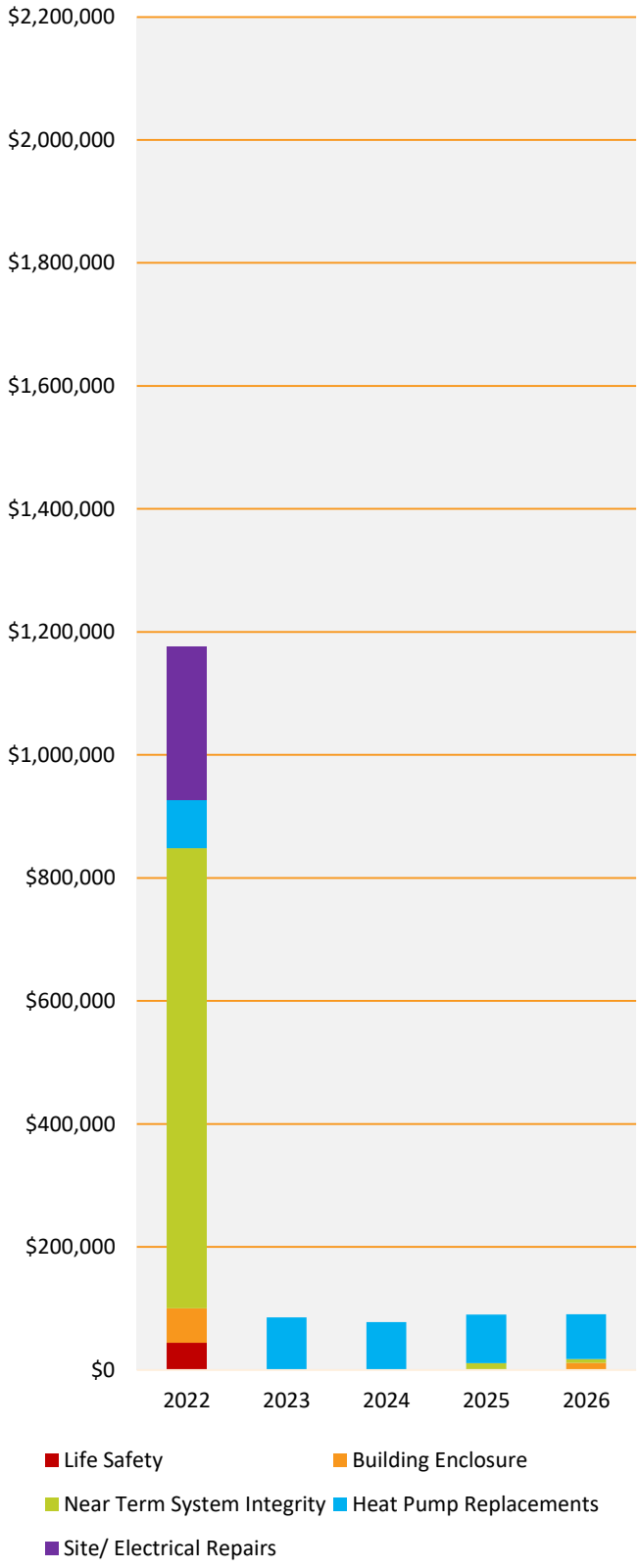
Priority 2: Building Enclosure. Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.

Priority 3: Near Term System Repairs Priority 3.1 are repairs that should be made on schedule because they protect the integrity of the building systems.

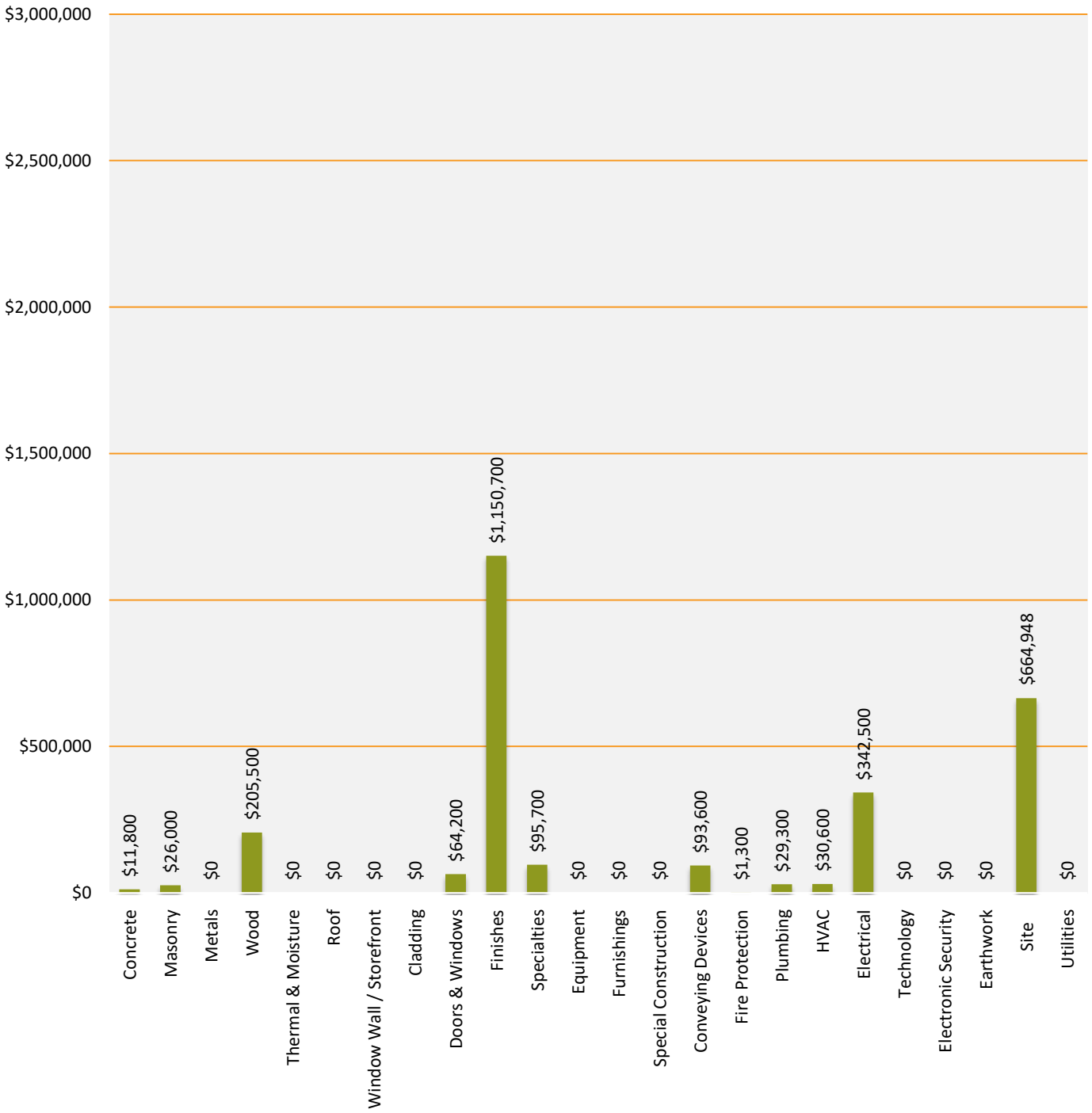
Priority 3.H Heat Pump Replacements There are number of replacements past due that would appear in the 2022 planning window. These have been reassigned to spread the cost across multiple years.

Priority 2S/E: Site & Electrical Repairs These are related to ongoing issues at the west end of the building and include pavement deterioration, retaining wall aging, and water infiltration

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.
Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window



5-Year Group CR+M Costs by Category, 2022-2026



A major expense in the 2022-2026 window in the finishes category is replacement of existing ceilings, about half of the total. Major electrical expenses include lighting and lighting controls in non-renovated areas, and, if desired, updates to the emergency generator. Repairs to the concrete paving at the wet entry and loading dock, asphalt parking areas, and water issues are anticipated. The water issues are yet to be quantified and are not part of this report.

5-Year Anticipated Costs by Priority 2027-2031

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

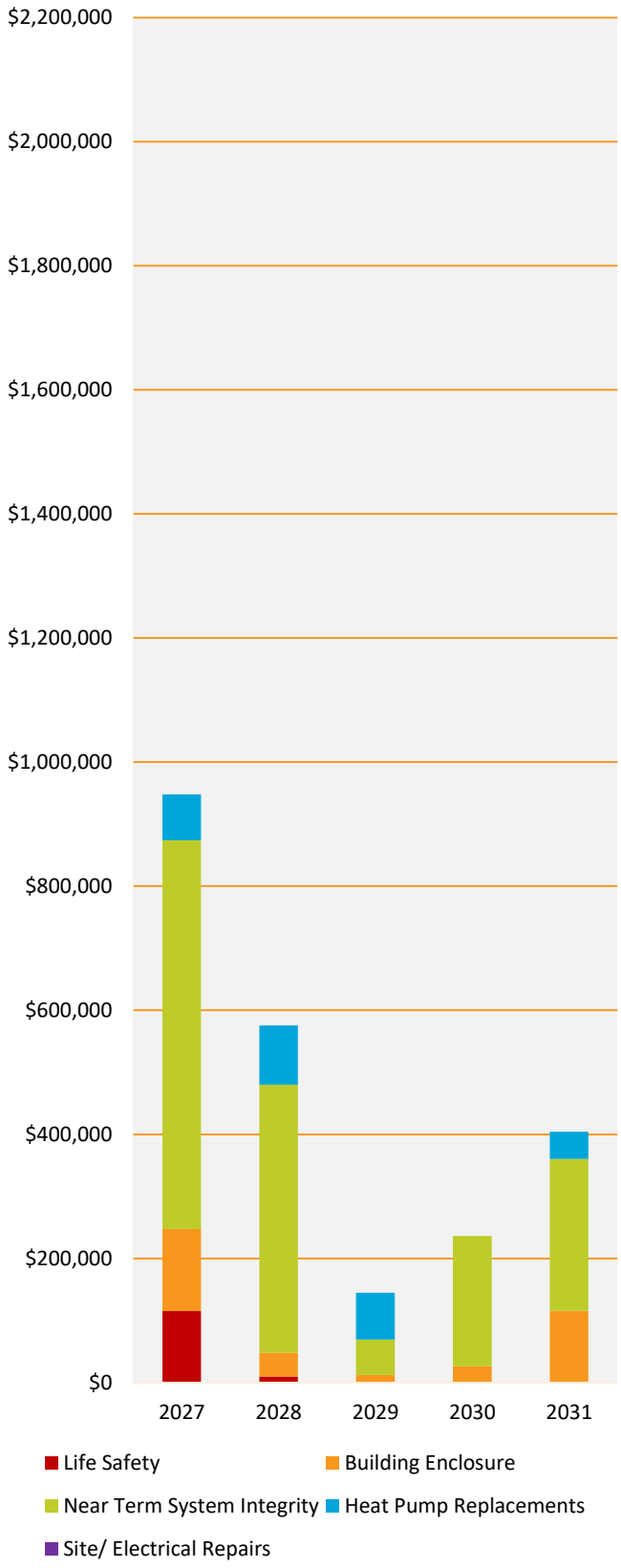
Priority 1: Life Safety or Building Code. Repairs or replacements are needed to meet the requirements of applicable code codes.

Priority 2: Building Enclosure. Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.

Priority 3: Near Term System Repairs Priority 3.1 are repairs that should be made on schedule because they protect the integrity of the building systems.

Priority 3.H Heat Pump Replacements There are number of replacements past due that would appear in the 2022 planning window. These have been reassigned to spread the cost across multiple years.

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work. Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window



5-Year Anticipated Costs by Priority 2032-2036

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

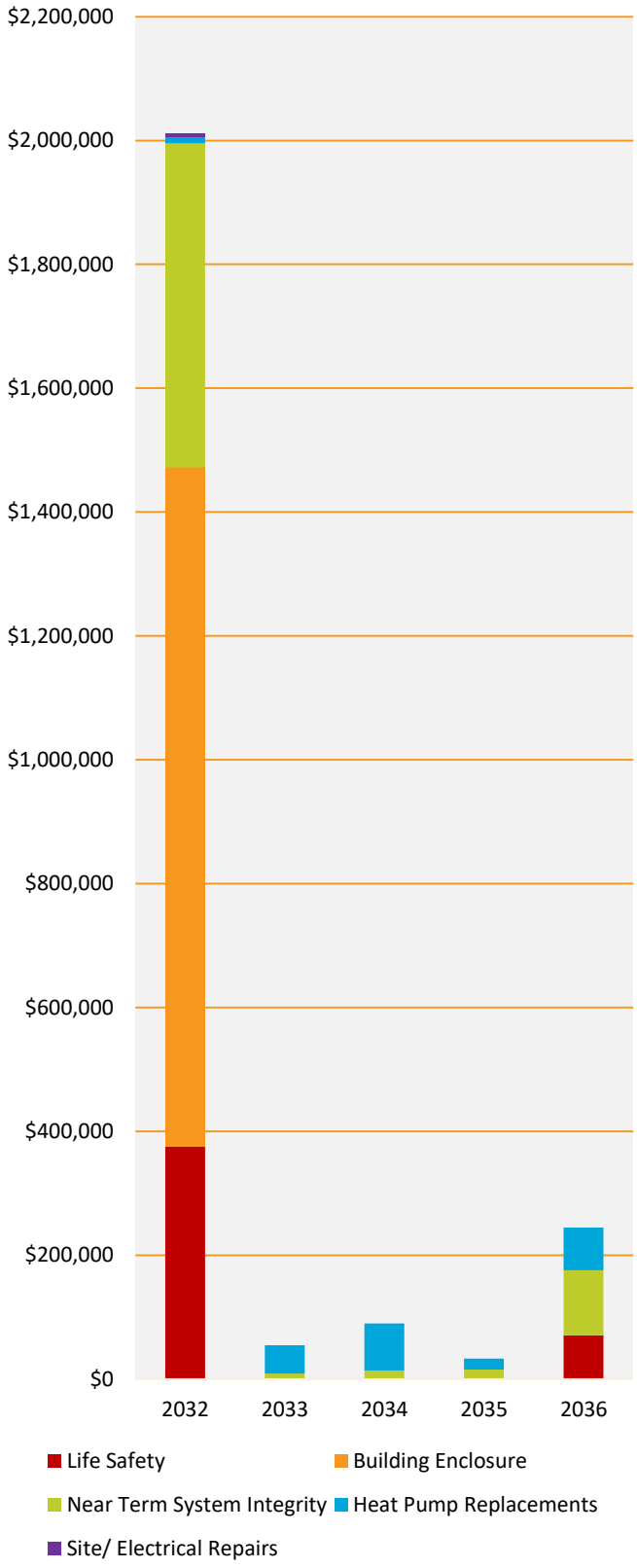
Priority 1: Life Safety or Building Code. Repairs or replacements are needed to meet the requirements of applicable code codes.

Priority 2: Building Enclosure. Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.

Priority 3: Near Term System Repairs Priority 3.1 are repairs that should be made on schedule because they protect the integrity of the building systems.

Priority 3.H Heat Pump Replacements There are number of replacements past due that would appear in the 2022 planning window. These have been reassigned to spread the cost across multiple years.

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.
Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window



5-Year Anticipated Costs by Priority 2037 -2041

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

Priority 1: Life Safety or Building Code. Repairs or replacements are needed to meet the requirements of applicable code codes.

Priority 2: Building Enclosure. Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.

Priority 3: Near Term System Repairs Priority 3.1 are repairs that should be made on schedule because they protect the integrity of the building systems.

Priority 3.H Heat Pump Replacements There are number of replacements past due that would appear in the 2022 planning window. These have been reassigned to spread the cost across multiple years.

Notes:
Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.
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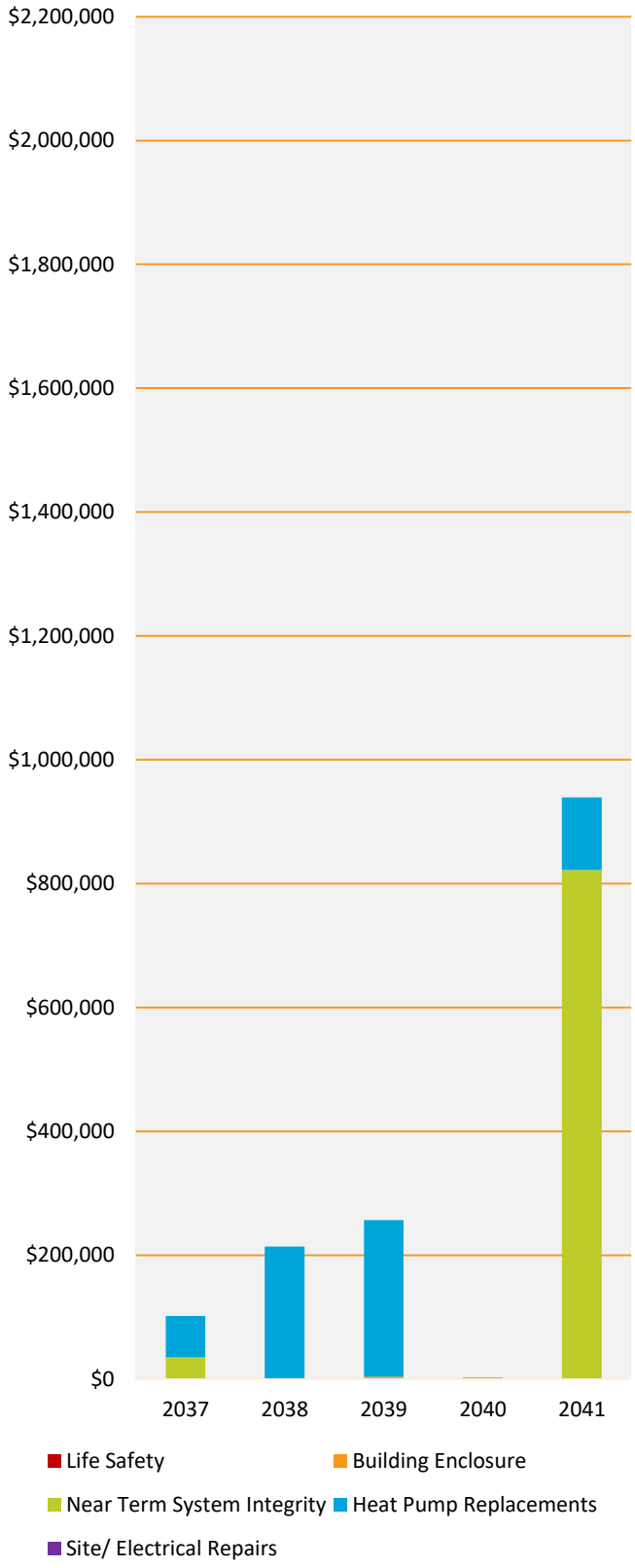


Site Conditions

Parking Lots

The parking lot shows extensive cracking consistent with moisture intrusion and subsequent stresses placed on the paving layers. The extent of the wear is such that a mill and overlay repair is insufficient to address the deterioration. Full replacement is included in the study.

Curb and gutter sections are in good condition.

West Entry

Concrete at the west entry is in poor condition with multiple significant cracks running through the area feeding the west parking area, garage access and loading dock area.

Retaining Walls

The retaining wall that forms the area well serving the lower level and supporting the building entry is showing signs of deterioration. Repairs have been forestalled by removing vines and allowing the block to dry. The vegetation is beginning to return and should be cropped back again. Repairs to the top layer of the major retailing walls are included in the study. More extensive deterioration of the retaining wall at the mechanical well are the result of moisture and salt. Repairs are anticipated in the study. These should be coordinated with the concrete paving repairs and any measures needed to address water entering the building through an electrical service conduit.

Other recommendations:

Make nose of sidewalk accessible in east parking lot. See photo 1.

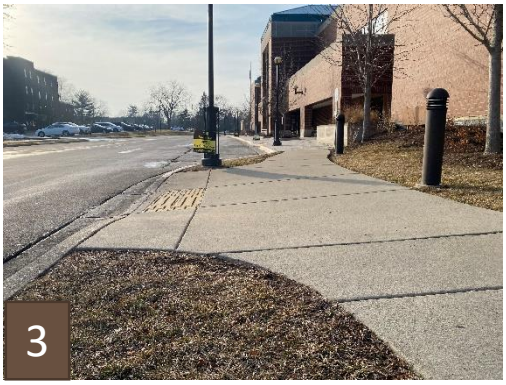
Show striped cross walk across east parking lot entrance, similar to what has been done in the west parking lot entrance. See photo 2.

Confirm ramp slope and sidewalk slope that is behind the ramp. If the ADA tile is sloped greater than 5%, then it is a RAMP and there will need to be a level landing behind the ramp. Regardless, the slope of the sidewalk that is running perpendicular to the ramp should be no greater than 2% side slope. See photos 3 and 4. We are not sure why these ramps are even there because they don't connect to a sidewalk crossing on the opposite side of the street. Could they be left over from an older design?

The handicap painted parking spaces in the drop-off lane are non-compliant. Parking spaces in this configuration should be at least 13 feet wide. Designing and building a compliant handicap space in this area would require pushing back the sidewalk behind the existing curb line or striping a space out into the public street. One option would be to remove the handicap sign and the paint striping and put up a sign that says "for seniors and expectant mothers" for example.


1


2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4

Key Priority 2S/E Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	CSI	System		Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	2S/E	Parking-UL	Parking Areas	08	Doors & Windows	West Opening	Garage Door - Replace	1992	Used Up	-10	2022	$5,200
CR	2S/E	Site	Dock	32	Site	Ramp	Paving, concrete - replace	1992	Normal	0	2022	$90,045
CR	2S/E	Site	Dock/ Garage	32	Site	Ramp	Allowance for Drainage Repairs	1992	Normal	0	2022	$72,500
CR	2S/E	Site	Garage	32	Site	Ramp	Paving, concrete - replace	1992	Normal	0	2022	$33,336
CR	2S/E	EXT	West Parking Lot	32	Site	Loading Dock Walls	Retaining Wall, segmented CMU - repair	1992	Normal	0	2022	$47,698
M	2S/E	Parking-UL	Parking Areas	08	Doors & Windows	West Opening	Garage Door - Operator Replace	1992	Used Up	-10	2032	$4,700

The condition of the paving, retaining and door elements along the loading dock and parking level entry are such that, in combination with waiter infiltration issues into the electrical conduit connecting the transformer to the primary switchgear, more immediate remediation is warranted and related projects should be grouped. An added allowance is included in recognition of the ambiguous nature of the water infiltration, outlined in orange, above.

Key Surface Parking Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	CSI	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
CR	3	Parking-Surface	East Parking Lot	32	Site	Paving - Replace	2017	Used Up	-2	2022	$178,640
CR	3	Parking-Surface	West Parking Lot	32	Site	Paving - Replace	1992	Used Up	-27	2022	$235,480
M	3	Parking-Surface	West Parking Lot	32	Site	Storm Drain	1992	Normal	0	2022	$7,250
M	3	Parking-Surface	Drop off lane	32	Site	Paving - Repair	2017	Better	**5**	2027	$0
M	3	Parking-Surface	East parking Lot	32	Site	Curb and Gutter	1992	Better	**5**	2027	$630
M	3	Parking-Surface	West Parking Lot	32	Site	Curb and Gutter	1992	Better	**5**	2027	$528
M	3	Parking-Surface	Elevators	05	Metals	Railings - repaint	2019	Normal	7	2029	$5,200
CR	3	Parking-Surface	Scattered	05	Metals	Railings - replace - Aluminum	1992	Better	**10**	2032	$39,900
M	3	Parking-Surface	South Entry Paving	32	Site	Sidewalks, concrete - replace, with sno-melt.	2009	Normal	12	2034	$13,893
CR	3	Parking-Surface	Drop off lane	32	Site	Paving - Replace	2017	Normal	15	2037	$18,072
M	3	Parking-Surface	North Entry Paving	32	Site	Sidewalks, concrete - replace, with sno-melt.	2021	Normal	24	2046	$14,148

Key Retaining Wall Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
CR	2S/E	EXT	West Parking Lot	Loading Dock Walls	Retaining Wall, segmented CMU - repair	1992	Normal	0	2022	$ 47,698
M	3	Parking-LL	East Light Well	Lower Level Wall	Retaining Wall, segmented CMU - repair	1992	Normal	5	2027	$ 9,602
M	3	Parking-LL	West Light Well	Lower Level Wall	Retaining Wall, segmented CMU - repair	1992	Normal	5	2027	$ 5,029
M	3	Parking-UL	East Light Well	Upper Level Wall	Retaining Wall, segmented CMU - repair	1992	Normal	5	2027	$ 7,315
M	3	Parking-UL	West Light Well	Upper Level Wall	Retaining Wall, segmented CMU - repair	1992	Normal	5	2027	$ 8,459
CR	3	EXT	East Parking Lot	Perimeter Wall	Retaining Wall, segmented CMU - repair	1992	Normal	5	2027	$ 15,774
CR	3	Parking-LL	East Light Well	Lower Level Wall	Retaining Wall, segmented CMU - replace	1992	Normal	20	2042	$ 131,991
CR	3	Parking-LL	West Light Well	Lower Level Wall	Retaining Wall, segmented CMU - replace	1992	Normal	20	2042	$ 69,138
CR	3	Parking-UL	East Light Well	Upper Level Wall	Retaining Wall, segmented CMU - replace	1992	Normal	20	2042	$ 100,564
CR	3	Parking-UL	West Light Well	Upper Level Wall	Retaining Wall, segmented CMU - replace	1992	Normal	20	2042	$ 116,277
CR	3	EXT	East Parking Lot	Perimeter Wall	Retaining Wall, segmented CMU - replace	1992	Normal	20	2042	$ 86,737
M	3	EXT	North Site Zone	North, Exit Stair	Retaining Wall, segmented CMU - replace	2021	Normal	39	2061	$ 13,384
M	3	EXT	North Site Zone	North, Exit Stair	Retaining Wall, segmented CMU - replace	2021	Normal	39	2061	$ 7,638

Roof Assemblies

Membrane Roofs

Inspections by the Library's maintenance contractor and by a second roofing contractor both suggest a remaining life of ~5 to 7 years. Core samples at each roof indicate dry insulation, a sound membrane and corrosion free deck. These conditions and visual inspection suggest that the roof will continue to perform to the typical 20-year lifespan.

At the time of replacement, the library should consider adding insulation to bring the roof assembly to a total R30. While in some instances the nature of the replacement may not require compliance with prevailing energy codes, the library will see reduced energy consumption for the effort.

Metal Roofs

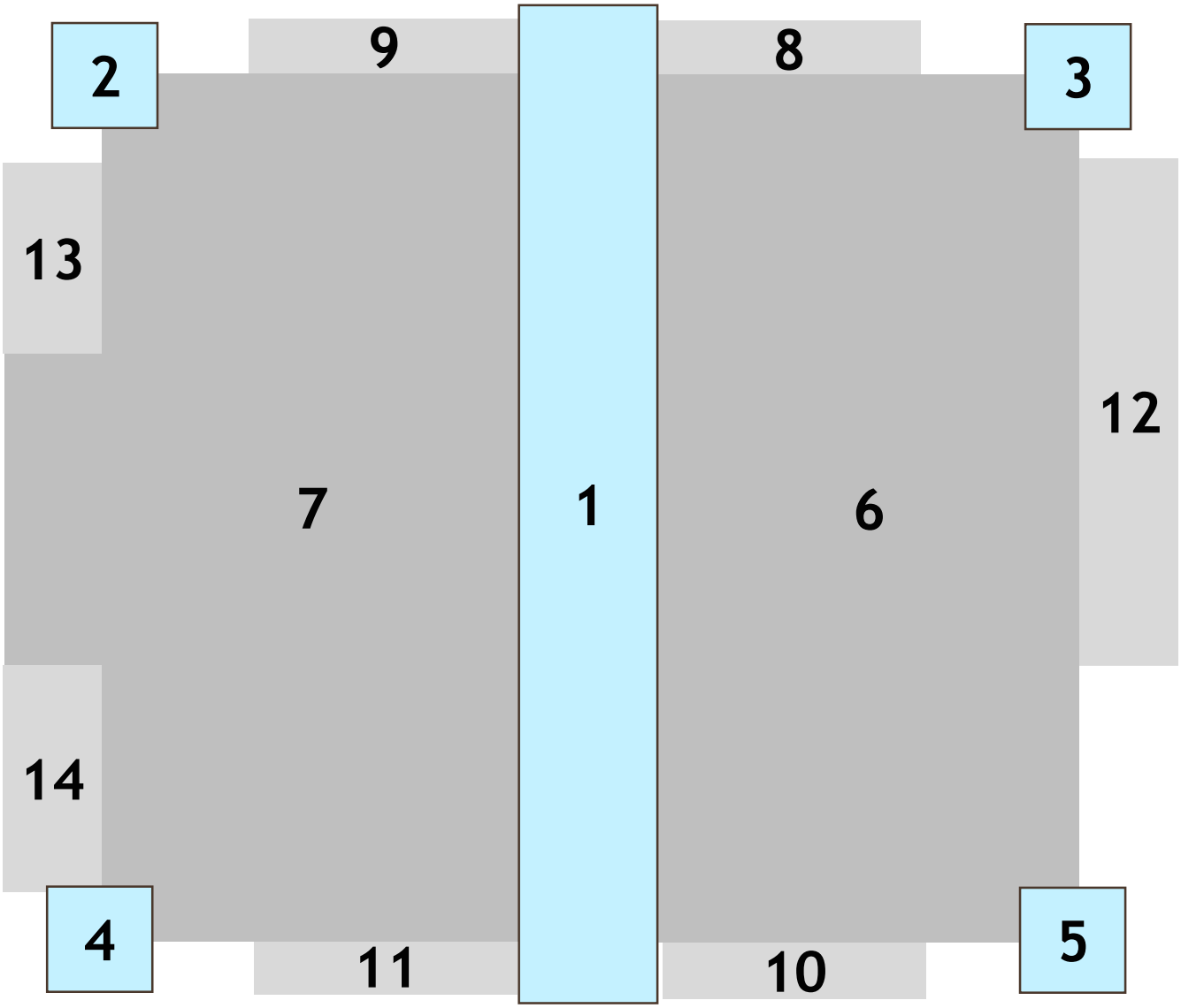
The metal roofs too are expected to reach their typical end of life date (2042).

Continued Maintenance

Periodic inspection and minor repairs as necessary are strongly encouraged. This regimen will minimize any extended damage from leaks that do occur and will offer the best path to full or extended life. As the roofs near the end of their lives, more frequent inspections are suggested and more frequent repairs should be anticipated.

The present value estimate for the roof replacements is $1,930,000. Escalated costs at the anticipated replacement years total $3,120,000.

Roof Zone Diagram



Key Roof Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
CR	2	Roof			Gutter & Downspout, aluminum - replace	1992	Better	8	2030	$ 13,400
CR	2	Roof		Parapet	Metal Coping - replace	1992	Normal	10	2032	$ 37,900
CR	2	Roof		Roof 6 - Main E	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 427,900
CR	2	Roof		Roof 7 - Main W	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 463,000
M	2	Roof		Roof 8 - N Edge E	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 12,500
M	2	Roof		Roof 9 - N Edge W	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 12,400
M	2	Roof		Roof 10 - S Edge E	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 12,500
M	2	Roof		Roof 11 - S Edge W	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 12,400
CR	2	Roof		Roof 12 - E Edge	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 51,000
CR	2	Roof		Roof 13 - W Edge N	Roof, EPDM Membrane - replace, fully adhered	2012	Normal	10	2032	$ 18,700
CR	2	Roof		Roof 1 - Main Ridge	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 484,000
CR	2	Roof		Roof 14 - W Edge S	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 60,000
CR	2	Roof		Roof 2 - NW Tower	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 636,700
CR	2	Roof		Roof 3 - NE Tower	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 636,700
CR	2	Roof		Roof 4 - SW Tower	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 636,700
CR	2	Roof		Roof 5 - SE Tower	Roof, standing seam metal - replace	1992	Normal	20	2042	$ 88,600

Exterior Wall Assemblies

Cracking

The 2016 Capital Repairs Study indicated cracking at concrete masonry units (cmu) in stair towers that had been visually evident for at least 8 years. Anecdotal information suggested no new movement in recent memory. Since then the Library has been monitoring the width and extent of the cracks to determine the frequency and variation in crack width, if any and the amount of moisture observed entering the building through the cracks, if any. No movement or moisture penetration has observed since the 2016 study. Repair of the cracks shows no reopening of the joint or new cracking.

Masonry

The Library has continued to replace deteriorating portions of the exterior wall assembly. Most notably recent efforts have included replacement of vertical joints in the brick veneer have been replaced. All of these efforts should be continued moving forward with, with particular attention paid to building sealants.

Near term cleaning and repointing of the brick is estimated at a total present day value of $21,500.

Key Exterior Wall Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	2	Envelope	Scattered		Brick - clean and repoint	1992	Used Up	-5	2022	$ 2,800
M	2	Envelope	Garage		Brick - clean and repoint	1992	Used Up	-5	2022	$ 3,500
M	2	Envelope	Scattered		Brick - clean and repoint	1992	Used Up	-5	2022	$ 2,100
M	2	Envelope	Scattered		Brick - clean and repoint	1992	Used Up	-5	2022	$ 3,900
M	2	Envelope	Scattered		Stone & Brick - reseal joints	1992	Used Up	-10	2022	$ 3,400
M	2	Envelope	Whole Building		Stone & Brick - reseal joints	1992	Used Up	-10	2022	$ 2,200
M	2	Envelope	Scattered		Stone - stabilize	1992	Used Up	-5	2022	$ 8,100
M	2	Envelope	East	East	Curtainwall - replace perimeter sealant	1992	Used Up	-18	2022	$ 300
M	2	Envelope	North	North	Curtainwall - replace perimeter sealant	1992	Used Up	-18	2022	$ 1,100
M	2	Envelope	South	South	Curtainwall - replace perimeter sealant	1992	Used Up	-18	2022	$ 1,500
M	2	Envelope	West	West	Curtainwall - replace perimeter sealant	1992	Used Up	-18	2022	$ 300
M	4	Envelope	South	Ceiling	Ceilings, exposed plaster soffit - repainting	1992	Better	3	2025	$ 2,800
M	3	Envelope	First Floor	Dock	Garage Door - Replace	1992	Better	5	2027	$ 6,100
M	2	Envelope	East	East	Windows, Aluminum - replace IGU	1992	Better	5	2027	$ 1,700
M	2	Envelope	North	North	Windows, Aluminum - replace IGU	1992	Better	5	2027	$ 2,700
M	2	Envelope	South	South	Windows, Aluminum - replace IGU	1992	Better	5	2027	$ 1,300
M	2	Envelope	West	West	Windows, Aluminum - replace IGU	1992	Better	5	2027	$ 1,900
M	2	Envelope	Garage and parking levels		Lintels, Steel, painted - repaint	2014	Normal	7	2029	$ 2,700
M	2	Envelope	Scattered		Lintels, Steel, painted - repaint	2014	Normal	7	2029	$ 3,900
M	2	Envelope	Mechanical/ Storage		Lintels, Steel, painted - repaint	2014	Normal	7	2029	$ 2,700
M	2	Envelope	West		Lintels, Steel, painted - repaint	2014	Normal	7	2029	$ 2,700
M	2	Envelope	Scattered		Stone - stabilize	1992	Better	10	2032	$ 1,700
M	2	Envelope	Scattered		Stone - stabilize	1992	Better	10	2032	$ 1,700
M	2	Envelope	Scattered		Stone - stabilize	1992	Better	10	2032	$ 2,200
M	2	Envelope	Pump Room		Stone - stabilize	1992	Better	10	2032	$ 1,700

Building Systems

HVAC Systems

The building is served by Heat Pumps located in the ceiling space throughout the lower and upper floors. There are two DOAS (direct outside air supply) RTUs (roof top units) that provide ventilation air to plenum mounted heat pumps. The heat pumps are original to the building and installed in 1992. The heat pumps have been replaced yearly as they fail. Roughly 2/3 or the original heat pumps have been replaced over the years. A condenser water loop with boiler for supplemental heating and cooling tower for supplemental cooling serves the heat pumps. The boilers were replaced in 2019 with high efficiency condensing boilers. The Cooling Tower was installed in 2005 and had the basin resealed in 2018. All the HVAC pumps were installed in 2007.

The library has ten exhaust fans located on the roof. Nine of the fans are original and installed in 1992. A new fan was installed in 2021 as part of the interior renovations for the laser cutter.

Electric Cabinet and unit heaters are located throughout the building for supplemental heat.

There are three snow melt systems that serve areas outside of the building.

Plumbing Systems

The plumbing system is in good condition and currently has no issues. A 125,000 BTU, 75 gallon storage tank water heater was installed in 2014 and provides hot water throughout the building. Plumbing fixtures are in good shape. There have been no issues with sump pumps within the building.

Fire Protection System

A wet sprinkler system serves the interior building was installed in 1992. The dry piping fire protection system in the parking garage was replaced in 2017.

Electrical Systems

Power Distribution Systems

The Building is supplied by one utility service which is metered separately downstream. One meter is for the electric heat loads rated @ 2400 amp, 480Y/277 volt, 3-phase, 4-wire and the rest of the loads are metered under 1200 amp, 480Y/277 volt, 3-phase, 4-wire overcurrent protection. Meter data was not available, but we estimate there is ample spare capacity based on historical comparison of the service sizes and the library size. Branch panels are located throughout the building and typically have spare circuit breaker positions. Panels serving electric heat loads are inactive.

The Building has a 350kW interior diesel generator for emergency power. Staff noted that some loads have been added since the original construction and they believe there is more spare capacity. The Library noted they would like to add existing stairwell lighting to the generator in order to have them as shelter areas.

Nearly all of the power distribution equipment was installed during the original construction. All equipment appears to be in good condition. Staff reported no problems with the equipment except the current issue with water seeping into the main switchboard.

Lighting

Newer fixtures are LED (majority were replaced in 2021 renovation) and few of the original fixtures have been retrofit/replaced by the staff. Only 10% of the current building still utilize a mix of T8 linear fluorescent, compact fluorescent from original construction.

Exterior fixtures have retrofit with LED lamps, except for bollards which got replaced/added in the 2021 renovation.

All fixtures appear to be in good condition and working order.

A relay-based lighting control system is provided to serve public area lighting. Staff reported no problems with the system, but that it is only used for manual on/off and not time-based scheduling. This system was installed in 2021 renovation and has significant life remaining.

Non-public areas use local controls in each space.

Code required emergency lighting is provided by selected fixtures connected to the emergency power system.

Fire Alarm System

A Notifier fire alarm system with voice evacuation serves the building. Devices appear to be adequately located per Code. Staff reported the control panel was recently replaced.

BUILDING SUSTAINABILITY

The Library has a decoupled HVAC system, meaning the ventilation air load (DOAS RTUs) is separate from the heating and cooling load (Heat Pumps). Many new buildings are being designed with this type of system because they are inherently more efficient because it uses liquid (water or refrigerant) to heat/cool rather than air. Liquid has a higher specific gravity than air and can more effectively transport energy around the building using pumps which are more efficient than fans. The current heat pump system has a condenser water loop where the heat pump reject/pull heat as needed to heat and cool the spaces. A heat pump system can be combined with a geothermal field to gain increased efficiency by using the ground as a heat sink. Installing a new geothermal field would require a large area and would require the existing system to be reconfigured. The long payback would not make sense for this building.

Key Fire Protection Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	1	FP P HVAC E	Mechanical/ Storage		Backflow Preventer	1992	Better	**5**	2027	$ 2,300
M	1	FP P HVAC E	Mechanical/ Storage		Air Compressor for Dry	2015	Normal	3	2025	$ 1,300
CR	1	FP P HVAC E	Ceiling Plenum		Sprinkler heads	1992	Normal	20	2042	$ 133,700
CR	1	FP P HVAC E	Whole Building		Mains and Branches	1992	Normal	30	2052	$ 631,400
CR	1	FP P HVAC E	Mechanical/ Storage		Water Service	1992	Normal	30	2052	$ 90,700
CR	1	FP P HVAC E	Parking Levels		Mains for Dry System	2017	Normal	45	2067	$ 1,097,200
M	1	FP P HVAC E	Stairs		Standpipe Hose Connections	1992	Normal	70	2092	$ 66,500

Key Plumbing Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	1	FP P HVAC E	Mechanical/ Storage		Backflow Preventer	1992	Better	5	2022	$ 2,000
M	1	FP P HVAC E	Mechanical Room		Backflow Preventer	1992	Better	5	2022	$ 1,800
M	1	FP P HVAC E	Mechanical/ Storage		Backflow Preventer	1992	Better	5	2022	$ 1,700
CR	2	Pump Room South	Pump Room South		Sump Pump	1992	Normal	0	2022	$ 27,000
M	3	Pump Room	Pump Room		Water Heater Trim	1992	Normal	0	2022	$ 2,300
M	1	Common	Scattered		Drinking Fountain with Bottle Station	2012	Normal	5	2027	$ 8,400
M	1	FP P HVAC E	Garage		Eyewash and Drench Shower	1992	Better	5	2027	$ 1,500
CR	1	Common	Scattered		Faucet with Hand Dryer	2012	Normal	5	2027	$ 30,600
CR	1	Common	Scattered		Faucets and Trim	2002	Normal	5	2027	$ 44,600
CR	1	Common	Scattered		Flush Valves	2002	Normal	5	2027	$ 23,800
M	3	Common	Scattered		Hose Bibs	1992	Better	5	2027	$ 6,400
M	3	FP P HVAC E	Mechanical/ Storage		Irrigation Pump	1992	Better	5	2027	$ 4,300
CR	3	Common	Scattered		Janitors sink with faucet	1992	Better	5	2027	$ 11,600
M	1	Common	Scattered		Electric Drinking Fountain	2013	Normal	6	2028	$ 9,700
CR	2	Pump Room North	Pump Room North		Sump Pump	1992	Better	6	2028	$ 38,200
M	3	Pump Room	Pump Room		Hot Water Circulation Pump	2016	Normal	9	2031	$ 1,100
CR	1	Common	Scattered		Floor Drains	1992	Normal	20	2042	$ 21,700
CR	1	Common	Scattered		Porcelain Fixtures	1992	Normal	20	2042	$ 66,000
CR	1	Common	Whole Building		Sanitary Piping	1992	Normal	20	2042	$ 50,600
M	3	Common	Whole Building		Pipe insulation	1992	Normal	20	2042	$ 15,900
CR	3	Common	Scattered		Plumbing Specialties	1992	Normal	20	2042	$ 18,100
M	1	Common	Scattered		Stainless Steel Fixtures	1992	Normal	20	2042	$ 15,700
CR	2	EXT	Scattered		Roof Drains	1992	Normal	20	2042	$ 18,100
CR	1	Common	Whole Building		Water Distribution Piping	1992	Normal	20	2042	$ 28,900
CR	2	Common	Whole Building		Storm Piping	1992	Normal	20	2042	$ 45,200

Key Plumbing Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	2	Common	Elevators		Sump Pump	2017	Normal	20	2042	$ 11,600
M	2	Common	Scattered		Trench Drain	1992	Normal	20	2042	$ 7,200
M	2	Common	Garage and parking levels		Triple Basin	1992	Normal	20	2042	$ 16,900
CR	3	Common	Scattered		Valves, various sizes	1992	Normal	20	2042	$ 18,100
CR	2	FP P HVAC E	Mechanical/ Storage		Water Service	1992	Normal	20	2042	$ 50,596

Key HVAC Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
M	3	EXT	Area Well		CT-1 Spray Pump 1	2012	Normal	0	2022	$ 5,300
M	3	INT	LL Boiler Room		P-5 - Pump	1992	Normal	0	2022	$ 2,000
M	3	INT	LL Boiler Room		P-6 - Pump	1992	Normal	0	2022	$ 2,000
M	3	INT	LL Boiler Room		P-7 - Pump	1992	Normal	0	2022	$ 2,000
M	3	INT	Loading Dock		P-8 - Pump	2011	Used Up	-1	2022	$ 3,300
M	3	INT	LL Boiler Room		B-2 water pump	2007	Normal	3	2025	$ 5,500
M	3	INT	LL Boiler Room		P-5 - Motor	2007	Normal	3	2025	$ 1,500
M	3	INT	LL Boiler Room		P-6 - Motor	2007	Normal	3	2025	$ 1,500
M	3	INT	LL Boiler Room		P-7 - Motor	2007	Normal	3	2025	$ 1,500
M	3	EXT	Area Well		CT-1 Spray Pump 2	2016	Normal	4	2026	$ 6,000
CR	3	EXT	Roof		AHU-1	2005	Wearing	**5**	2027	$ 154,600
CR	3	EXT	Roof		AHU-2	2005	Wearing	**5**	2027	$ 154,600
M	3	EXT	Area Well		CT-1 Spray Pump 2 Motor	2009	Normal	5	2027	$ 4,600
M	3	EXT	Roof		EF-1	1992	Normal	5	2027	$ 3,500
M	3	EXT	Roof		EF-2	1992	Normal	5	2027	$ 3,500
M	3	EXT	Roof		EF-3	1992	Normal	5	2027	$ 3,500
M	3	EXT	Roof		EF-4	1992	Normal	5	2027	$ 3,500
M	3	EXT	Roof		EF-5	1992	Normal	5	2027	$ 3,500
M	3	EXT	Roof		EF-6	1992	Normal	5	2027	$ 3,500
M	3	INT	Garage		EF-7	1992	Normal	5	2027	$ 2,000
M	3	INT	Garage		EF-8	1992	Normal	5	2027	$ 2,000
M	3	INT	Garage		EF-9	1992	Normal	5	2027	$ 2,000
M	3	INT	LL Mech Room		P-2 - Motor	1992	Normal	5	2027	$ 4,300
CR	3	INT	LL Mech Room		P-2 - Pump	1992	Normal	5	2027	$ 18,600
M	3	INT	LL Mech Room		P-3 - Motor	1992	Normal	5	2027	$ 4,300

Key HVAC Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
CR	3	INT	LL Mech Room		P-3 - Pump	1992	Normal	5	2027	$ 18,600
M	3	INT	LL Mech Room		P-4 - Motor	1992	Normal	5	2027	$ 4,300
CR	3	INT	LL Mech Room		P-4 - Pump	1992	Normal	5	2027	$ 18,600
CR	3	EXT	Area Well		CT-1	2005	Normal	6	2028	$ 430,100
M	3	INT	Loading Dock		P-8 - Motor	2011	Normal	7	2029	$ 2,500
CR	3	EXT	Area Well		Cooling Tower Reseal	2018	Normal	8	2030	$ 94,600
M	3	EXT	Area Well		CT-1 Spray Pump 1 Motor	2012	Normal	8	2030	$ 5,100
CR	3	INT	Stairs, elev lobbies		ECUH-1	1992	Better	8	2030	$ 38,000
CR	3	INT	Stairs		ECUH-2	1992	Better	8	2030	$ 21,100
CR	3	INT	Utility closets		EUH-1	1992	Better	8	2030	$ 16,900
CR	3	INT	Utility closets		EUH-2	1992	Better	8	2030	$ 16,900
CR	3	INT	Loading Dock		EUH-3	1992	Better	8	2030	$ 16,900
M	3	INT	LL Mech Room		P-1 - Motor	2015	Normal	11	2033	$ 5,100
CR	3	INT	LL Mech Room		P-1 - Pump	2015	Normal	13	2035	$ 15,500
CR	3	INT	Loading Dock		B-3 Snowmelt	2011	Normal	14	2036	$ 50,400
CR	3	INT	LL Mech Room		B-1 Building Boiler	2017	Normal	20	2042	$ 216,800
CR	3	INT	LL Mech Room		B-2 Building Boiler	2017	Normal	20	2042	$ 180,700
CR	3	INT	LL Boiler Room		B-4 SnowMelt	2017	Normal	20	2042	$ 90,400
CR	3	INT	LL Mech Room		HX-1	1992	Normal	20	2042	$ 60,200
CR		INT	UTILITY 251B		B-5 (North Side Snowmelt System)	2021	Normal	24	2046	$ 135,600
CR		INT	UTILITY 251B		B-5 pump	2021	Normal	34	2056	$ 31,900
CR		EXT	Roof		EF - Laser Cutter	2021	Normal	34	2056	$ 54,700
M	3	INT	LL Mech Room		P-2 - Motor	1992	Normal	5	2027	$ 4,300
CR	3	INT	LL Mech Room		P-2 - Pump	1992	Normal	5	2027	$ 18,600
M	3	INT	LL Mech Room		P-3 - Motor	1992	Normal	5	2027	$ 4,300

Key Electrical Items by Budget Year

System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing

Type	Priority	Zone	Room	System	Item		Condition	Remaining Life	Replacement Year	Replacement Cost
CR	1	Common			Converting Stairs into shelter areas, add to Generator	1992	Normal	0	2022	$ 44,000
CR	3	Common			Lighting controls on all levels that were not renovated in 2021	1992	Normal	0	2022	$ 53,400
CR	3	Common			Lighting on all levels that were not renovated in 2021	1992	Normal	0	2022	$ 240,100
M	3A	Public-2nd Flr	BOARD ROOM	Clg	Change lights to Decorative Lighting in Board Room	1992	Normal	0	2022	$ 5,000
CR	3	Common			Branch wiring and receptacles that were not renovated in 2021	1991	Normal	9	2031	$ 243,700
CR	1	Common			Generator and ATS	1992	Better	10	2032	$ 160,200
CR	3	Common			Power Distribution (Panels, Transformers, Etc.)	1992	Normal	10	2032	$ 224,100
M	3	Common			Main switchboard Replacement along with new feeders to the transformer	1992	Normal	10	2032	$ 9,000
CR	3	Site			Site Lighting and controls	2016	Normal	14	2036	$ 51,500
CR	3	Common			Interior Lighting and lighting controls (2021 Renovation scope)	2021	Normal	29	2051	$ 792,200
CR	3	GARAGE			Parking Garage Lighting	2022	Normal	30	2052	$ 150,100