FACILITY CONDITION ASSESSMENT & NETZERO ENERGY AUDIT

prepared for

School Administrative Unit 70
41 Lebanon Street, Suite 2
Hanover, New Hampshire
Jamie Teague

Marion Cross School
22 Church Street
Norwich, Vermont 05055

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BV PROJECT #:
158531.22R000-002.379

DATE OF REPORT:
To Be Filled In By CD

ON SITE DATE:
November 17, 2022

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1. Executive Summary

Property Overview and Assessment Details

General Information	
Property Type	School
Main Address	22 Church Street, Norwich, Vermont 05055
Site Developed	1898, Phase I / 1954, Phase II / 1960, Phase III / 1989, Phase IV
Site Area	7.00 acres (estimated)
Parking Spaces	54 total spaces all in open lots; four of which are accessible
Building Area	57,250 SF
Number of Stories	Two above grade with one below-grade basement level
Outside Occupants / Leased Spaces	None
Date(s) of Visit	November 17, 2022
Management Point of Contact	School Administrative Unit 70, Anthony Daigle, Director of Facilities 603.643.3810 phone anthonydaigle@hanovernorwichschools.org email
On-site Point of Contact (POC)	same as above
Assessment and Report Prepared By	Carl Alejandro
Reviewed By	Mary Venable, CEM, RA, Technical Report Reviewer for Kaustubh Anil Chabukswar, CEM, CAP Program Manager Kaustubh.Chabukswar@bureauveritas.com 800.733.0660 x7297512
AssetCalc Link	Full dataset for this assessment can be found at: https://www.assetcalc.net/

Significant/Systemic Findings and Deficiencies

Historical Summary

The Marion Cross School was originally constructed in 1898. Building additions were constructed in phases in 1950, 1960, and 1989. The last building phase involved the construction of the Multi-Purpose Room, gymnasium, and library.

Architectural

A partial roof replacement was done in 2013, but most of the roofs were replaced/installed in 1989. According to a prior roof study, there are isolated areas of the roof that are subject to ponding. This was made evident by ceiling leaks observed in multiple rooms inside the school. Due to the roof being quite aged and worn out, replacement is recommended. Interior and exterior wall cracking observed on the expansion joints around the gymnasium building will require periodic sealing. According to the point of contact, there are no issues with building settlement. However, due to the age of the building, routine maintenance checks on the foundation are recommended. The windows on the 1898 portion of the school are single glazed and are recommended to be upgraded with double glazed windows upon replacement.

The interior finishes are replaced on an as needed basis. Most of the finishes are from the 1989 renovation. There were two interior renovations last year that involved constructing walls to create more offices and installing an ADA accessible restroom. Some of the classroom doors were also replaced with the past year and are in excellent condition. Typical lifecycle based interior and exterior finish replacements are budgeted and anticipated.

Mechanical, Electrical, Plumbing and Fire (MEPF)

The HVAC system consists of a central boiler system with one pair of boilers heating the older sections of the school and another pair heating the newer sections. The oldest boiler originates back to the 1989 renovation, and the newer boilers were replaced in 2011. Multiple energy efficiency improvements have been implemented including the installation of a new building automation system in 2020 and the addition of energy recovery units.

The electrical wiring and equipment vary in age throughout the building. An electrical inspection was done on April 19, 2022, and any deficiencies that were reported have since been repaired. The electrical system is controlled by a series of main safety switches. There are also solar panels located on the exterior of the building that were installed in 2000 and are in overall fair working condition.

Hot water is supplied by vertical tank water heaters and the boilers in the newer section of the school. During the summer, the boilers are turned off, and domestic hot water is supplied solely by the vertical tank water heaters. The tank water heaters were replaced in 2015 and 2017. Typical commercial plumbing fixtures are utilized in the restrooms.

Fire suppression mainly consists of fire extinguishers and nearby fire hydrants. There is a fire sprinkler system for the mechanical areas and utility closets of the building. The fire alarm system was last upgraded in 2021 with new devices and a new fire alarm control panel.

Site

Significant areas of asphalt pavement cracking were observed in the rear and front entrance parking lots. Mill and overlay of the damaged areas are recommended during the reserve term. The exterior basketball courts also have significant cracking. Site lighting has been upgraded with LED fixtures and appears to be adequate for the facility's needs. Poor site drainage has been a major issue at the property in both the rear and front playing fields. Evidence of significant ponding and freezing was observed during the on-site visit. There is also an issue with sewage coming up to the front field. The school has its own on-site septic system that was installed in 1989. There are issues with the leach field freezing. A state engineer has already been acquired to study the sewage issues. However, management is reportedly still working on a proper solution for the problem. An estimated budgetary cost has been included in the capital planning database for the site drainage issue.

Recommended Additional Studies

No additional studies recommended at this time.

Facility Condition Index (FCI)

One of the major goals of the FCA is to calculate each building's Facility Condition Index (FCI), which provides a theoretical objective indication of a building's overall condition. By definition, the FCI is defined as the ratio of the cost of current needs divided by current replacement value (CRV) of the facility. The chart below presents the industry standard ranges and cut-off points.

FCI Ranges and Description	
0 – 5%	In new or well-maintained condition, with little or no visual evidence of wear or deficiencies.
5 – 10%	Subjected to wear but is still in a serviceable and functioning condition.
10 – 30%	Subjected to hard or long-term wear. Nearing the end of its useful or serviceable life.
30% and above	Has reached the end of its useful or serviceable life. Renewal is now necessary.

The deficiencies and lifecycle needs identified in this assessment provide the basis for a portfolio-wide capital improvement funding strategy. In addition to the current FCI, extended FCI's have been developed to provide owners the intelligence needed to plan and budget for the "keep-up costs" for their facilities. As such the 3-year, 5-year, and 10-year FCI's are calculated by dividing the anticipated needs of those respective time periods by current replacement value. As a final point, the FCI's ultimately provide more value when used to relatively compare facilities across a portfolio instead of being over-analyzed and scrutinized as stand-alone values. The table below summarizes the individual findings for this FCA:

FCI Analysis | Marion Cross School

Replacement Value	*Total SF*	*Cost/SF*
$ 24,617,500	*57,250*	*$ 430*

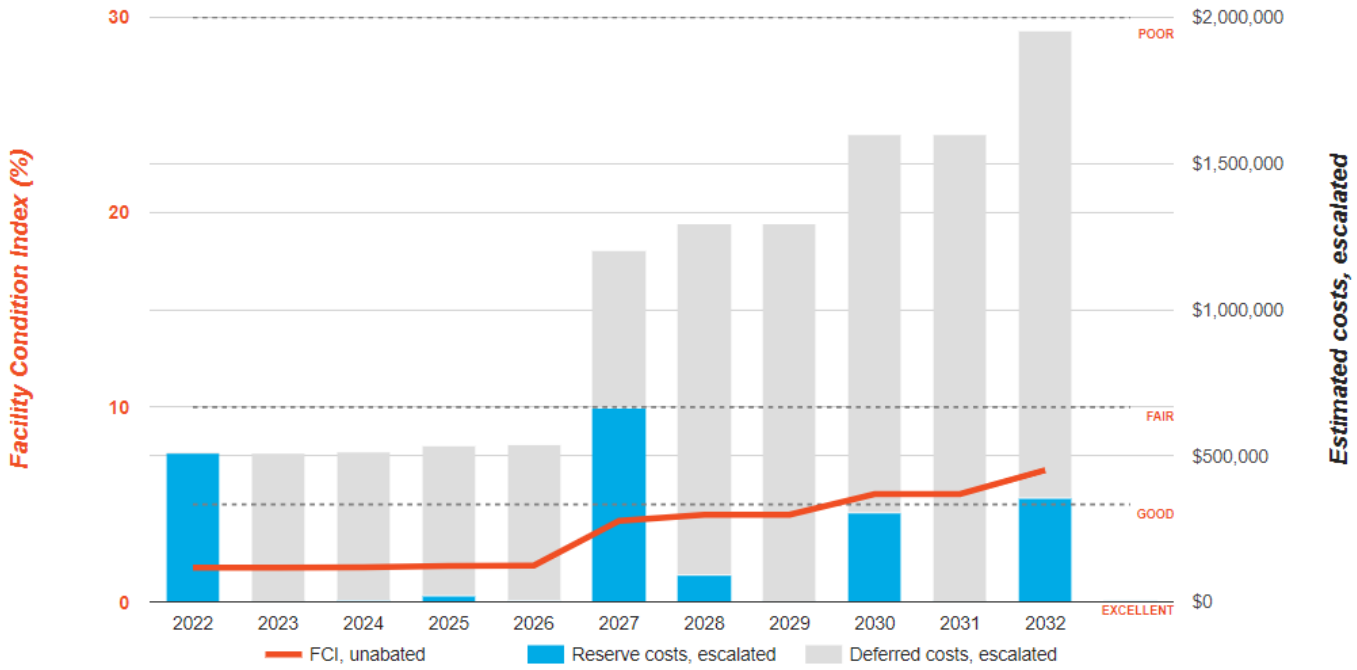
	Est Reserve Cost	FCI
Current	$ 508,800	2.1 %
3-Year	$ 623,700	2.5 %
5-Year	$ 1,290,500	5.2 %
10-Year	$ 2,126,600	8.6 %

The vertical bars below represent the year-by-year needs identified for the site. The orange line in the graph below forecasts what would happen to the FCI (left Y axis) over time, assuming zero capital expenditures over the next ten years. The dollar amounts allocated for each year (blue bars) are associated with the values along the right Y axis.

Needs by Year with Unaddressed FCI Over Time

FCI Analysis: Marion Cross School Buildings and Site

Replacement Value: $0 Inflation Rate: 3.0% Average Needs per Year: $177,800



Immediate Needs

Facility/Building	Total Items	Total Cost
Marion Cross School	5	$188,800
Total	**5**	**$188,800**

Marion Cross School

ID	Location	Location Description	UF Code	Description	Condition	Plan Type	Cost
4512478	Marion Cross School	Building Exterior	B2010	Exterior Walls, Brick, Repair/Repoint	Poor	Performance/Integrity	$6,600
4512411	Marion Cross School	Roof	B3010	Roofing, Single-Ply Membrane, EPDM, Replace	Poor	Performance/Integrity	$71,500
4512447	Marion Cross School	Gymnasium	C1010	Interior Wall, Concrete Block (CMU), Repair/Repoint	Poor	Performance/Integrity	$4,000
4512362	Marion Cross School	Stairwell	C1010	Interior Wall Construction, Brick, Repair	Poor	Performance/Integrity	$1,700
4512383	Marion Cross School	Rear Playground Area	G3030	Storm Drainage System, Inlets & Underground Piping, All-Inclusive, Replace	Poor	Performance/Integrity	$105,000
Total (5 items)							**$188,800**

Key Findings

Exterior Walls in Poor condition.

Brick
Marion Cross School Building Exterior

Uniformat Code: B2010
Recommendation: **Repair/Repoint in 2022**

Priority Score: **89.9**

Plan Type:
Performance/Integrity

Cost Estimate: $6,600

**$$**$$

Brick veneer cracking at expansion joints. Caulking recommended - AssetCALC ID: 4512478

Roofing in Poor condition.

Single-Ply Membrane, EPDM
Marion Cross School Roof

Uniformat Code: B3010
Recommendation: **Replace in 2022**

Priority Score: **88.9**

Plan Type:
Performance/Integrity

Cost Estimate: $71,500

$$$$

Roof is aged and worn out. Leaks have occurred and are patched up as needed. Prior moisture analysis report showed isolated areas of moisture issues. - AssetCALC ID: 4512411

Roofing in Poor condition.

Single-Ply Membrane, TPO/PVC
Marion Cross School Roof

Uniformat Code: B3010
Recommendation: **Replace in 2022**

Priority Score: **88.9**

Plan Type:
Performance/Integrity

Cost Estimate: $425,000

$$$$

Roof is aged and worn out. Leaks have occurred and are patched up as needed. Prior moisture analysis report showed isolated areas of moisture issues. - AssetCALC ID: 4512455

Storm Drainage System in Poor condition.

Inlets & Underground Piping, All-Inclusive
Marion Cross School Rear Playground Area

Uniformat Code: G3030
Recommendation: **Replace in 2022**

Priority Score: **86.9**

Plan Type:
Performance/Integrity

Cost Estimate: $105,000

$$$$

Significant ponding in the rear and front fields. There is only one site drain at the southern end of the front field. There have been issues with the sewage system where sewage would come up onto the front field. A State Engineer has already come to observe the issues. The system is reportedly quite aged. - AssetCALC ID: 4512383

Interior Wall Construction in Poor condition.

Brick
Marion Cross School Stairwell

Uniformat Code: C1010
Recommendation: **Repair in 2022**

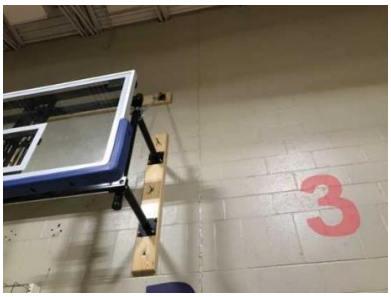
Priority Score: **84.9**

Plan Type:
Performance/Integrity

Cost Estimate: $1,700

$$$$

Interior wall cracking observed in stairwell. Repair is recommended. - AssetCALC ID: 4512362



Interior Wall in Poor condition.

Concrete Block (CMU)
Marion Cross School Gymnasium

Uniformat Code: C1010
Recommendation: **Repair/Repoint in 2022**

Priority Score: **84.9**

Plan Type:
Performance/Integrity

Cost Estimate: $4,000

**$$**$$

Interior wall cracking at expansion joints - AssetCALC ID: 4512447

Parking Lots in Poor condition.

Pavement, Asphalt
Marion Cross School Rear Parking

Uniformat Code: G2020
Recommendation: **Mill & Overlay in 2023**

Priority Score: **84.8**

Plan Type:
Performance/Integrity

Cost Estimate: $70,000

$$$$

Significant alligator cracking - AssetCALC ID: 4512433

Parking Lots in Poor condition.

Pavement, Asphalt
Marion Cross School North Entrance Parking

Uniformat Code: G2020
Recommendation: **Mill & Overlay in 2023**

Priority Score: **84.8**

Plan Type:
Performance/Integrity

Cost Estimate: $21,000

**$$$**$

Isolated areas of asphalt cracking and pothole - AssetCALC ID: 4512349

Athletic Surfaces & Courts in Poor condition.

Basketball/General, Asphalt Pavement
Marion Cross School Site

Uniformat Code: G2050
Recommendation: **Mill & Overlay in 2023**

Priority Score: **82.8**

Plan Type:
Performance/Integrity

Cost Estimate: $8,800

**$$**$$

Cracking on basketball court. POC reported that repairs will occur only after site drainage issues are resolved. - AssetCALC ID: 4512392

Athletic Surfaces & Courts in Poor condition.

Basketball/General, Asphalt Pavement
Marion Cross School Site

Uniformat Code: G2050
Recommendation: **Mill & Overlay in 2023**

Priority Score: **82.8**

Plan Type: Performance/Integrity

Cost Estimate: $8,800

**$$**$$

Cracking on basketball court. POC reported that repairs will occur only after site drainage issues are resolved. - AssetCALC ID: 4512423

Suspended Ceilings in Poor condition.

Acoustical Tile (ACT)
Marion Cross School Throughout building

Uniformat Code: C1070
Recommendation: **Replace in 2024**

Priority Score: **81.7**

Plan Type: Performance/Integrity

Cost Estimate: $3,500

**$$**$$

Isolated ceiling tiles damaged by leaks. Replacement is recommended to prevent mold issues. - AssetCALC ID: 4512354

Plan Types

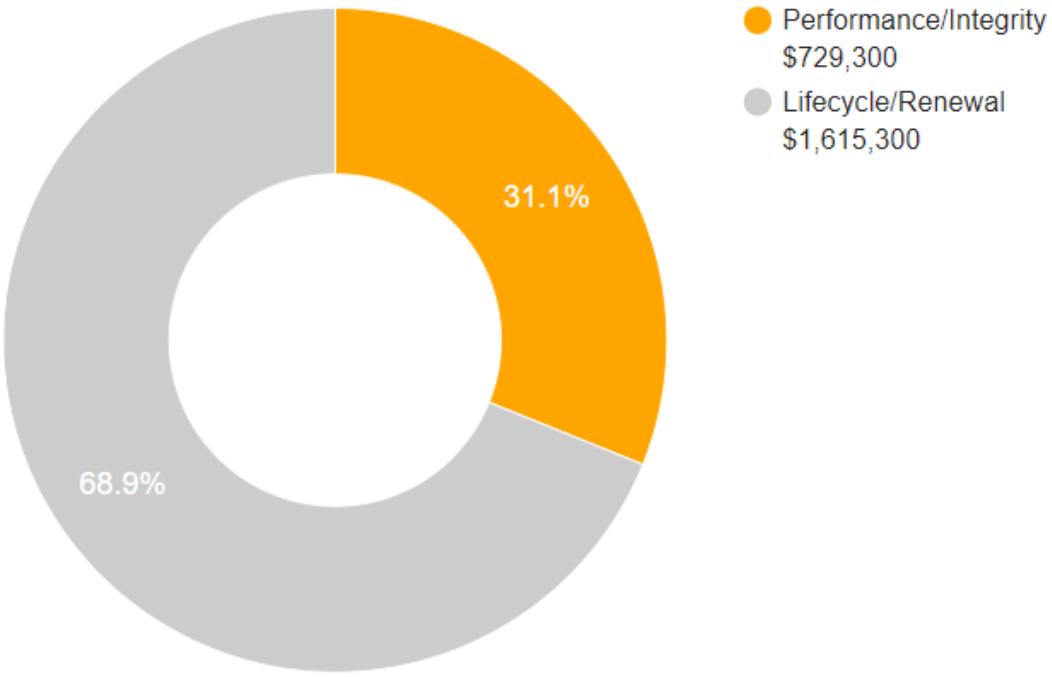
Each line item in the cost database is assigned a Plan Type, which is the primary reason or rationale for the recommended replacement, repair, or other corrective action. This is the “why” part of the equation. A cost or line item may commonly have more than one applicable Plan Type; however, only one Plan Type will be assigned based on the “best” fit, typically the one with the greatest significance.

Plan Type Descriptions		
Safety	■	An observed or reported unsafe condition that if left unaddressed could result in injury; a system or component that presents potential liability risk.
Performance/Integrity	■	Component or system has failed, is almost failing, performs unreliably, does not perform as intended, and/or poses risk to overall system stability.
Accessibility	■	Does not meet ADA, UFAS, and/or other handicap accessibility requirements.
Environmental	■	Improvements to air or water quality, including removal of hazardous materials from the building or site.
Retrofit/Adaptation	■	Components, systems, or spaces recommended for upgrades in in order to meet current standards, facility usage, or client/occupant needs.

Plan Type Descriptions

Lifecycle/Renewal — Any component or system that is not currently deficient or problematic but for which future replacement or repair is anticipated and budgeted.

Plan Type Distribution (by Cost)



10-YEAR TOTAL: $2,344,600

2. Building and Site Information

Systems Summary

System	Description	Condition
Structure	Steel frame with concrete-topped metal decks over concrete raft foundation slab (newer sections) Masonry bearing walls with wood roof deck supported by wood joists on concrete raft foundation slab (older sections)	Fair
Façade	Primary Wall Finish: Brick Secondary Wall Finish: EIFS Windows: Aluminum, wood	Good
Roof	Primary: Flat construction with single-ply TPO/PVC membrane Secondary: Flat construction with single-ply EPDM membrane Additional roofs: Sloped construction with asphalt shingles	Poor
Interiors	Walls: Painted gypsum board and CMU Floors: Carpet, VCT, ceramic tile, quarry tile, wood strip, coated concrete Ceilings: ACT	Fair
Elevators	Passenger: One hydraulic car serving all floors	Fair
Plumbing	Distribution: Copper supply and cast iron waste & venting Hot Water: Fuel oil boilers and electric and fuel oil water heaters with integral tanks Fixtures: Toilets, urinals, and sinks in all restrooms	Fair
HVAC	Central System: Boilers feeding air handlers, hydronic baseboard radiators and unit ventilators Non-Central System: Packaged units, ductless split-systems	Fair
Fire Suppression	Wet-pipe sprinkler system in mechanical areas, fire extinguishers, kitchen hood system	Fair

Systems Summary

Electrical	Source & Distribution: Main safety switches with copper wiring Interior Lighting: LED, linear fluorescent, CFL Emergency Power: None	Fair
Fire Alarm	Alarm panel with smoke detectors, heat detectors, alarms, strobes, pull stations, back-up emergency lights, and exit signs	Good
Equipment/Special	Commercial kitchen equipment	Good
Site Pavement	Asphalt lots with limited areas of concrete aprons and pavement and adjacent concrete sidewalks and curbs	Poor
Site Development	Building-mounted signage; wooden fencing Limited picnic tables	Fair
Landscaping and Topography	Significant landscaping features including lawns and trees Irrigation not present Low to moderate site slopes throughout	Fair
Utilities	Municipal water, on-site wells and septic Local utility-provided electric and fuel oil tanks	Fair
Site Lighting	Pole-mounted: LED Building-mounted: LED	Fair
Ancillary Structures	Storage sheds	Fair
Accessibility	Presently it does not appear an accessibility study is needed for this property.	
Key Issues and Findings	Aged and leaking roof, interior and exterior cracking at expansion joints, leak damaged ceiling tiles, asphalt alligator cracking and potholes, exterior basketball court cracking, poor site drainage, sewage issues	

Systems Expenditure Forecast

System	Immediate	Short Term (1-2 yr)	Near Term (3-5 yr)	Med Term (6-10 yr)	Long Term (11-20 yr)	TOTAL
Facade	$6,600	-	-	$176,186	$59,167	$241,953
Roofing	$496,500	-	$22,837	-	$896,733	$1,416,070
Interiors	$5,650	$3,713	$343,736	$187,153	$1,033,235	$1,573,487
Conveying	-	-	$3,477	-	$113,730	$117,207
Plumbing	-	-	-	$7,289	$1,117,584	$1,124,873
HVAC	-	-	$299,750	$119,317	$976,156	$1,395,223
Fire Protection	-	-	-	$7,405	$3,142	$10,547
Electrical	-	-	-	$53,219	$1,605,485	$1,658,704
Fire Alarm & Electronic Systems	-	-	-	$145,045	$534,035	$679,080
Equipment & Furnishings	-	-	$19,821	$50,450	$44,472	$114,743
Special Construction & Demo	-	-	-	$6,719	$15,579	$22,298
Site Development	-	$22,267	$4,637	$63,928	$84,893	$175,725
Site Pavement	-	$93,730	-	-	$14,391	$108,121
Site Utilities	$105,000	-	$65,563	$34,500	-	$205,063
TOTALS (3% inflation)	**$613,800**	**$119,800**	**$759,900**	**$851,300**	**$6,498,700**	**$8,843,500**

3. Property Space Use and Observed Areas

Areas Observed

The interior spaces were observed in order to gain a clear understanding of the property's overall condition. Other areas accessed included the site within the property boundaries and the exterior of the property.

Key Spaces Not Observed

Areas of note that were either inaccessible or not observed for other reasons are listed here:

- Roof; safety concerns due to icy conditions on roof

4. ADA Accessibility

Generally, Title II of the Americans with Disabilities Act (ADA) prohibits discrimination by entities to access and use of "areas of public accommodations" and "public facilities" on the basis of disability. Regardless of their age, these areas and facilities must be maintained and operated to comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

A public entity (i.e. city governments) shall operate each service, program, or activity so that the service, program, or activity, when viewed in its entirety, is readily accessible to and usable by individuals with disabilities.

However, this does not:

1. Necessarily require a public entity to make each of its existing facilities accessible to and usable by individuals with disabilities;
2. Require a public entity to take any action that would threaten or destroy the historic significance of an historic property; or
3. Require a public entity to take any action that it can demonstrate would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens. In those circumstances where personnel of the public entity believe that the proposed action would fundamentally alter the service, program, or activity or would result in undue financial and administrative burdens, a public entity has the burden of proving that compliance with 35.150(a) of this part would result in such alteration or burdens. The decision that compliance would result in such alteration or burdens must be made by the head of a public entity or his or her designee after considering all resources available for use in the funding and operation of the service, program, or activity, and must be accompanied by a written statement of the reasons for reaching that conclusion. If an action would result in such an alteration or such burdens, a public entity shall take any other action that would not result in such an alteration or such burdens but would nevertheless ensure that individuals with disabilities receive the benefits or services provided by the public entity.

Removal of barriers to accessibility should be addressed from a liability standpoint in order to comply with federal law, but the barriers may or may not be building code violations. The Americans with Disabilities Act Accessibility Guidelines are part of the ADA federal civil rights law pertaining to the disabled and are not a construction code. State and local jurisdictions have adopted the ADA Guidelines or have adopted other standards for accessibility as part of their construction codes.

During the FCA, Bureau Veritas performed a limited high-level accessibility review of the facility non-specific to any local regulations or codes. The scope of the visual observation was limited to the same areas observed while performing the FCA and the categories set forth in the tables that are included in the appendix. It is understood by the Client that the limited observations described herein do not comprise a full ADA Compliance Survey, and that such a survey is beyond the scope of this particular assessment. A full measured ADA survey would be required to identify any and all specific potential accessibility issues. Additional clarifications of this limited survey:

- This survey was visual in nature and actual measurements were not taken to verify compliance
- Only a representative sample of areas was observed
- Two overview photos were taken for each subsection regardless of perceived compliance or non-compliance
- Itemized costs for individual non-compliant items are not included in the dataset
- For any "none" boxes checked or reference to "no issues" identified, that alone does not guarantee full compliance

The original part of the facility was originally constructed in 1898, with additions in 1954, 1960, and 1989. The facility was substantially renovated in 1989 and some accessibility improvements appear to have been implemented at that time.

Complaints about accessibility issues have been sporadically received by property management, although no prior or pending litigation was reported.

A prior accessibility survey was performed during the 1989 renovation. From BV's perspective and limited analysis of the documents provided in conjunction with our own site visit, it appears that the recommendations from that study have been partially addressed. A line item by line item comparison between the prior study and BV's recent observations are beyond the scope of this assessment. Reference the appendix for specific data, photos, and tables or checklists associated with this limited accessibility survey.

5. Purpose and Scope

Purpose

Bureau Veritas was retained by the client to render an opinion as to the Property's current general physical condition on the day of the site visit.

Based on the observations, interviews and document review outlined below, this report identifies significant deferred maintenance issues, existing deficiencies, and material code violations of record, which affect the Property's use. Opinions are rendered as to its structural integrity, building system condition and the Property's overall condition. The report also notes building systems or components that have realized or exceeded their typical expected useful lives.

The physical condition of building systems and related components are typically defined as being in one of five condition ratings. For the purposes of this report, the following definitions are used:

Condition Ratings	
Excellent	New or very close to new; component or system typically has been installed within the past year, sound and performing its function. Eventual repair or replacement will be required when the component or system either reaches the end of its useful life or fails in service.
Good	Satisfactory as-is. Component or system is sound and performing its function, typically within the first third of its lifecycle. However, it may show minor signs of normal wear and tear. Repair or replacement will be required when the component or system either reaches the end of its useful life or fails in service.
Fair	Showing signs of wear and use but still satisfactory as-is, typically near the median of its estimated useful life. Component or system is performing adequately at this time but may exhibit some signs of wear, deferred maintenance, or evidence of previous repairs. Repair or replacement will be required due to the component or system's condition and/or its estimated remaining useful life.
Poor	Component or system is significantly aged, flawed, functioning intermittently or unreliably; displays obvious signs of deferred maintenance; shows evidence of previous repair or workmanship not in compliance with commonly accepted standards; has become obsolete; or exhibits an inherent deficiency. The present condition could contribute to or cause the deterioration of contiguous elements or systems. Either full component replacement is needed or repairs are required to restore to good condition, prevent premature failure, and/or prolong useful life.
Failed	Component or system has ceased functioning or performing as intended. Replacement, repair, or other significant corrective action is recommended or required.
Not Applicable	Assigning a condition does not apply or make logical sense, most commonly due to the item in question not being present.

Scope

The standard scope of the Facility Condition Assessment includes the following:

- Visit the Property to evaluate the general condition of the building and site improvements, review available construction documents in order to familiarize ourselves with, and be able to comment on, the in-place construction systems, life safety, mechanical, electrical, and plumbing systems, and the general built environment.
- Identify those components that are exhibiting deferred maintenance issues and provide cost estimates for Immediate Costs and Replacement Reserves based on observed conditions, maintenance history and industry standard useful life estimates. This will include the review of documented capital improvements completed within the last five-year period and work currently contracted for, if applicable.
- Provide a full description of the Property with descriptions of in-place systems and commentary on observed conditions.
- Provide a high-level categorical general statement regarding the subject Property's compliance to Title III of the Americans with Disabilities Act. This will not constitute a full ADA survey, but will help identify exposure to issues and the need for further review.
- Obtain background and historical information about the facility from a building engineer, property manager, maintenance staff, or other knowledgeable source. The preferred methodology is to have the client representative or building occupant complete a Pre-Survey Questionnaire (PSQ) in advance of the site visit. Common alternatives include a verbal interview just prior to or during the walk-through portion of the assessment.
- Review maintenance records and procedures with the in-place maintenance personnel.
- Observe a representative sample of the interior spaces/units, including vacant spaces/units, to gain a clear understanding of the property's overall condition. Other areas to be observed include the exterior of the property, the roofs, interior common areas, and the significant mechanical, electrical and elevator equipment rooms.
- Provide recommendations for additional studies, if required, with related budgetary information.
- Provide an Executive Summary at the beginning of this report, which highlights key findings and includes a Facility Condition Index as a basis for comparing the relative conditions of the buildings within the portfolio.

6. Opinions of Probable Costs

Cost estimates are attached throughout this report, with the Replacement Reserves in the appendix.

These estimates are based on Invoice or Bid Document/s provided either by the Owner/facility and construction costs developed by construction resources such as *R.S. Means, CBRE Whitestone,* and *Marshall & Swift,* Bureau Veritas's experience with past costs for similar properties, city cost indexes, and assumptions regarding future economic conditions.

Opinions of probable costs should only be construed as preliminary, order of magnitude budgets. Actual costs most probably will vary from the consultant's opinions of probable costs depending on such matters as type and design of suggested remedy, quality of materials and installation, manufacturer and type of equipment or system selected, field conditions, whether a physical deficiency is repaired or replaced in whole, phasing or bundling of the work (if applicable), quality of contractor, quality of project management exercised, market conditions, use of subcontractors, and whether competitive pricing is solicited, etc. Certain opinions of probable costs cannot be developed within the scope of this guide without further study. Opinions of probable cost for further study should be included in the FCA.

Definitions

Immediate Needs

Immediate Needs are line items that require immediate action as a result of: (1) material existing or potential unsafe conditions, (2) failed or imminent failure of mission critical building systems or components, or (3) conditions that, if not addressed, have the potential to result in, or contribute to, critical element or system failure within one year or will most probably result in a significant escalation of its remedial cost.

For database and reporting purposes the line items with RUL=0, and commonly associated with *Safety* or *Performance/Integrity* Plan Types, are considered Immediate Needs.

Replacement Reserves

Cost line items traditionally called Replacement Reserves (equivalently referred to as Lifecycle/Renewals) are for recurring probable renewals or expenditures, which are not classified as operation or maintenance expenses. The replacement reserves should be budgeted for in advance on an annual basis. Replacement Reserves are reasonably predictable both in terms of frequency and cost. However, Replacement Reserves may also include components or systems that have an indeterminable life but, nonetheless, have a potential for failure within an estimated time period.

Replacement Reserves generally exclude systems or components that are estimated to expire after the reserve term and are not considered material to the structural and mechanical integrity of the subject property. Furthermore, systems and components that are not deemed to have a material effect on the use of the Property are also excluded. Costs that are caused by acts of God, accidents, or other occurrences that are typically covered by insurance, rather than reserved for, are also excluded.

Replacement costs are solicited from ownership/property management, Bureau Veritas's discussions with service companies, manufacturers' representatives, and previous experience in preparing such schedules for other similar facilities. Costs for work performed by the ownership's or property management's maintenance staff are also considered.

Bureau Veritas's reserve methodology involves identification and quantification of those systems or components requiring capital reserve funds within the assessment period. The assessment period is defined as the effective age plus the reserve term. Additional information concerning system's or component's respective replacement costs (in today's dollars), typical expected useful lives, and remaining useful lives were estimated so that a funding schedule could be prepared. The Replacement Reserves Schedule presupposes that all required remedial work has been performed or that monies for remediation have been budgeted for items defined as Immediate Needs.

For the purposes of 'bucketizing' the System Expenditure Forecasts in this report, the Replacement Reserves have been subdivided and grouped as follows: Short Term (years 1-3), Near Term (years 4-5), Medium Term (years 6-10), and Long Term (years 11-20).

Key Findings

In an effort to highlight the most significant cost items and not be overwhelmed by the Replacement Reserves report in its totality, a subsection of Key Findings is included within the Executive Summary section of this report. Key Findings typically include repairs or replacements of deficient items within the first five-year window, as well as the most significant high-dollar line items that fall anywhere within the ten-year term. Note that while there is some subjectivity associated with identifying the Key Findings, the Immediate Needs are always included as a subset.

Exceedingly Aged

A fairly common scenario encountered during the assessment process, and a frequent source of debate, occurs when classifying and describing "very old" systems or components that are still functioning adequately and do not appear nor were reported to be in any way deficient. To help provide some additional intelligence on these items, such components will be tagged in the database as Exceedingly Aged. This designation will be reserved for mechanical or electrical systems or components that have aged well beyond their industry standard lifecycles, typically at least 15 years beyond and/or twice their Estimated Useful Life (EUL). In tandem with this designation, these items will be assigned a Remaining Useful Life (RUL) not less than two years but not greater than 1/3 of their standard EUL. As such the recommended replacement time for these components will reside outside the typical Short Term window but will not be pushed 'irresponsibly' (too far) into the future.

Methodology

Based upon site observations, research, and judgment, along with referencing Expected Useful Life (EUL) tables from various industry sources, Bureau Veritas opines as to when a system or component will most probably necessitate replacement. Accurate historical replacement records, if provided, are typically the best source of information. Exposure to the elements, initial quality and installation, extent of use, the quality and amount of preventive maintenance exercised, etc., are all factors that impact the effective age of a system or component. As a result, a system or component may have an effective age that is greater or less than its actual chronological age. The Remaining Useful Life (RUL) of a component or system equals the EUL less its *effective age*, whether explicitly or implicitly stated. Projections of Remaining Useful Life (RUL) are based primarily on age and condition with the presumption of continued use and maintenance of the Property similar to the observed and reported past use and maintenance practices, in conjunction with the professional judgment of Bureau Veritas's assessors. Significant changes in occupants and/or usage may affect the service life of some systems or components.

Where quantities could not be or were not derived from an actual construction document take-off or facility walk-through, and/or where systemic costs are more applicable or provide more intrinsic value, budgetary square foot and gross square foot costs are used. Estimated costs are based on professional judgment and the probable or actual extent of the observed defect, inclusive of the cost to design, procure, construct and manage the corrections.

7. Net Zero Energy Audit

The purpose of this Net Zero Energy Audit is to provide Marion Cross School with a baseline of energy usage, the relative energy efficiency of the facility, and specific recommendations for both renewable and non-renewable Energy Conservation Measures to reduce the carbon emissions from building operations to net zero. This is achieved through the following steps:

1. Benchmark the building using EPA -portfolio manager tool to understand the existing carbon foot print.
2. Identify ways to reduce and optimize energy use in building through retrofits and energy efficient replacments.
3. Electrification – replace all fossil fuel consuming HVAC and DWH systems with high efficiency electric equivanelts
4. Onsite generation- perform feasibility study on installing solar PV systems on building roof and carports to offset electric use at the site
5. Procure the balance of electricity from renewable source such as “Solar Farms” or “Wind Farms”.

This audit will focus on the first four steps of the process, terminating with performing a “Gap- Analysis” to project the carbon footprint of the building post implementation of all non-renewable and renewable energy + water saving measures at the building.

Historical Energy and Water Performance Metrics + EPA Benchmarking

- Establishing the energy baseline begins with an analysis of the utility cost and consumption of the facility. Utilizing the historical energy data and local weather information, we evaluate the existing utility consumption and assign it to the various end-uses throughout the buildings.
- On developing a baseline, Bureau Veritas uses the Portfolio Manager tool developed by the Federal Environmental Protection Agency to track relative energy uses of buildings by property type.

Energy and Water Use Optimization Audit

The energy audit consisted of an onsite visual assessment to determine current conditions, itemize the energy consuming equipment (i.e. Boilers, Make-Up Air Units, DWH equipment); review lighting systems both exterior and interior; and review efficiency of all such equipment. The study also included interviews and consultation with operational and maintenance personnel. The energy audit process includes the following:

- Interviewing staff and review plans and past upgrades
- Performing an energy audit for each use type
- Performing a preliminary evaluation of the utility system
- Analyzing findings, utilizing ECM cost-benefit worksheets
- Making preliminary recommendations for system energy improvements and measures
- Estimating initial cost and changes in operating and maintenance costs based on implementation of energy efficiency measures.
- Ranking recommended cost measures, based on the criticality of the project and the largest payback.

Electrification

This includes identifying all fossil fuel burning HVAC and DWH systems and identifying optimal energy efficient electric alternatives to offset any Scope -II emissions from building operations.

Onsite Generation

This includes conducting feasibility study for onsite energy generation through renewable energy sources such as roof top solar PV to offset the electric use at the building.

8. Historical Energy and Water Performance Metrics

Utility Data Tabulation Methodology

The baseline utility consumption data for the proper has been developed by aggregating the consumption from one electric meter, fuel oil delivery data, and one water meter.

Data Limitation:
No assumptions were made in tabulation of the utility data for the purposes of the audit.

Utilities Metering at Glance	
Number of electric meters observed	One
Number of gas meters observed	None
Number of central steam meters observed	None
Number of domestic water meter observed	One

Average Utility Rates				
Electricity	Natural Gas	Steam	Propane / No.2 Oil	Water & Sewer
Average Rate	Average Rate	Average Rate	Average Rate	Blended Rate
$0.18/kWh	N/A	N/A	$1.95/Gal	$11.55/kgal

Electricity

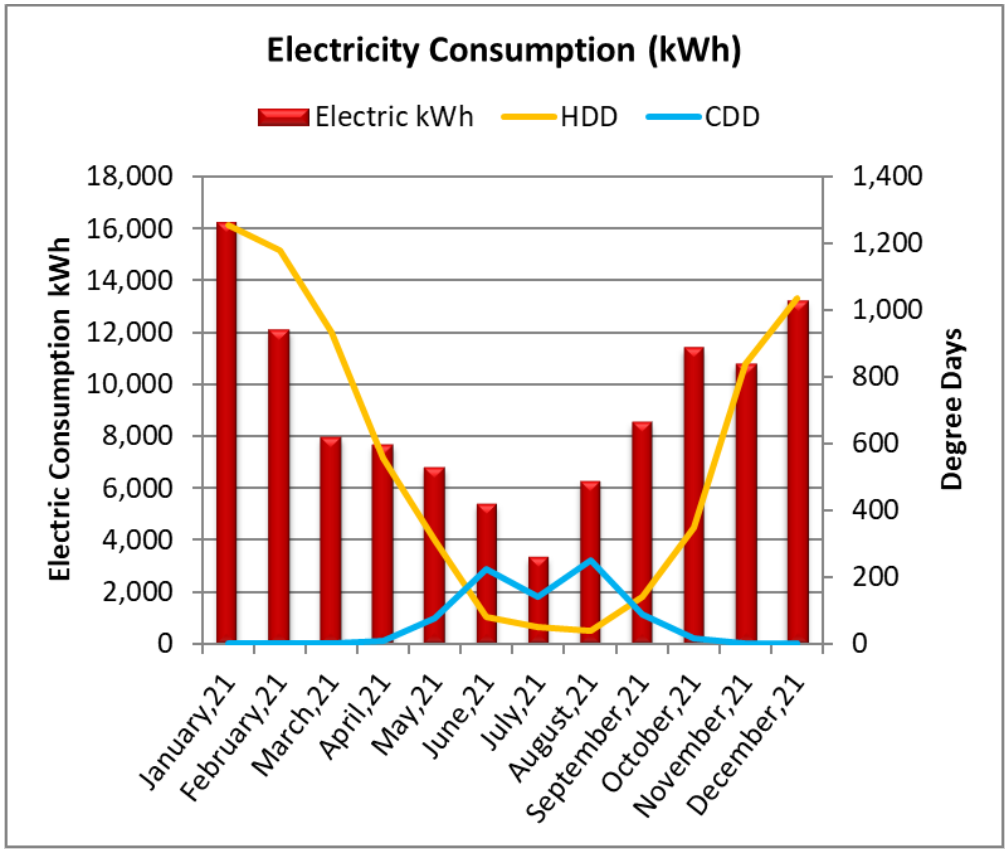
Green Mountain Power provides the electrical service to the facility.

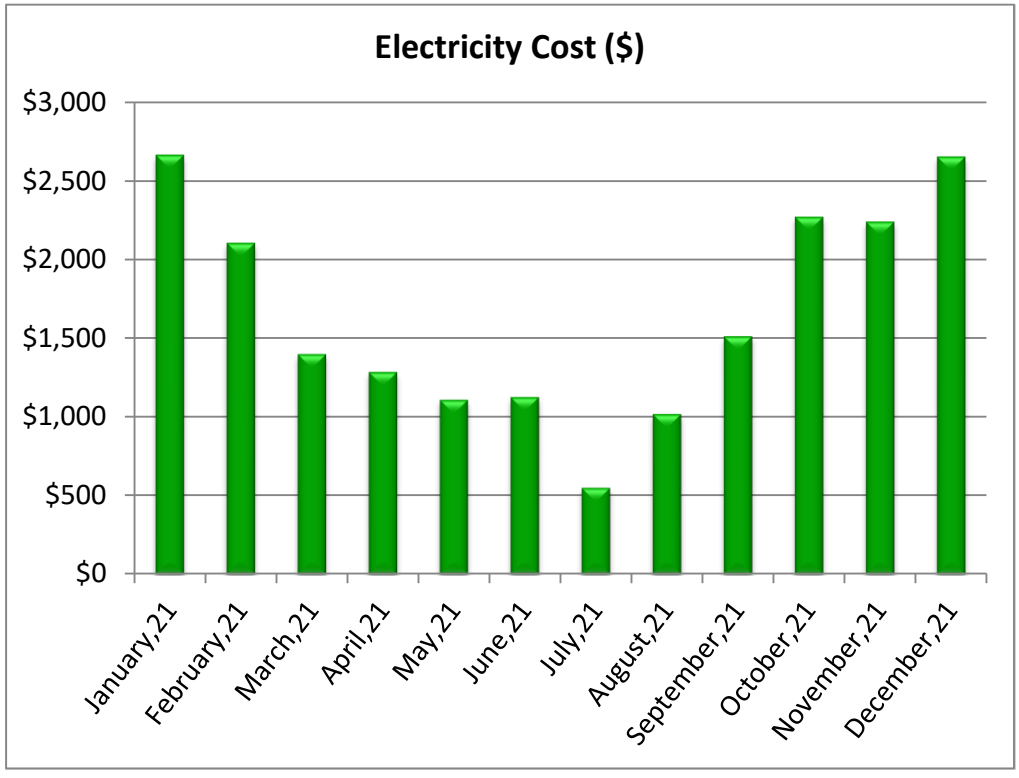
The consumption pattern for the period under consideration varies seasonally. The seasonal variation in the consumption is primarily attributed to the heating and cooling loads, while the static base load primarily consists of lighting, appliances, and domestic water heating.

"Heating degree days", or "HDD", are a measure of how much (in degrees), and for how long (in days), outside air temperature was lower than a specific "base temperature" (in this case 65F). They are widely used in the energy industry for calculations relating to the effect of outside air temperature on building energy consumption.

"Cooling degree days", or "CDD", are a measure of how much (in degrees), and for how long (in days), outside air temperature was higher than a specific base temperature. They are used for calculations relating to the energy consumption required to cool buildings.

Electricity Consumption & Cost Data			
Billing Month	Consumption (kWh)	Unit Cost (per kWh)	Total Cost
January, 2021	16,186	$0.16	$2,664
February, 2021	12,070	$0.17	$2,105
March, 2021	7,926	$0.18	$1,399
April, 2021	7,676	$0.17	$1,286
May, 2021	6,765	$0.16	$1,110
June, 2021	5,391	$0.21	$1,127
July, 2021	3,335	$0.17	$551
August, 2021	6,263	$0.16	$1,018
September, 2021	8,526	$0.18	$1,512
October, 2021	11,418	$0.20	$2,271
November, 2021	10,787	$0.21	$2,239
December, 2021	13,205	$0.20	$2,653
TOTAL/AVERAGE	**109,548**	**$0.18**	**$19,935**


Electricity Consumption (kWh)
Electric kWh
HDD
CDD
Electric Consumption kWh
Degree Days
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1,400
1,200
1,000
800
600
400
200
0
January,21
February,21
March,21
April,21
May,21
June,21
July,21
August,21
September,21
October,21
November,21
December,21


Electricity Cost ($)
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
January,21
February,21
March,21
April,21
May,21
June,21
July,21
August,21
September,21
October,21
November,21
December,21

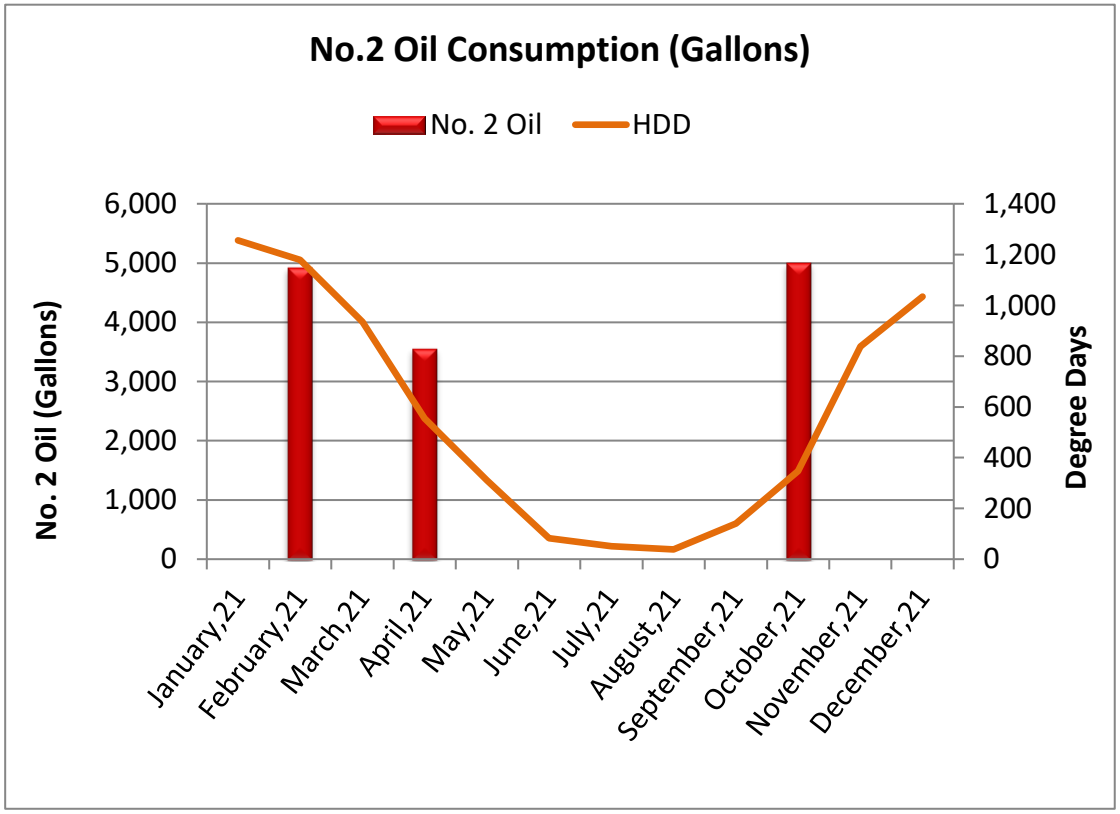
Fuel Oil

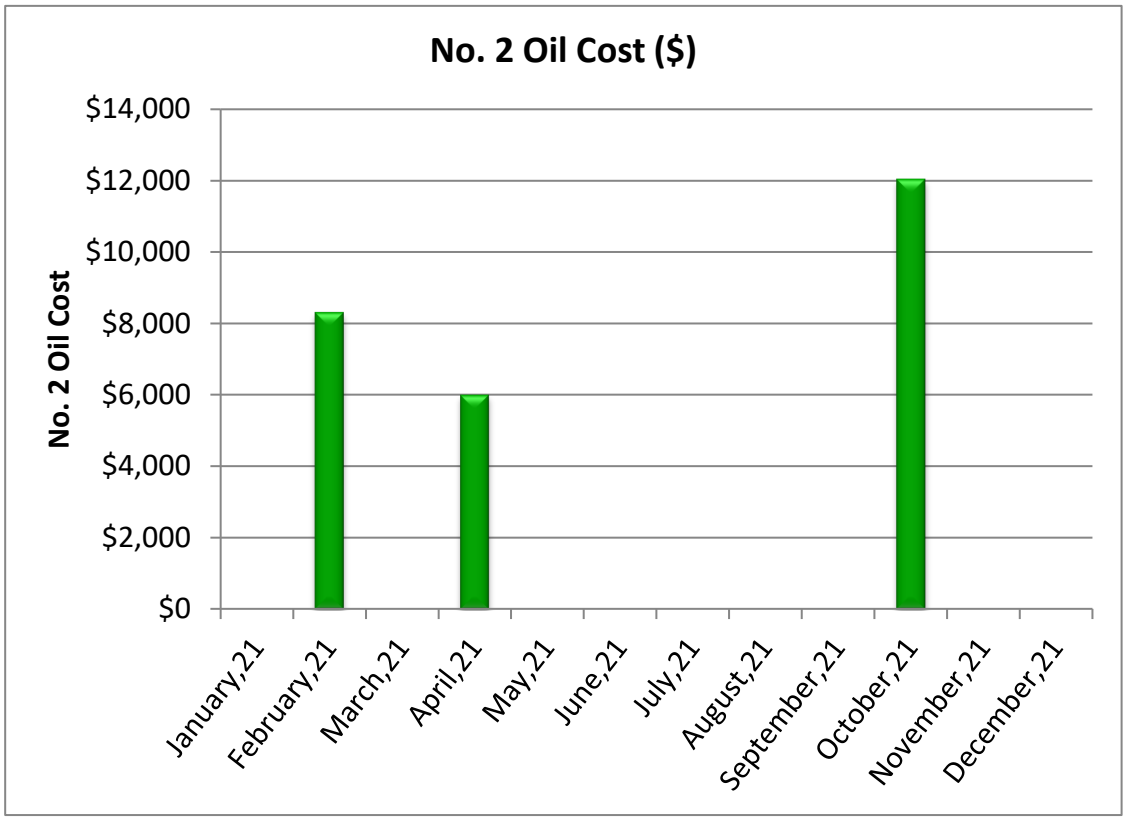
Dead River provides the fuel oil to the facility. The deliveries are made on an as-needed basis. The underground storage tanks are located near the front playground.

The primary use of the fuel oil is for space heating and domestic water heating. The consumption pattern for the period under consideration varies seasonally. The seasonal variation in the consumption is primarily attributed to the heating loads.

"Heating degree days", or "HDD", are a measure of how much (in degrees), and for how long (in days), outside air temperature was lower than a specific "base temperature" (in this case 65F). They are widely used in the energy industry for calculations relating to the effect of outside air temperature on building energy consumption.

Fuel Oil Consumption & Cost Data			
Delivery Month	Delivery (gallons)	Unit Cost (per gallon)	Total Cost
January, 2021	0	0	$0
February, 2021	4,922	$1.69	$8,303
March, 2021	0	0	$0
April, 2021	3,557	$1.69	$5,999
May, 2021	0	0	$0
June, 2021	0	0	$0
July, 2021	0	0	$0
August, 2021	0	0	$0
September, 2021	0	0	$0
October, 2021	5,003	$2.40	$12,025
November, 2021	0	0	$0
December, 2021	0	0	$0
Total	**13,481**	**$1.95**	**$26,328**


No.2 Oil Consumption (Gallons)
No. 2 Oil
HDD
No. 2 Oil (Gallons)
Degree Days
6,000
5,000
4,000
3,000
2,000
1,000
0
1,400
1,200
1,000
800
600
400
200
0
January,21
February,21
March,21
April,21
May,21
June,21
July,21
August,21
September,21
October,21
November,21
December,21

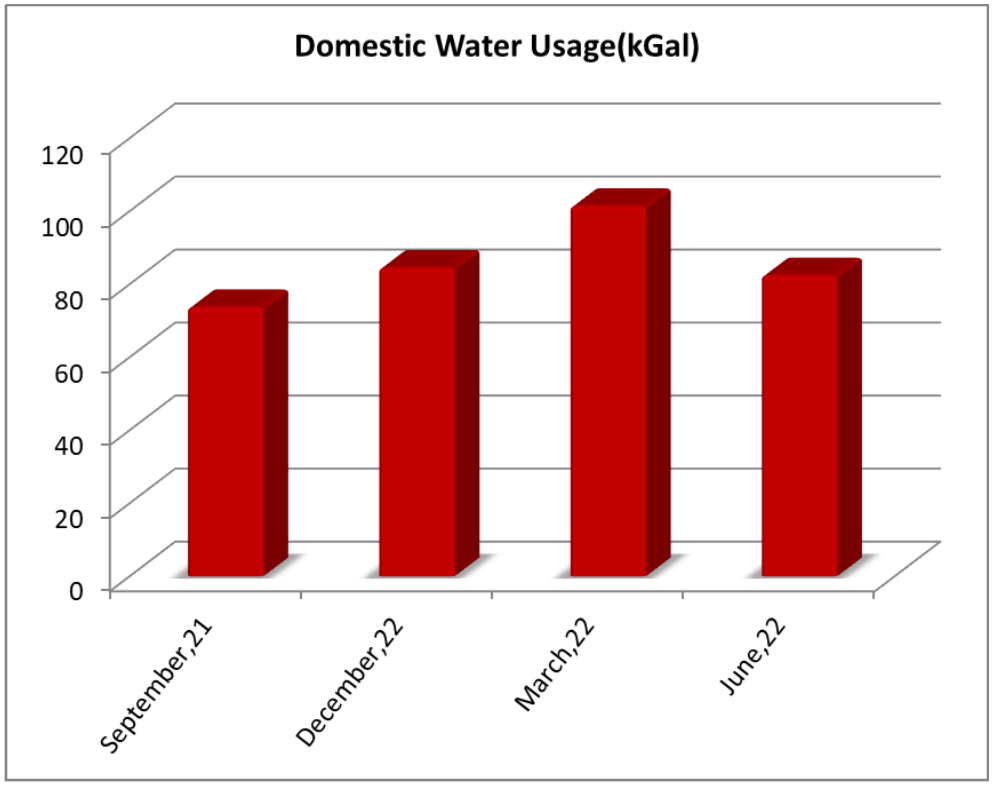

No. 2 Oil Cost ($)
No. 2 Oil Cost
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0
January,21
February,21
March,21
April,21
May,21
June,21
July,21
August,21
September,21
October,21
November,21
December,21

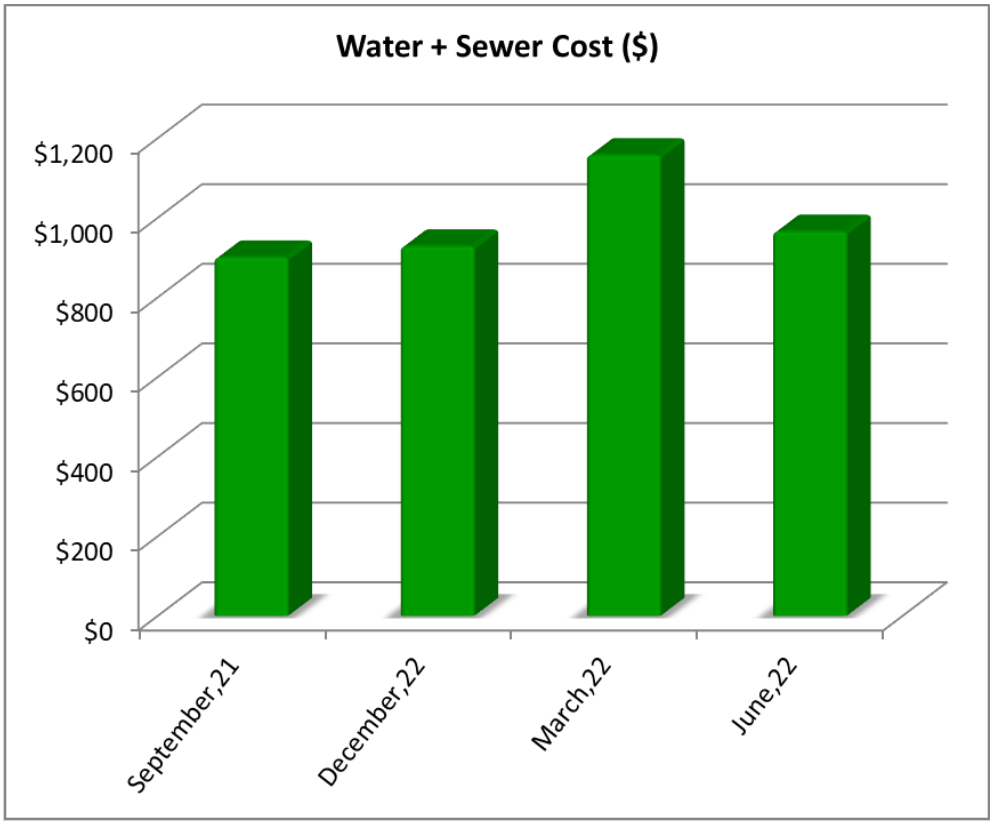
Water and Sewer

Norwich Fire District satisfies the water and sewer requirements of the facility. The billing for the water and sewer is annually.

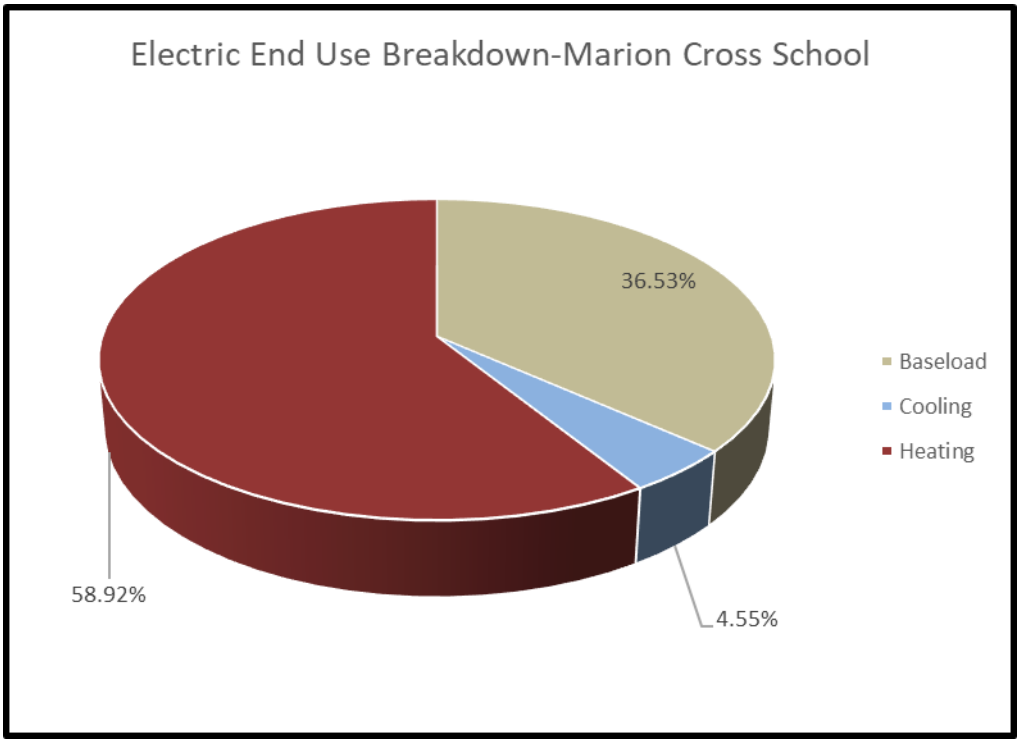
Based on the 2021-2022 water and sewer usage and costs provided, the average blended price paid during the year was $11.55 per kilogallon. The total annual consumption for the 12-month period analyzed is 342 kilogallons for a total cost of $3,950.

Water & Sewer Consumption & Cost Data			
Billing Month	Consumption (kGal)	Unit Cost (per kGal)	Total Cost
September,21	74	$12.21	$900
December,22	85	$10.98	$928
March,22	101	$11.41	$1,157
June,22	82	$11.71	$965
TOTAL/AVERAGE	**342**	**$11.55**	**$3,950**




Water + Sewer Cost ($)
$1,200
$1,000
$800
$600
$400
$200
$0
September,21
December,22
March,22
June,22

End Use Energy Distribution



Energy Star Portfolio Manager Facility Summary

Bureau Veritas uses the Portfolio Manager tool developed by the Federal Environmental Protection Agency to track relative energy uses of buildings by property type. This tool allows the input of a facility's historic utility data to be compared with normalized data of a large database of its peer facilities.

Based on this analysis, Marion Cross School is performing above the national average level.

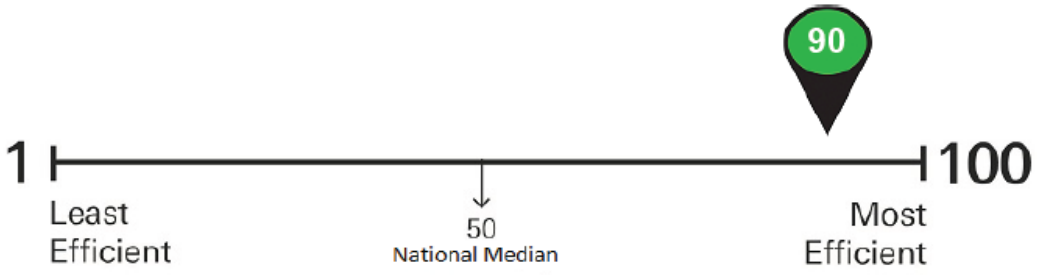
ENERGY STAR® Energy Performance Scorecard

90

out of 100

Marion Cross School

For Year Ending	December 31, 2021
Property Address	22 Church Street Norwich, Vermont 05055
Primary Function	K-12 School
Gross Floor Area (ft²)	57,250
Year built	1898
Energy Use per sq. ft.*	39 kBtu



What is the ENERGY STAR Score?
The ENERGY STAR score rates commercial building's energy performance relative to similar buildings nationwide. Expressed as a number on a simple 1-100 scale, the score rates performance on a percentile basis: a building with a score of 50 performs better than 50% of its peers. Higher scores mean better energy efficiency, resulting in less energy use and fewer greenhouse gas emissions. If a 1-100 score for a specific building type has not been developed, Site Energy Use Intensity (EUI) will be displayed on this scorecard.

Learn more at:
energystar.gov/scorecard

*Site energy use

EPA United States Environmental Protection Agency

Date Generated: December 05, 2022

9. Energy Conservation Measures

Bureau Veritas has conducted an Energy Audit on Marion Cross School. The study included a review of the building's construction features, historical energy and water consumption and costs, review of the building envelope, HVAC equipment, heat distribution systems, lighting, and the building's operational and maintenance practices.

Bureau Veritas has evaluated three Energy Conservation Measures (ECMs) for this property. The savings for each measure are calculated using standard engineering methods followed in the industry, and detailed calculations for ECM are provided in Appendix H for reference. A 10% discount in energy savings was applied to account for the interactive effects amongst the ECMs. In addition to the consideration of the interactive effects, Bureau Veritas has applied a 15% contingency to the implementation costs to account for potential cost overruns during the implementation of the ECMs.

The following table summarizes the recommended ECMs in terms of description, investment cost, energy consumption reduction, and cost savings.

Recommended Non-Renewable Energy Conservation Measures: Financial Impact	
Total Projected Initial ECM Investment	$54,563 *(In Current Dollars)*
Estimated Annual Cost Savings Related to ECMs	$12,113 *(In Current Dollars)*
Net Effective ECM Payback	4.5 years
Estimated Annual Energy Savings	7%
Estimated Annual Utility Cost Savings *(excluding water)*	17%
Estimated Annual Water Cost Savings	22%

Solar Rooftop Photovoltaic Analysis	
Estimated number of panels (in addition to existing)	213
Estimated kW Rating	67.2 kW
Potential Annual kWh Produced	17,305.8 kWh
% of Current Electricity Load	15.7%
Investment Cost	$345,287
Estimated Energy Cost Savings	$3,149
Payback without Incentives	109.6 Years
Payback with All Incentives	81.1 Years

Key Metrics to Benchmark the Subject Property's Energy Usage Profile

- Building Site Energy Use Intensity - The sum of the total site energy use in thousands of Btu per unit of gross building area. Site energy accounts for all energy consumed at the building location only not the energy consumed during generation and transmission of the energy to the site.
- Building Source Energy Use Intensity – The sum of the total source energy use in thousands of Btu per unit of gross building area. Source energy is the energy consumed during generation and transmission in supplying the energy to your site.
- Building Cost Intensity - This metric is the sum of all energy use costs in dollars per unit of gross building area.

- Greenhouse Gas Emissions - Although there are numerous gases that are classified as contributors to the total for Greenhouse Emissions, the scope of this energy audit focuses on carbon dioxide (CO_2). Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).

Energy Usage Profile	
Site Energy Use Intensity	
Current Site Energy Use Intensity (EUI)	39.14 kBTU/SF
Post ECM Site Energy Use Intensity (EUI)	36.20 kBTU/SF
Source Energy Use Intensity (EUI)	
Current Source Energy Use Intensity (EUI)	54.75 kBTU/SF
Post ECM Source Energy Use Intensity (EUI)	46.24 kBTU/SF
Building Cost Intensity (BCI)	
Current Building Cost Intensity	$0.81/SF
Post ECM Building Cost Intensity	$0.67/SF
Greenhouse Gas Emissions Reduction *(from recommended ECM's)*	
Current Annual CO2e Emissions from Building Operation	136.59 $MtCO_2$/Yr
Total Annual CO2 Emissions Reduced	1.66 $MtCO_2$/Yr
Estimated Annual Thermal Energy Reduction	161.56 MMBTU
Total Cars off the Road (Equivalent)*	1
Total Acres of Pine Trees Planted (Equivalent)*	1

Energy Conservation Measures Screening:

Bureau Veritas screens ECMs using two financial methodologies. ECMs which are considered financially viable must meet both criteria.

1. Simple Payback Period –The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates. ECMs with a payback period greater than the Expected Useful Life (EUL) of the project are not typically recommended, as the cost of the project will not be recovered during the lifespan of the equipment. These ECMs are recommended for implementation during future system replacement. At that time, replacement may be evaluated based on the premium cost of installing energy efficient equipment.

$$Simple\ Payback = \frac{Initial\ Cost}{Annual\ Savings}$$

2. Savings-to-Investment Ratio (SIR) – The savings-to-investment ratio is the ratio of the present value savings to the present value costs of an energy or water conservation measure. The numerator of the ratio is the present value over the estimated useful life (EUL) of net savings in energy or water and non-fuel or non-water operation and maintenance costs attributable to the proposed energy or water conservation measure. The denominator of the ratio is the present value of the net increase in investment and replacement costs less salvage value attributable to the proposed energy or water conservation measure. It is recommended that energy efficiency recommendations should be based on a calculated SIR, with larger SIRs receiving a higher priority. A project is typically only recommended if SIR is greater than or equal to 1.0, unless other factors outweigh the financial benefit.

$$SIR = \frac{Present\ Value\ (Annual\ Savings, i\%, EUL)}{Initial\ Cost}$$

Bureau Veritas has identified three Energy Conservation Measures (ECM) for this property:

List of Recommended Energy Conservation Measures For Marion Cross School

		Description of ECM	Location	Labor Cost	Material Cost	Projected Initial Investment	Utility Company Incentive	Net Projected Initial Investment	Estimated Annual Energy & Water Savings				Total Energy Savings	Total Green House Gas Savings	Estimated Utility Cost Savings	Estimated Annual O&M Savings	Total Estimated Annual Cost Savings	Simple Payback	S.I.R.	Life Cycle Savings	Expected Useful Life (EUL)
						(a)	(b)	C=(a-b)	No.2 Oil	Electricity	Demand Reduction	Water									
				($)	($)	($)	($)	($)	(Gallons)	(kWh)	(KW)	(kGal)	(Mmbtu)	($MtCO_2$/Yr)	($)	($)	($)	(Yrs.)		($)	(Yrs.)
1	Title:	Install Low Flow Faucet Aerators	Location: Restrooms	$125	$144	$269	$0	$269	182	0	0	30	25	1.84	$355	$0	$732	0.37	23.20	$5,976	10.00
	ttribute:	Replace 18x 2GPM rated bathroom aerators with 0.5GPM WaterSense certified aerators																			
2	Title:	Retrofit Flush Tank Toilets to Dual Flush	Location: Restrooms	$1,452	$336	$1,788	$0	$1,788	0	0	0	53	0	0.00	$0	$0	$670	2.67	5.58	$8,182	20.00
	ttribute:	Retrofit 14x 1.6GPF toilets to dual-flush																			
3	Title:	Upgrade Building Lighting to LED and Install Automatic Lighting Controls	Location: Building Interior and Exterior - Marion Cross School	$24,486	$20,903	$45,389	$0	$45,389	0	45,228	30	0	154	10.70	$8,230	$3,827	$12,057	3.76	3.17	$98,543	15.00
	ttribute:	Replace CFL (29x) ;Linear Fluorescent (401x) ;																			
Totals for No/Low Cost Items				**$125**	**$144**	**$269**	**$0**	**$269**	**182**	**0**	**0**	**0**	**30**	**1.84**	**$355**	**$0**	**$732**	**0.37**			
Total For Capital Cost				**$25,938**	**$21,239**	**$47,177**	**$0**	**$47,177**	**0**	**45,228**	**30**	**30**	**53**	**10.70**	**$8,230**	**$3,827**	**$12,727**	**3.71**			
		Interactive Savings Discount @ 10%							-18	-4,523	-3	-3	-8	-1.25	-$859	-$383	-$1,346				
		Total Contingency Expenses @ 15%				$7,117		$7,117													
Total for Improvements						**$54,563**	**$0**	**$54,563**	**164**	**40,705**	**27**	**27**	**75**	**11.29**	**$7,727**	**$3,444**	**$12,113**	**4.50**			

10. Electrification

This analysis investigates replacing HVAC and other fossil fuel consuming systems within the building with efficient electric alternatives. These improvements can be considered as green replacements to traditional “like and in kind” replacements as done as part of the life cycle replacement These replacements are recommended under Capital improvements and not as energy improvements as the cost savings are not significant enough to offset the initial investment.
To take advantage of the saving by transferring the improvements to electrical usage an increase in electrical demand for your present system will be required. This will require ensuring that the electrical equipment is of adequate size to handle the increased load. There are several things to consider before making an upgrade to the electrical equipment.

1. First determine if the service you presently have will require an increase in size. This can be done by reviewing your current electrical usage to see if the additional load will be more than you present system can accommodate. By getting a copy of the last year’s usage from the utility company a comparison can be made to determine if your system can handle the additional load.
2. Updating you present equipment may be required, based on the age and condition of your present equipment. If your system is at the end of its useful life or parts are not available, then a change to the entire system may be required. Things to consider beside the cost of a new system include the cost of shutdown of your present system during the changeover and remodeling to replace present systems.
3. We recommend building another service alongside your present system to handle the increase from the changes being recommended. According to the National Electrical Code under the “Rule of Six” you are allowed to have 6 separate electrical services, or six different main disconnects on your building. This rule allows you to build an additional electrical system to handle the increased load only.

Any changes made to your electrical system should be evaluated by an Electrical Engineer to ensure that the new system will meet the new load requirements and for compliance with all electrical codes. The cost for that study has been included in this evaluation.

Note: The facility is heated by two 1356 MBH boilers, installed in 1989 and in the 2000’s, two 1438 MBH boilers, installed in 2011, and a fuel oil water heater, installed in 2015. Bureau Veritas proposes the electrification replacements be scheduled so that the equipment with the longer remaining useful life is changed out last.

Fossil Fuel Burning Systems

	Asset Description	Input Capacity (MBH)	Quantity	EUL	RUL	Fuel
1	Boiler	1,356	1	30	15	Fuel Oil
2	Boiler	1,356	1	30	6	Fuel Oil
3	Boiler	1,438	2	30	19	Fuel Oil
4	Water Heater	104	1	18	11	Fuel Oil

Net-Zero Project Schedule

						0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Action	Attributes	Qty	Unit Cost	Initial Investment	###	2023	2024	2025	2026	###	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Totals
1	Omplement all non-renewable measures		1	$54,563.00	$54,563		$54,563																				$54,563
2	Electrical service upgrade	1,600A/120/208V	1	$111,185.00	$111,185			$111,185																			$111,185
3	Water Heater, Electric, Commercial	130 Gal	1	$18,500.00	$18,500				$18,500																		$18,500
4	Older 2 Boilers, Remove/Decommission		2	$20,000.00	$40,000				$40,000																		$40,000
5	Variable Refrigerant Flow (VRF) Heat Pump System 1	200 Ton	28,625	$15.00	$429,375				$429,375																		$429,375
6	ECM Electric, Solar Photovoltaic (PV) System,	67 kW	1	$345,287.00	$345,287							$69,057		$69,057.40		$69,057		$69,057		$69,057							$345,287
7	Water Heater, Electric, Commercial	130 Gal	1	$18,500.00	$18,500																				$18,500		$18,500
8	Newer 2 Boilers, Remove/Decommission		2	$20,000.00	$40,000																				$40,000		$40,000
9	Variable Refrigerant Flow (VRF) Heat Pump System 2	200 Ton	28,625	$15.00	$429,375																				$429,375		$429,375
10	Hydronic Piping, 2-Pipe, Remove	Per SF	57,250	$1.50	$85,875																				$85,875		$85,875
11	Storage Tank, Site Fuel, Underground, Abandon		1	$4,000.00	$4,000																					$4,000	$4,000
	Totals				**$1,576,660**	$0	$54,563	$111,185	$487,875	$0	$0	$69,057	$0	$69,057	$0	$69,057	$0	$69,057	$0	$69,057	$0	$0	$0	$0	$573,750	$4,000	**$1,576,660**
	Escalated at 3% Inflation					$0	$56,391	$115,907	$512,009	$0	$0	$73,503	$0	$73,996	$0	$74,402	$0	$74,747	$0	$75,047	$0	$0	$0	$0	$628,622	$4,000	**$1,688,624**

11. Onsite Renewable Energy Generation

A photovoltaic array is a linked collection of photovoltaic modules, which are in turn made of multiple interconnected solar cells. The cells convert solar energy into direct current electricity via the photovoltaic effect. The power that one module can produce is seldom enough to meet requirements of a home or a business, so the modules are linked together to form an array. Most PV arrays use an inverter to convert the DC power produced by the modules into alternating current that can plug into the existing infrastructure to power lights, motors, and other loads. The modules in a PV array are usually first connected in series to obtain the desired voltage; the individual strings are then connected in parallel to allow the system to produce more current. Solar arrays are typically measured by the peak electrical power they produce, in watts, kilowatts, or even megawatts.

When determining if a site is suitable for a solar application, two basic considerations must be evaluated:

- At minimum, the sun should shine upon the solar collectors from 9 AM to 3 PM. If less, the application may still be worthwhile, but the benefit will be less.
- The array should face south and be free of any shading from buildings, trees, rooftop equipment, etc. If the array is not facing directly south, there will be a penalty in transfer efficiency, reducing the overall efficiency of the system.

Solar Feasibility	
Does the property have a south, east, or west facing roof or available land of more than 250 square feet per required Solar Array Panel?	Yes
Is the area free from any shading such as trees, buildings, equipment etc throughout the whole day	Yes
Can the panels be mounted at an incline of roughly 25-45 degrees? (equal to latitude of property)	Yes
Is the property in an area with acceptable average monthly sunlight levels?	Yes
Has the roofing been replaced within the past 3-5 years?	No
Is the roof structure sufficient to hold solar panels?	No
Is the property located in a state eligible for net metering?	Yes

Solar Panels are already in use at the property. Sufficient roof area is available for installation of larger arrays.

12. Net Zero Gap Analysis

Net Zero Energy Analysis for Renewable and Non-Renewable Evaluated Measures

Net Zero Energy Analysis						
		No. 2 Oil	Wood Pellet	Propane	Electric	MMBTU
--		(Gal)	(Lbs)	(Gal)	(kWh)	(MMBtu)
(a)	Existing Net Annual Energy Consumption	13,481			109,548	2,241
(b)	Projected First Year, Annual Energy Savings from Non-Renewable Energy Measures	164			40,705	162
(c) = (a)-(b)	Projected Annual Consumption Post Non-Renewable Energy Measures	**13,317**			**68,843**	**2,079**
(d)	Projected Energy Consumption Post Electrification and Fossil Fuel Conversion	--			609,424	2,079
(e)	Projected First Year, Annual Energy Savings from Renewable Energy Measures				17,306	59.0474
(f) = (d)-(e)	Projected Energy Consumption Post Renewable + Non-Renewable Energy Implementation + Electrification				592,118	2,020

Net Zero Financial Analysis	
Total Projected Initial Investment for Recommended Non-Renewable Measures	$54,563 *(In Current Dollars)*
Total Projected Initial Investment for Electrification	$ 0
Total Projected Initial Investment for Recommended Renewable Measures	$345,287
Total project initial investment	$ 76,064

13. Recommended Operations & Maintenance Plan

The quality of the maintenance and the operation of the facility's energy systems have a direct effect on its overall energy efficiency. Energy-efficiency needs to be a consideration when implementing facility modifications, equipment replacements, and general corrective actions. The following is a list of activities that should be performed as part of the routine maintenance program for the property.

Building Envelope

- ✓ Ensure that the building envelope has proper caulking and weather stripping.
- ✓ Patch holes in the building envelope with foam insulation and fire rated caulk around combustion vents
- ✓ Inspect building vents semiannually for bird infestation
- ✓ Inspect windows monthly for damaged panes and failed thermal seals
- ✓ Repair and adjust automatic door closing mechanisms as needed.

Heating and Cooling

- ✗ Pilots lights on furnaces and boilers be turned off in summer
- ✓ All preventive maintenance should be performed on all furnaces and boilers, which would include cleaning of burners and heat exchanger tubes.
- ✓ Ensure that the combustion vents exhaust outside the conditioned space and the vent dampers are functional
- ✓ Ensure that the control valves are functioning properly before start of every season
- ✓ Ensure steam traps are functional before start of each heating season
- ✓ Ensure use of chemical treatment for boiler make up water
- ✓ Ensure boiler outside temperature re-set is set to 55F
- ✗ Ensure use of chemical treatment for cooling tower water to prevent corrosion
- ✓ Ensure the duct work in unconditioned space is un-compromised and well insulated
- ✓ Duct cleaning is recommended every 10 years. This should include sealing of ducts using products similar to 'aero-seal'
- ✓ Ensure use of economizer mode is functional and used
- ✓ Ensure that the outside air dampers actuators are operating correctly
- ✓ Ensure air coils in the AHU and FCA's are pressure washed annually
- ✓ Return vents should remain un-obstructed and be located centrally
- ✓ Temperature settings reduced in unoccupied areas and set points seasonally adjusted.
- ✓ Evaporator coils and condenser coils should be regularly cleaned to improve heat transfer
- ✓ Refrigerant pipes should be insulated with a minimum of ¾" thick Elastomeric Rubber Pipe Insulation
- ✓ Ensure refrigerant pressure is maintained in the condensers
- ✓ Change air filters on return vents seasonally. Use only filters with 'Minimum Efficiency Rating Value'(MERV) of 8

Central Domestic Hot Water Heater

- ✓ Never place gas fired water heaters adjacent to return vents so as to prevent flame roll outs
- ✓ Ensure the circulation system is on timer to reduce the losses through re-circulation
- ✓ Ensure all hot water pipes are insulated with fiberglass insulation at all times
- ✗ Replacement water heater should have Energy Factor (EF)>0.9
- ✗ Tank-type water heaters flushed annually

Lighting Improvements

- ✓ Utilize bi-level lighting controls in stairwells and hallways.
- ✓ Use LED replacement lamps
- ✓ Clean lighting fixture reflective surfaces and translucent covers.
- ✓ Ensure that timers and/or photocells are operating correctly on exterior lighting
- ✓ Use occupancy sensors for offices and other rooms with infrequent occupancy

Existing Equipment and Replacements

- ✓ Ensure that refrigerator and freezer doors close and seal correctly
- ✓ Ensure kitchen and bathroom exhaust outside the building and the internal damper operates properly
- ✓ Ensure that bathroom vents exhaust out
- ✓ Office/ computer equipment either in the “sleep” or “off” mode when not used

Key

x	Maintenance Measure is Not Applicable For the Given Facility
✓	Maintenance Measure is Applicable For the Given Facility

14. Certification

School Administrative Unit 70 (the Client) retained Bureau Veritas to perform this Facility Condition Assessment in connection with its continued operation of Marion Cross School, 22 Church Street, Norwich, Vermont 05055, the "Property". It is our understanding that the primary interest of the Client is to locate and evaluate materials and building system defects that might significantly affect the value of the property and to determine if the present Property has conditions that will have a significant impact on its continued operations.

The conclusions and recommendations presented in this report are based on the brief review of the plans and records made available to our Project Manager during the site visit, interviews of available property management personnel and maintenance contractors familiar with the Property, appropriate inquiry of municipal authorities, our Project Manager's walk-through observations during the site visit, and our experience with similar properties.

No testing, exploratory probing, dismantling or operating of equipment or in-depth studies were performed unless specifically required under the *Purpose and Scope* section of this report. This assessment did not include engineering calculations to determine the adequacy of the Property's original design or existing systems. Although walk-through observations were performed, not all areas may have been observed (see Section 1 for specific details). There may be defects in the Property, which were in areas not observed or readily accessible, may not have been visible, or were not disclosed by management personnel when questioned. The report describes property conditions at the time that the observations and research were conducted.

This report has been prepared on behalf of and exclusively for the use of the Client for the purpose stated within the *Purpose and Scope* section of this report. The report, or any excerpt thereof, shall not be used by any party other than the Client or for any other purpose than that specifically stated in our agreement or within the *Purpose and Scope* section of this report without the express written consent of Bureau Veritas.

Any reuse or distribution of this report without such consent shall be at the Client and the recipient's sole risk, without liability to Bureau Veritas.

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Reviewed by: 

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15. Appendices

Appendix A: Photographic Record
Appendix B: Site Plan
Appendix C: Pre-Survey Questionnaire
Appendix D: Accessibility Review and Photos
Appendix E: Component Condition Report
Appendix F: Replacement Reserves
Appendix G: Equipment Inventory List
Appendix H: Lighting System Schedule
Appendix I: Energy Conservation Measures Calculation
Appendix J: Solar Photovoltaic Feasibility Study
Appendix K: Energy Audit Glossary of Terms

Appendix A:
Photographic Record

Photographic Overview

1 - FRONT ELEVATION

2 - LEFT ELEVATION

3 - REAR ELEVATION

4 - RIGHT ELEVATION

5 - ROOF

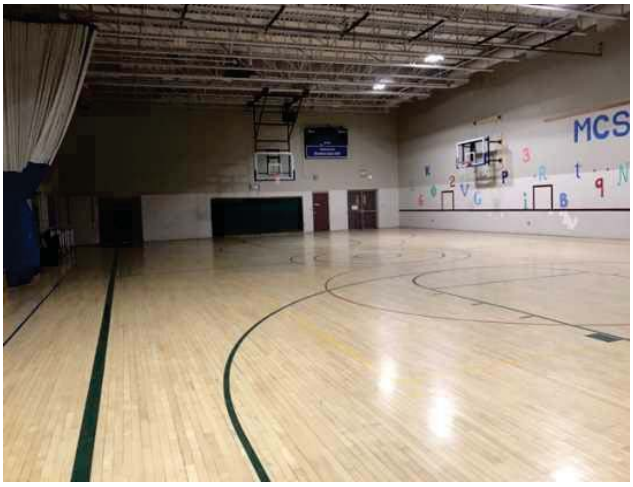
6 - LOBBY

Photographic Overview

7 - CLASSROOM 1

8 - CLASSROOM 2

9 - LIBRARY



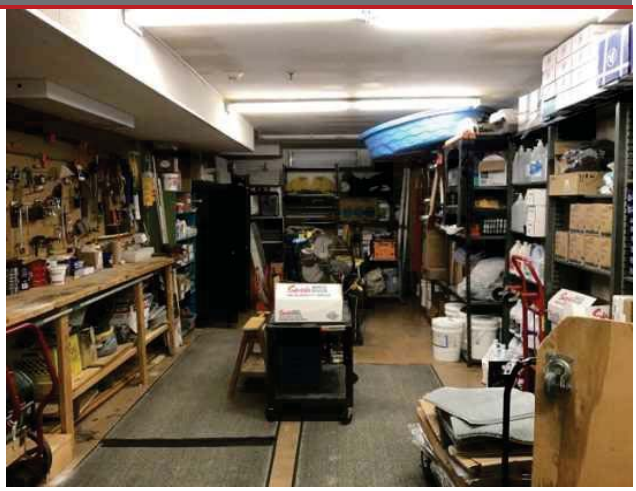
10 - GYMNASIUM

11 - MULTI-PURPOSE ROOM

12 - HALLWAY

Photographic Overview

13 - RESTROOM



14 - MAINTENANCE SHOP

15 - ELEVATOR

16 - ELEVATOR MACHINERY

17 - WATER HEATER

18 - STEAM BOILERS

Photographic Overview

19 - HOT WATER BOILER

20 - ROOFTOP PACKAGED UNIT

21 - ENERGY RECOVERY VENTILATOR

22 - UNIT VENTILATOR

23 - EXHAUST FAN

24 - UNDERGROUND FUEL STORAGE TANK

Photographic Overview

25 - ELECTRIC PANEL

26 - MAIN DISCONNECT SWITCHES

27 - FIRE ALARM PANEL

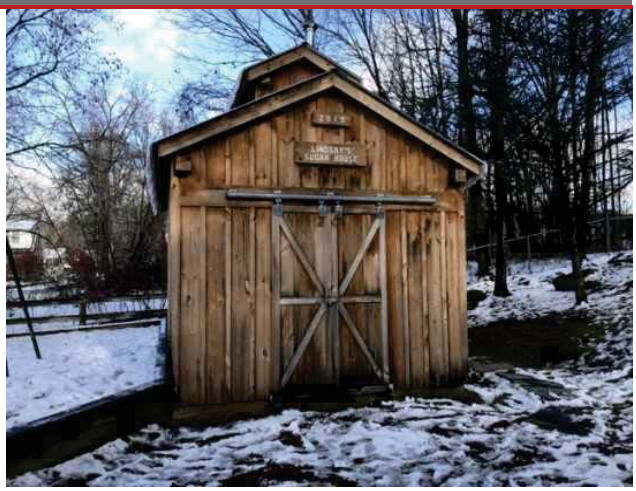
28 - FIRE PUMP

29 - PARKING LOT

30 - BASKETBALL COURT

Photographic Overview

31 - POLE LIGHT



32 - ANCILLARY BUILDING

33 - PLAY STRUCTURE

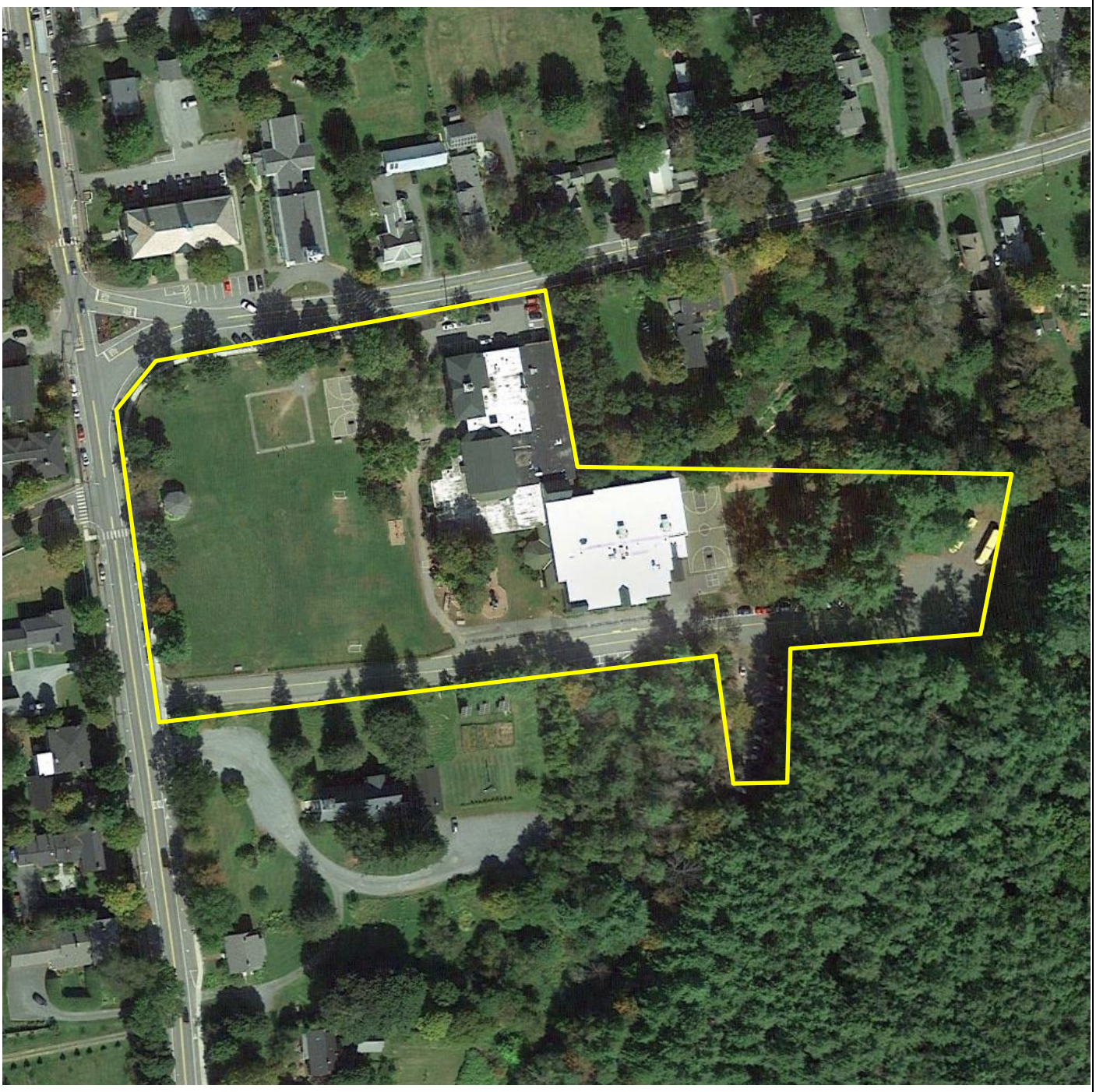
34 - INTERIOR WALL CRACKING - SEAL

35 - ALLIGATOR CRACKING - REPAIR

36 - SITE PONDING - REPAIR

Appendix B:
Site Plan

Site Plan



Project Number	Project Name
158531.22R000-002.379	Marion Cross School
Source	**On-Site Date**
Google	November 17, 2022

N

Appendix C:
Pre-Survey Questionnaire

Energy & FCA Audit
Pre-Survey Questionnaire

This questionnaire must be completed by the property owner, the owner's designated representative, or someone knowledgeable about the subject property. During the site visit, BV's Field Observer may ask for details associated with selected questions. This questionnaire will be utilized as an exhibit in BV's final report.

Name of Institution:	SAU-70 Norwich School District		
Name of Building: Marion Cross School		Building #:	1
Name of person completing questionnaire:	Tony Daigle		
Length of Association with the Property:	Six Years	Phone Number:	603-643-3810

Site Information				
Year of Construction?	1898 / 1954 / 1960 / 1989			
No. of Stories?	Flrs.			
Total Site Area?	7 Acres			
Total Building Area?	52,250 SqFt			
Parking	Open Parking	Enclosed Parking	Partly Enclosed Parking	Is parking Heated?
Parking Area?	Sqft	Sqft	Sqft	Yes /No
Area Heated (%)	100 %			
Area Cooled (%)	2.5 % | Cooling Equipment Redundancy? N // N+1 // N+2 // >2N			
Total Conditioned Area (%)	%			
Primary Heating System?	#2 Oil Hot Water and Steam			
Secondary Heating System?				
If Oil Used for Heating- Tank Capacity	10,000 Gallons	1 No. of Tanks		
Primary Cooling System & Capacity?	Split Systems			
Do Any HVAC Systems Use R-11, R-12 or R-22 Refrigerants?	R410A			

	Elec.	Natural Gas	Propane	No.2 Oil	Dist. Steam
Primary Heating Fuel?	☐	☐	☐	☒	☐
Secondary Heating Fuel?	☐	☐	☐	☐	☐
Domestic Water Heater Fuel?	☐	☐	☐	☒	

Building Occupancy/Schedule		
Facility Occupancy (avg. people ea. day)		
After Hours Facility Occupancy (avg. people /day)		
Standard Staff Work Timing	7:30 AM/PM - 4:00 AM/PM	
Maintenance Staff Hours	6:00 AM/PM - 11:00 AM/PM	
Number of Computers at Site	TBD - Tech Dept.	
Day	Hours open to Public	Hours open to Staff
Monday	7:30 AM/PM - 5:00 AM/PM	7:00 AM/PM - 8:00 AM/PM
Tuesday	: AM/PM - : AM/PM	: AM/PM - : AM/PM
Wednesday	: AM/PM - : AM/PM	: AM/PM - : AM/PM
Thursday	: AM/PM - : AM/PM	: AM/PM - : AM/PM
Friday	7:30 AM/PM - 5:00 AM/PM	: AM/PM - : AM/PM
Saturday	9:00 AM/PM - 5:00 AM/PM	: AM/PM - : AM/PM
Sunday	9:00 AM/PM - 5:00 AM/PM	7:00 AM/PM - 8:00 AM/PM
Number of Months the Facility Operates in a Year?	Months	

Energy & FCA Audit
Pre-Survey Questionnaire

Estimated Percentage of Male Staff and Guests	%

Inspections	Date of Last Inspection	List of Any Outstanding Repairs Required
1. Elevators	8/2022	
2. HVAC Mechanical, Electric, Plumbing?	1/2021	HVAC - RTU's Electrical - 4/2022
3. Life-Safety/Fire?	5/2022	
4. Roofs?	5/2022	

Key Questions	Response
Major Capital Improvements in Last 3 yrs.	Fire Alarm System, 3 ERU's
Planned Capital Expenditure for Next Year?	Septic System
Age of the Roof?	Partial 30 years / Partial 9 Years
What bldg. Systems Are Responsibilities of Tenants? (HVAC/Roof/Interior/Exterior/Paving)	None

Unk = Unknown, NA = Not Applicable	Yes	No	NA	Unk	Comments
1. Are the plumbing fixtures Low Flow *(Below 2.0GPM, .6GPF)*	☒	☐	☐	☐	
2. Are there any vacant buildings or significant building areas?	☐	☒	☐	☐	
3. Do tenants pay for utilities at leased properties?	☐	☒	☐	☐	
4. Does the owner pay for exterior site lighting electricity?	☒	☐	☐	☐	
5. Any Issues with exterior Lighting?	☒	☐	☐	☐	Minor Repairs

Preventive Maintenance of Mechanical System		
Systems	**Annual Professional Maintenance**	**Seldom or Never Maintained**
Tenant Space Heating Systems (*Furnace/Boilers/Heat pumps*)	☒	☐
Tenant Space Cooling Systems (*Condensers/Window AC*)	☒	☐
Domestic Water Heaters	☒	☐
Air Quality – Air Handling Unit - Air Filter Rating (MERV):	MERV- 12 and 14	
Air Quality – Annual Frequency of Filter Check	Choose an item. Every 4 months	

Utility Metering		
	Qty	Comments?
# of Elevators	1	Hydraulic/Traction
# of Electric Meters	1	
# of Nat. Gas Meters	N/A	
# of Water Meters	1	
# of Backup Generator	N/A	Generator Fuel?
Does facility have 3rd party power Procurement agreement?	Yes	Solar
% of Green energy procured (Electric)		__% TBD
% of Green energy procured (Natural Gas)		__%
Facility generates part of energy through onsite renewable?	Yes	Flat Panels

Energy & FCA Audit
Pre-Survey Questionnaire

Facility has onsite battery storage system?	NO	
Mechanical system sub-metered (boiler make-up water /humidifier)?	NO	
Makeup water for cooling tower metered Separately (if applicable)?	N/A	
Irrigation system metered separately (if applicable)?	N/A	

Building Appliances		
	Value	Additional Comments?
Percentage of Energy Star Certified Refrigerators	100 %	
Percentage of Refrigerators older than 8 years	0 %	New and 5 Years
Cooking Range Type (Electric/Gas/Propane)	Electric	
Laundry System (Leased/Owned)	Owned	
No. of Washers	1	
No. of Dryers	1	

Mark the column corresponding to the appropriate response. Please provide additional details in the Comments column, or backup documentation for any *Yes* responses. (**NA** indicates "*Not Applicable*", **Unk** indicates "*Unknown*")

	QUESTION	Y	N	Unk	NA	COMMENTS
	ZONING, BUILDING DESIGN & LIFE SAFETY ISSUES					
1	Are there any unresolved building, fire, or zoning code issues?		X			
2	Is there any pending litigation concerning the property?		X			
3	Are there any other significant issues/hazards with the property?		X			UST
4	Are there any unresolved construction defects at the property?	X				leach Fields Freeze up.
5	Has any part of the property ever contained visible suspect mold growth?		X			
6	Is there a mold Operations and Maintenance Plan?	X				Plan: Dry and clean wet areas with in 48 hours
7	Are there any recalled fire sprinkler heads (Star, GEM, Central, and Omega)?		X			
8	Have there been indoor air quality or mold related complaints from tenants?		X			
	GENERAL SITE					
9	Are there any problems with erosion, storm water drainage or areas of paving that do not drain?	X				Rear play space has poor drainage. Only one yard drain for entire Front Playing fields

Energy & FCA Audit
Pre-Survey Questionnaire

10	Are there any problems with the landscape irrigation systems?				N/A	
	BUILDING STRUCTURE					
11	Are there any problems with foundations or structures?		X			
12	Is there any water infiltration in basements or crawl spaces?	X				Ground water into a sump in boiler room (Basement)
13	Has a termite/wood boring insect inspection been performed within the last year?		X			
	BUILDING ENVELOPE					
	Mark the column corresponding to the appropriate response. Please provide additional details in the Comments column, or backup documentation for any *Yes* responses. (**NA** indicates "*Not Applicable*", **Unk** indicates *"Unknown"*)					
	QUESTION	Y	N	Unk	NA	**COMMENTS**
14	Are there any wall, or window leaks?		X			
15	Are there any roof leaks?	X				Repair as needed.
16	Is the roofing covered by a warranty or bond?	X	X			Partial (2013 roof)
17	Are there any poorly insulated areas?			X		
18	Is Fire Retardant Treated (FRT) plywood used?		X			
19	Is exterior insulation and finish system (EIFS) or a synthetic stucco finish used?	X				
	BUILDING HVAC AND ELECTRICAL					
20	Are there any leaks or pressure problems with natural gas service?				N/A	
21	Does any part of the electrical system use aluminum wiring?		X			
22	Do Commercial units have less than 200-Amp service?	X				
23	Are there any problems with the utilities, such as inadequate capacities?		X			
	ADA					
25	Has the management previously completed an ADA review?		X			

Energy & FCA Audit
Pre-Survey Questionnaire

26	Have any ADA improvements been made to the property?		X			
27	Does a Barrier Removal Plan exist for the property?		X			
28	Has the Barrier Removal Plan been approved by an arms-length third party?		X			

Mark the column corresponding to the appropriate response. Please provide additional details in the Comments column, or backup documentation for any *Yes* responses. (**NA** indicates *"Not Applicable"*, *Unk* indicates *"Unknown"*)

	QUESTION	Y	N	Unk	NA	COMMENTS
29	Has building ownership or management received any ADA related complaints?	X				Access to play spaces.
30	Does elevator equipment require upgrades to meet ADA standards?		X			
	PLUMBING					
31	Is the property served by private water well?		X			
32	Is the property served by a private septic system or other waste treatment systems?	X				
33	Is polybutylene piping used?		X			
34	Are there any plumbing leaks or water pressure problems?		X			

Issues or Concerns That BV Should Know About?	
1.	
2.	
3.	

Items Provided to BV Auditors	Yes	No	N/A	Additional Comments?
Access to All Mechanical Spaces	☒	☐	☐	
Access to Roof/Attic Space	☒	☐	☐	
Access to Building As-Built Drawings	☒	☐	☐	
Site plan with bldg., roads, parking and other features	☒	☐	☐	
Access to last 12/24 Months Common Area Utility Data	☒	☐	☐	
Contact Details of Mech, Elevator, Roof, Fire Contractors:	☒	☐	☐	
Previous reports pertaining to the physical condition of property.	☒	☐	☐	
ADA survey and status of improvements implemented.	☐	☐	☒	

Energy & FCA Audit
Pre-Survey Questionnaire

Current / pending litigation related to property condition.			X	
Any brochures or marketing information.	☐	☐	☒	
Appraisal, either current or previously prepared.	☒	☐	☐	
Summary of Projects executed in last 5 years	☒	☐	☐	

Signature of person Interviewed or completing form

Date 2/24/2022

Appendix D:
Accessibility Review and Photos

Visual Survey - 2010 ADA Standards for Accessible Design

Property Name: Marion Cross School

BV Project Number: 158531.22R000 - 002.379

Facility History & Interview

	Question	Yes	No	Unk	Comments
1	Has an accessibility study been previously performed? If so, when?	X			1989
2	Have any ADA improvements been made to the property since original construction? Describe.	X			ADA restroom built last year. ADA improvements to playground
3	Has building management reported any accessibility-based complaints or litigation?	X			Access to play spaces

Marion Cross School: Accessibility Issues

Category	Major Issues (ADA study recommended)	Moderate Issues (ADA study recommended)	Minor Issues	None*
Parking				X
Exterior Accessible Route				X
Building Entrances		ADA doors needed for one of the 1st floor levels. No other access		
Interior Accessible Route			One of the 1st floor levels cannot be accessed except by stairs.	
Elevators			Elevator does not stop at one of the first floor levels.	
Public Restrooms				X
Kitchens/Kitchenettes				X
Playgrounds & Swimming Pools				X
Other				X

**be cognizant that if the "None" box is checked that does not guarantee full compliance; this study is limited in nature*

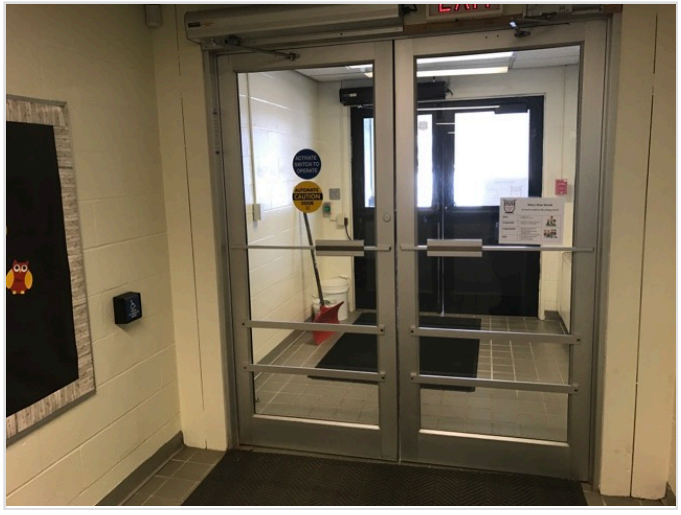
Marion Cross School: Photographic Overview

OVERVIEW OF ACCESSIBLE PARKING AREA

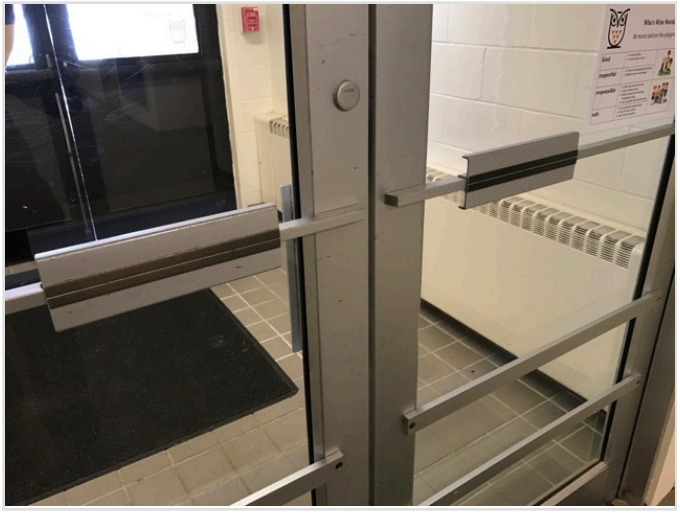
2ND AREA OF ACCESSIBLE PARKING

ACCESSIBLE PATH

CURB CUT



ACCESSIBLE ENTRANCE

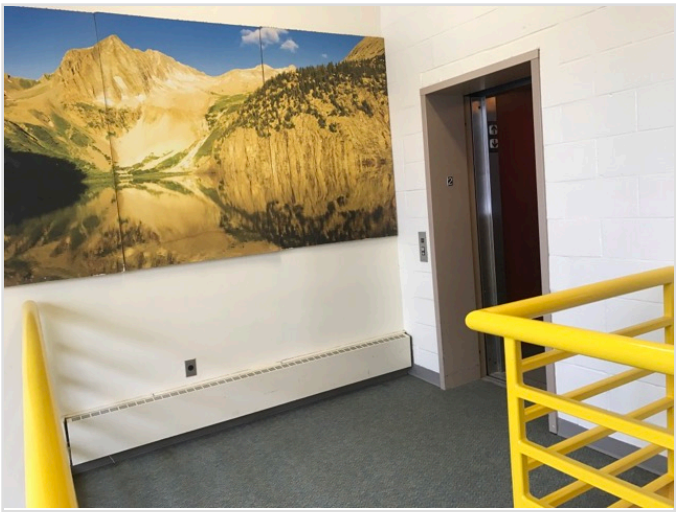


DOOR HARDWARE

Marion Cross School: Photographic Overview

ACCESSIBLE INTERIOR RAMP

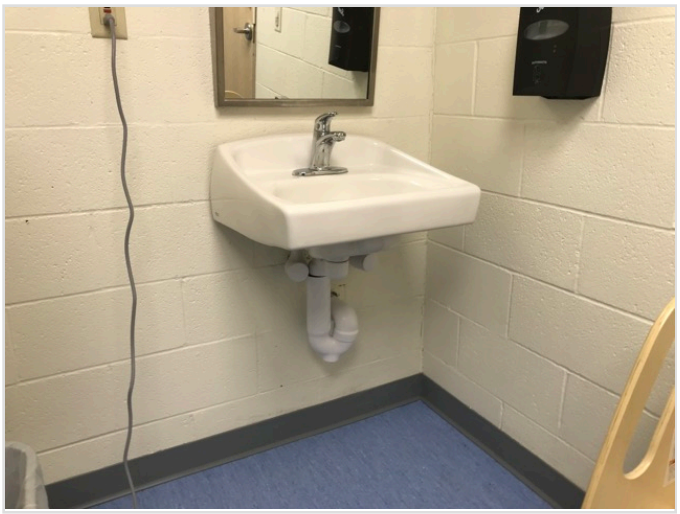
DOOR HARDWARE



LOBBY LOOKING AT CABS (WITH DOORS OPEN)

IN-CAB CONTROLS

TOILET STALL OVERVIEW



SINK, FAUCET HANDLES AND ACCESSORIES

Marion Cross School: Photographic Overview

OVERVIEW OF PLAYGROUND

ACCESSIBLE ROUTE TO PLAYGROUND

Appendix E:
Component Condition Report

UF L3 Code	Location	Condition	Asset/Component/Repair	Quantity	RUL	ID
Facade						
B2010	Building Exterior	Poor	Exterior Walls, Brick, Repair/Repoint	200 SF	0	4512478
B2020	1989 Building Exterior	Fair	Window, Aluminum Double-Glazed, 16-25 SF	102	10	4512465
B2020	1960 Building Exterior	Fair	Window, Wood, up to 15 SF	22	15	4512351
B2020	1898 Building Exterior	Fair	Window, Aluminum Double-Glazed, 16-25 SF	36	10	4512475
B2050	Building Exterior	Fair	Exterior Door, Steel, Standard	5	20	4512472
B2050	Building Exterior	Fair	Exterior Door, Aluminum-Framed & Glazed, Standard Swing	13	15	4512408
Roofing						
B3010	Roof	Poor	Roofing, Single-Ply Membrane, EPDM	6,500 SF	0	4512411
B3010	Roof	Poor	Roofing, Single-Ply Membrane, TPO/PVC	25,000 SF	0	4512455
B3010	Roof	Fair	Roofing, Asphalt Shingle, 20-Year Standard	5,500 SF	3	4512400
Interiors						
C1010	Gymnasium	Poor	Interior Wall, Concrete Block (CMU), Repair/Repoint	200 SF	0	4512447
C1010	Stairwell	Poor	Interior Wall Construction, Brick, Repair	50 SF	0	4512362
C1030	Throughout building	Excellent	Interior Door, Wood, Solid-Core Decorative High-End w/ Glazing	12	40	4512461
C1030	Throughout building	Fair	Interior Door, Steel, Standard	4	20	4512435
C1030	Throughout building	Fair	Interior Door, Wood, Solid-Core	20	20	4512468
C1070	Throughout building	Poor	Suspended Ceilings, Acoustical Tile (ACT)	1,000 SF	2	4512354
C1070	Throughout building	Fair	Suspended Ceilings, Acoustical Tile (ACT)	48,000 SF	13	4560778
C1090	Throughout building	Fair	Lockers, Steel-Baked Enamel, 12" W x 15" D x 72" H	90	10	4512439
C2010	Throughout building	Fair	Wall Finishes, any surface, Prep & Paint	74,425 SF	5	4512471
C2030	Throughout building	Fair	Flooring, Carpet, Commercial Standard	24,250 SF	5	4512456
C2030	Kitchen	Fair	Flooring, Quarry Tile	1,000 SF	17	4512415
C2030	Throughout building	Fair	Flooring, any surface, w/ Paint or Sealant, Prep & Paint	2,000 SF	5	4512430
C2030	MPR	Fair	Flooring, Wood, Strip	3,000 SF	15	4512436
C2030	Gymnasium	Fair	Flooring, Wood, Strip	5,000 SF	15	4512422
C2030	Throughout building	Fair	Flooring, Vinyl Tile (VCT)	20,000 SF	8	4512413
C2030	Restrooms	Fair	Flooring, Ceramic Tile	2,000 SF	20	4512476
Conveying						
D1010	Elevator	Fair	Elevator Cab Finishes, Economy	1	5	4512421
D1010	Elevator	Fair	Passenger Elevator, Hydraulic, 3 Floors, Renovate	1	15	4512444
Plumbing						
D2010	Restrooms	Fair	Toilet, Commercial Water Closet	5	15	4512394
D2010	Throughout building	Fair	Plumbing System, Supply & Sanitary, Medium Density (excludes fixtures)	57,250 SF	15	4512462
D2010	Kitchen	Fair	Sink/Lavatory, Commercial Kitchen, 3-Bowl	1	15	4512366
D2010	Mechanical room	Fair	Sink/Lavatory, Service Sink, Wall-Hung	3	15	4512397
D2010	Restrooms	Fair	Toilet, Residential Water Closet	14	15	4512431
D2010	Throughout building	Fair	Sink/Lavatory, Vanity Top, Stainless Steel	29	15	4512350

UF L3 Code	Location	Condition	Asset/Component/Repair	Quantity	RUL	ID
D2010	Restrooms	Fair	Sink/Lavatory, Vanity Top, Enameled Steel	18	15	4512405
D2010	Restrooms	Fair	Urinal, Standard	6	15	4512371
D2010	Mechanical room	Fair	Water Heater, Oil	1	11	4512452
D2010	Throughout building	Fair	Drinking Fountain, Wall-Mounted, Single-Level	4	8	4512419
D2010	164	Fair	Water Heater, Electric, Residential	1	10	4512388
D2010	Restrooms	Fair	Sink/Lavatory, Wall-Hung, Enameled Steel	1	15	4512429
HVAC						
D3020	Roof	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #4]	1	5	4560811
D3020	Basement	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #1]	1	6	4560809
D3020	Mechanical 162	Fair	Boiler Supplemental Components, Expansion Tank	1	17	4512380
D3020	Throughout building	Fair	Radiator, Hydronic, Baseboard (per LF)	32 LF	5	4512432
D3020	Mechanical room	Fair	Boiler, Dual Fuel, HVAC	1	15	4512403
D3020	Kitchen	Fair	Unit Heater, Hydronic	1	4	4512467
D3020	Mechanical 162	Fair	Boiler, Dual Fuel, HVAC, 1000 to 2000 MBH	1	19	4512368
D3020	Roof	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #3]	1	5	4515038
D3020	Basement	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #7]	1	6	4512396
D3020	Roof	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #6]	1	5	4560814
D3020	Mechanical room	Fair	Boiler, Dual Fuel, HVAC	1	6	4512385
D3020	Roof	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #2]	1	5	4515036
D3020	Mechanical 162	Fair	Boiler, Dual Fuel, HVAC, 1000 to 2000 MBH	1	19	4512357
D3020	Roof	Fair	Air Ventilator, Energy Recovery Unit, up to 750 CFM [HRU #5]	1	5	4560813
D3030	Roof	Fair	Split System Ductless, Single Zone, 1.5 to 2 TON	3	8	4560837
D3030	Throughout building	Fair	Unit Ventilator, approx/nominal 2 Ton	22	5	4512390
D3050	Throughout building	Fair	HVAC System, Hydronic Piping, 2-Pipe	57,250 SF	16	4561544
D3050	Gym Roof	Fair	Air Handler, Exterior AHU, 1201 to 2400 CFM [AHU-1]	1	5	4560807
D3050	Roof	Good	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON	1	18	4560835
D3050	Roof	Good	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON	1	18	4560836
D3050	MPR	Fair	Air Handler, Interior AHU, Easy/Moderate Access, 401 to 800 CFM [AHU (SU-1)]	1	5	4560804
D3050	Roof	Good	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON	1	18	4560816
D3050	Gym Roof	Good	Packaged Unit, RTU, Pad or Roof-Mounted	1	18	4515037
D3050	Gym Roof	Fair	Air Handler, Exterior AHU, 1201 to 2400 CFM [AHU-2]	1	5	4560808
D3050	MPR	Fair	Air Handler, Interior AHU, Easy/Moderate Access, 401 to 800 CFM [AHU (SU-2)]	1	5	4560806
D3050	Gym Roof	Good	Packaged Unit, RTU, Pad or Roof-Mounted	1	18	4515035
D3060	Roof	Fair	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM [EF-3]	1	10	4560799
D3060	Roof	Fair	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM [EF-2]	1	10	4560797
D3060	Roof	Fair	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM [EF-5]	1	10	4560802
D3060	Roof	Fair	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM [EF-1]	1	10	4560796
D3060	Roof	Fair	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM [EF-4]	1	10	4560801
Fire Protection						

UF L3 Code	Location	Condition	Asset/Component/Repair	Quantity	RUL	ID
D4010	Kitchen	Fair	Fire Suppression System, Commercial Kitchen, per LF of Hood	10 LF	10	4512409
D4010	Mechanical room	Fair	Supplemental Components, Fire Jockey Pump	1	6	4512414
D4010	Mechanical room	Fair	Supplemental Components, Fire Jockey Pump	1	10	4512441
D4010	Mechanical room	Fair	Fire Suppression System, Existing Sprinkler Heads, by SF	2,000 SF	13	4512367
Electrical						
D5010	Building exterior	Fair	Solar Power, Photovoltaic (PV) Panel, 24 SF	22	10	4512481
D5020	Throughout building	Fair	Electrical System, Full System Renovation/Upgrade, Medium Density/Complexity	57,250 SF	15	4561517
Fire Alarm & Electronic Systems						
D7030	Throughout building	Fair	Security/Surveillance System, Full System Upgrade, Average Density	57,250 SF	8	4512443
D7050	Office	Good	Fire Alarm Panel, Fully Addressable	1	14	4512463
D7050	Throughout building	Good	Fire Alarm System, Full System Upgrade, Standard Addressable, Upgrade/Install	57,250 SF	19	4512359
D8010	Mechanical 162	Good	BAS/HVAC Controls, Basic System or Legacy Upgrades, Upgrade/Install	57,250 SF	13	4512364
Equipment & Furnishings						
E1030	Kitchen	Fair	Foodservice Equipment, Exhaust Hood, 8 to 10 LF	1	8	4512365
E1030	Kitchen	Fair	Foodservice Equipment, Steamer, Tabletop	1	5	4512473
E1030	Kitchen	Fair	Foodservice Equipment, Freezer, Chest	1	8	4512427
E1030	Kitchen	Excellent	Foodservice Equipment, Freezer, 2-Door Reach-In	1	15	4512412
E1030	Kitchen	Fair	Foodservice Equipment, Food Warmer, Proofing Cabinet on Wheels	1	8	4512482
E1030	Kitchen	Excellent	Foodservice Equipment, Refrigerator, 2-Door Reach-In	1	15	4512453
E1030	Kitchen	Fair	Foodservice Equipment, Convection Oven, Single	1	5	4512370
E1030	Kitchen	Good	Foodservice Equipment, Freezer, Chest	1	14	4512420
E1040	Throughout building	Fair	Healthcare Equipment, Defibrillator (AED), Cabinet-Mounted	3	5	4512434
E2010	Throughout building	Fair	Casework, Cabinetry, Hardwood Standard	100 LF	10	4512425
Special Construction & Demo						
F1020	Sugar House	Fair	Ancillary Building, Wood-Framed or CMU, Standard	100 SF	15	4512417
F1020	Site	Fair	Ancillary Building, Wood-Framed or CMU, Standard	50 SF	10	4512440
Pedestrian Plazas & Walkways						
G2020	North Entrance Parking	Poor	Parking Lots, Pavement, Asphalt, Mill & Overlay	6,000 SF	1	4512349
G2020	Rear Parking	Poor	Parking Lots, Pavement, Asphalt, Mill & Overlay	20,000 SF	1	4512433
G2020	North Road Parking	Fair	Parking Lots, Pavement, Asphalt, Mill & Overlay	2,800 SF	13	4512416
Athletic, Recreational & Playfield Areas						
G2050	Site	Poor	Athletic Surfaces & Courts, Basketball/General, Asphalt Pavement, Mill & Overlay	2,500 SF	1	4512423
G2050	Site	Good	Playfield Surfaces, Chips Wood, 3" Depth	4,000 SF	2	4512355
G2050	Site	Fair	Play Structure, Multipurpose, Very Small	1	10	4512469
G2050	Site	Fair	Play Structure, Multipurpose, Small	1	10	4512458
G2050	Site	Excellent	Play Structure, Multipurpose, Very Small	1	20	4512398
G2050	Site	Fair	Play Structure, Swing Set, 4 Seats	2	10	4512454
G2050	Site	Fair	Play Structure, Multipurpose, Medium	1	10	4512450
G2050	Site	Poor	Athletic Surfaces & Courts, Basketball/General, Asphalt Pavement, Mill & Overlay	2,500 SF	1	4512392

Component Condition Report | Marion Cross School / Buildings and Site

UF L3 Code	Location	Condition	Asset/Component/Repair	Quantity	RUL	ID
G2050	Site	Excellent	Play Structure, Swing Set, 4 Seats	1	20	4512387
Sitework						
G2060	Site	Fair	Fences & Gates, Fence, Wood Board 4'	1,180 LF	15	4512379
G2060	Site	Fair	Bike Rack, Fixed 6-10 Bikes	2	10	4512474
G2060	Site	Fair	Picnic Table, Wood/Composite/Fiberglass	2	10	4512386
G4050	Site	Fair	Pole Light Fixture w/ Lamps, any type 30' High, w/ LED Replacement, Replace/Install	1	10	4512391
G4050	Building exterior	Fair	Exterior Fixture w/ Lamp, any type, w/ LED Replacement	6	10	4512406
Utilities						
G3020	Under Front Playground	Fair	Septic Tank, Precast Concrete, 1500 GAL	2	7	4560844
G3030	Rear Playground Area	Poor	Storm Drainage System, Inlets & Underground Piping, All-Inclusive	300 LF	0	4512383
G3060	Front Playground	Fair	Storage Tank, Site Fuel, Underground, Replace/Install	1	3	4512479

Component Condition Report | Marion Cross School

UF L3 Code	Location	Condition	Asset/Component/Repair	Quantity	RUL	ID
Electrical						
D5020	Electrical room	Fair	Supplemental Components, Circuit Breaker/Disconnect, 200 AMP	6	15	4664395

Appendix F:
Replacement Reserves

Replacement Reserves Report

1/25/2023

Location	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Total Escalated Estimate
Marion Cross School	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$29,913	$0	$0	$0	$0	$0	**$29,913**
Marion Cross School / Buildings and Site	$613,750	$111,755	$7,957	$88,402	$2,364	$669,072	$92,627	$22,138	$311,245	$0	$425,215	$8,167	$0	$474,432	$31,462	$3,731,772	$137,804	$55,437	$144,707	$511,585	$1,095,108	**$8,534,999**
Marion Cross School / Electrification	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Grand Total	**$613,750**	**$111,755**	**$7,957**	**$88,402**	**$2,364**	**$669,072**	**$92,627**	**$22,138**	**$311,245**	**$0**	**$425,215**	**$8,167**	**$0**	**$474,432**	**$31,462**	**$3,761,685**	**$137,804**	**$55,437**	**$144,707**	**$511,585**	**$1,095,108**	**$8,564,912**

Marion Cross School

Uniformat Code	Location Description	ID	Cost Description	Lifespan (EUL)	EAge	RUL	Quantity	Unit	Unit Cost *	Subtotal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Deficiency Repair Estimate
D5020	Electrical room	4664395	Supplemental Components, Circuit Breaker/Disconnect, 200 AMP, Replace	30	15	15	6	EA	$3,200.00	$19,200																$19,200						**$19,200**
Totals, Unescalated											**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$19,200**	**$0**	**$0**	**$0**	**$0**	**$0**	**$19,200**
Totals, Escalated (3.0% inflation, compounded annually)											**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$29,913**	**$0**	**$0**	**$0**	**$0**	**$0**	**$29,913**

Marion Cross School / Buildings and Site

Uniformat Code	Location Description	ID	Cost Description	Lifespan (EUL)	EAge	RUL	Quantity	Unit	Unit Cost *	Subtotal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Deficiency Repair Estimate
B2010	Building Exterior	4512478	Exterior Walls, Brick, Repair/Repoint	0	0	0	200	SF	$33.00	$6,600	$6,600																					**$6,600**
B2020	1989 Building Exterior	4512465	Window, Aluminum Double-Glazed, 16-25 SF, Replace	30	20	10	102	EA	$950.00	$96,900											$96,900											**$96,900**
B2020	1898 Building Exterior	4512475	Window, Aluminum Double-Glazed, 16-25 SF, Replace	30	20	10	36	EA	$950.00	$34,200											$34,200											**$34,200**
B2020	1960 Building Exterior	4512351	Window, Wood, up to 15 SF, Replace	30	15	15	22	EA	$800.00	$17,600																$17,600						**$17,600**
B2050	Building Exterior	4512408	Exterior Door, Aluminum-Framed & Glazed, Standard Swing, Replace	30	15	15	13	EA	$1,300.00	$16,900																$16,900						**$16,900**
B2050	Building Exterior	4512472	Exterior Door, Steel, Standard, Replace	40	20	20	5	EA	$600.00	$3,000																					$3,000	**$3,000**
B3010	Roof	4512400	Roofing, Asphalt Shingle, 20-Year Standard, Replace	20	17	3	5500	SF	$3.80	$20,900				$20,900																		**$20,900**
B3010	Roof	4512411	Roofing, Single-Ply Membrane, EPDM, Replace	20	20	0	6500	SF	$11.00	$71,500	$71,500																				$71,500	**$143,000**
B3010	Roof	4512455	Roofing, Single-Ply Membrane, TPO/PVC, Replace	20	33	0	25000	SF	$17.00	$425,000	$425,000																				$425,000	**$850,000**
C1010	Gymnasium	4512447	Interior Wall, Concrete Block (CMU), Repair/Repoint	0	0	0	200	SF	$20.00	$4,000	$4,000																					**$4,000**
C1010	Stairwell	4512362	Interior Wall Construction, Brick, Repair	0	0	0	50	SF	$33.00	$1,650	$1,650																					**$1,650**
C1030	Throughout building	4512435	Interior Door, Steel, Standard, Replace	40	20	20	4	EA	$600.00	$2,400																					$2,400	**$2,400**
C1030	Throughout building	4512468	Interior Door, Wood, Solid-Core, Replace	40	20	20	20	EA	$700.00	$14,000																					$14,000	**$14,000**
C1070	Throughout building	4512354	Suspended Ceilings, Acoustical Tile (ACT), Replace	25	23	2	1000	SF	$3.50	$3,500			$3,500																			**$3,500**
C1070	Throughout building	4560778	Suspended Ceilings, Acoustical Tile (ACT), Replace	25	12	13	48000	SF	$3.50	$168,000															$168,000							**$168,000**
C1090	Throughout building	4512439	Lockers, Steel-Baked Enamel, 12" W x 15" D x 72" H, Replace	20	10	10	90	EA	$500.00	$45,000											$45,000											**$45,000**
C2010	Throughout building	4512471	Wall Finishes, any surface, Prep & Paint	10	5	5	74425	SF	$1.50	$111,638						$111,638										$111,638						**$223,275**
C2030	Throughout building	4512430	Flooring, any surface, w/ Paint or Sealant, Prep & Paint	10	5	5	2000	SF	$1.50	$3,000						$3,000										$3,000						**$6,000**
C2030	Kitchen	4512415	Flooring, Quarry Tile, Replace	50	33	17	1000	SF	$26.00	$26,000																		$26,000				**$26,000**
C2030	Restrooms	4512476	Flooring, Ceramic Tile, Replace	40	20	20	2000	SF	$18.00	$36,000																					$36,000	**$36,000**
C2030	MPR	4512436	Flooring, Wood, Strip, Replace	30	15	15	3000	SF	$15.00	$45,000																$45,000						**$45,000**
C2030	Gymnasium	4512422	Flooring, Wood, Strip, Replace	30	15	15	5000	SF	$15.00	$75,000																$75,000						**$75,000**
C2030	Throughout building	4512413	Flooring, Vinyl Tile (VCT), Replace	15	7	8	20000	SF	$5.00	$100,000										$100,000												**$100,000**
C2030	Throughout building	4512456	Flooring, Carpet, Commercial Standard, Replace	10	5	5	24250	SF	$7.50	$181,875						$181,875										$181,875						**$363,750**
D1010	Elevator	4512421	Elevator Cab Finishes, Economy, Replace	10	5	5	1	EA	$3,000.00	$3,000						$3,000										$3,000						**$6,000**
D1010	Elevator	4512444	Passenger Elevator, Hydraulic, 3 Floors, Renovate	30	15	15	1	EA	$70,000.00	$70,000																$70,000						**$70,000**
D2010	164	4512388	Water Heater, Electric, Residential, Replace	15	5	10	1	EA	$900.00	$900											$900											**$900**
D2010	Mechanical room	4512452	Water Heater, Oil, Replace	18	7	11	1	EA	$1,900.00	$1,900												$1,900										**$1,900**
D2010	Throughout building	4512462	Plumbing System, Supply & Sanitary, Medium Density (excludes fixtures), Replace	40	25	15	57250	SF	$11.00	$629,750																$629,750						**$629,750**
D2010	Throughout building	4512419	Drinking Fountain, Wall-Mounted, Single-Level, Replace	15	7	8	4	EA	$1,200.00	$4,800										$4,800												**$4,800**
D2010	Restrooms	4512394	Toilet, Commercial Water Closet, Replace	30	15	15	5	EA	$1,300.00	$6,500																$6,500						**$6,500**
D2010	Kitchen	4512366	Sink/Lavatory, Commercial Kitchen, 3-Bowl, Replace	30	15	15	1	EA	$2,500.00	$2,500																$2,500						**$2,500**
D2010	Mechanical room	4512397	Sink/Lavatory, Service Sink, Wall-Hung, Replace	35	20	15	3	EA	$1,400.00	$4,200																$4,200						**$4,200**
D2010	Restrooms	4512431	Toilet, Residential Water Closet, Replace	30	15	15	14	EA	$700.00	$9,800																$9,800						**$9,800**
D2010	Throughout building	4512350	Sink/Lavatory, Vanity Top, Stainless Steel, Replace	30	15	15	29	EA	$1,200.00	$34,800																$34,800						**$34,800**
D2010	Restrooms	4512405	Sink/Lavatory, Vanity Top, Enameled Steel, Replace	30	15	15	18	EA	$1,100.00	$19,800																$19,800						**$19,800**
D2010	Restrooms	4512371	Urinal, Standard, Replace	30	15	15	6	EA	$1,100.00	$6,600																$6,600						**$6,600**
D2010	Restrooms	4512429	Sink/Lavatory, Wall-Hung, Enameled Steel, Replace	30	15	15	1	EA	$1,700.00	$1,700																$1,700						**$1,700**
D3020	Mechanical room	4512385	Boiler, Dual Fuel, HVAC, Replace	30	24	6	1	EA	$60,000.00	$60,000							$60,000															**$60,000**
D3020	Mechanical room	4512403	Boiler, Dual Fuel, HVAC, Replace	30	15	15	1	EA	$60,000.00	$60,000																$60,000						**$60,000**
D3020	Mechanical 162	4512368	Boiler, Dual Fuel, HVAC, 1000 to 2000 MBH, Replace	30	11	19	1	EA	$60,000.00	$60,000																				$60,000		**$60,000**
D3020	Mechanical 162	4512357	Boiler, Dual Fuel, HVAC, 1000 to 2000 MBH, Replace	30	11	19	1	EA	$60,000.00	$60,000																				$60,000		**$60,000**
D3020	Kitchen	4512467	Unit Heater, Hydronic, Replace	20	16	4	1	EA	$2,100.00	$2,100				$2,100																		**$2,100**

Replacement Reserves Report

1/25/2023

Uniformat Code	Location Description	ID	Cost Description	Lifespan (EUL)	EAge	RUL	Quantity	Unit	Unit Cost *	Subtotal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Deficiency Repair Estimate
D3020	Roof	4560811	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	10	5	1	EA	$8,387.00	$8,387						$8,387															$8,387	**$16,774**
D3020	Throughout building	4512432	Radiator, Hydronic, Baseboard (per LF), Replace	30	25	5	32	LF	$150.00	$4,800						$4,800																**$4,800**
D3020	Roof	4515038	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	10	5	1	EA	$8,387.00	$8,387						$8,387															$8,387	**$16,774**
D3020	Roof	4560814	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	10	5	1	EA	$8,387.00	$8,387						$8,387															$8,387	**$16,774**
D3020	Roof	4515036	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	10	5	1	EA	$8,387.00	$8,387						$8,387															$8,387	**$16,774**
D3020	Roof	4560813	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	10	5	1	EA	$8,387.00	$8,387						$8,387															$8,387	**$16,774**
D3020	Basement	4560809	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	9	6	1	EA	$8,387.00	$8,387							$8,387															**$8,387**
D3020	Basement	4512396	Air Ventilator, Energy Recovery Unit, up to 750 CFM, Replace	15	9	6	1	EA	$8,387.00	$8,387							$8,387															**$8,387**
D3020	Mechanical 162	4512380	Boiler Supplemental Components, Expansion Tank, Replace	40	23	17	1	EA	$3,540.00	$3,540																		$3,540				**$3,540**
D3030	Throughout building	4512390	Unit Ventilator, approx/nominal 2 Ton, Replace	20	15	5	22	EA	$7,400.00	$162,800						$162,800																**$162,800**
D3030	Roof	4560837	Split System Ductless, Single Zone, 1.5 to 2 TON, Replace	15	7	8	3	EA	$4,800.00	$14,400									$14,400													**$14,400**
D3050	Throughout building	4561544	HVAC System, Hydronic Piping, 2-Pipe, Replace	40	24	16	57250	SF	$1.50	$85,875																$85,875						**$85,875**
D3050	Gym Roof	4560807	Air Handler, Exterior AHU, 1201 to 2400 CFM, Replace	20	15	5	1	EA	$17,300.00	$17,300						$17,300																**$17,300**
D3050	MPR	4560804	Air Handler, Interior AHU, Easy/Moderate Access, 401 to 800 CFM, Replace	25	20	5	1	EA	$6,200.00	$6,200						$6,200																**$6,200**
D3050	Gym Roof	4560808	Air Handler, Exterior AHU, 1201 to 2400 CFM, Replace	20	15	5	1	EA	$17,300.00	$17,300						$17,300																**$17,300**
D3050	MPR	4560806	Air Handler, Interior AHU, Easy/Moderate Access, 401 to 800 CFM, Replace	25	20	5	1	EA	$6,200.00	$6,200						$6,200																**$6,200**
D3050	Roof	4560835	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON, Replace	20	2	18	1	EA	$15,000.00	$15,000																			$15,000			**$15,000**
D3050	Roof	4560836	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON, Replace	20	2	18	1	EA	$15,000.00	$15,000																			$15,000			**$15,000**
D3050	Roof	4560816	Packaged Unit, RTU, Pad or Roof-Mounted, 6 to 7.5 TON, Replace	20	2	18	1	EA	$15,000.00	$15,000																			$15,000			**$15,000**
D3050	Gym Roof	4515037	Packaged Unit, RTU, Pad or Roof-Mounted, Replace	20	2	18	1	EA	$20,000.00	$20,000																			$20,000			**$20,000**
D3050	Gym Roof	4515035	Packaged Unit, RTU, Pad or Roof-Mounted, Replace	20	2	18	1	EA	$20,000.00	$20,000																			$20,000			**$20,000**
D3060	Roof	4560799	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM, Replace	20	10	10	1	EA	$1,400.00	$1,400											$1,400											**$1,400**
D3060	Roof	4560797	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM, Replace	20	10	10	1	EA	$1,400.00	$1,400											$1,400											**$1,400**
D3060	Roof	4560802	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM, Replace	20	10	10	1	EA	$1,400.00	$1,400											$1,400											**$1,400**
D3060	Roof	4560796	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM, Replace	20	10	10	1	EA	$1,400.00	$1,400											$1,400											**$1,400**
D3060	Roof	4560801	Exhaust Fan, Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM, Replace	20	10	10	1	EA	$1,400.00	$1,400											$1,400											**$1,400**
D4010	Mechanical room	4512414	Supplemental Components, Fire Jockey Pump, Replace	20	14	6	1	EA	$800.00	$800							$800															**$800**
D4010	Mechanical room	4512441	Supplemental Components, Fire Jockey Pump, Replace	20	10	10	1	EA	$800.00	$800											$800											**$800**
D4010	Mechanical room	4512367	Fire Suppression System, Existing Sprinkler Heads, by SF, Replace	25	12	13	2000	SF	$1.07	$2,140														$2,140								**$2,140**
D4010	Kitchen	4512409	Fire Suppression System, Commercial Kitchen, per LF of Hood, Replace	20	10	10	10	LF	$400.00	$4,000											$4,000											**$4,000**
D5010	Building exterior	4512481	Solar Power, Photovoltaic (PV) Panel, 24 SF, Replace	20	10	10	22	EA	$1,800.00	$39,600											$39,600											**$39,600**
D5020	Throughout building	4561517	Electrical System, Full System Renovation/Upgrade, Medium Density/Complexity, Replace	40	25	15	57250	SF	$18.00	$1,030,500																$1,030,500						**$1,030,500**
D7030	Throughout building	4512443	Security/Surveillance System, Full System Upgrade, Average Density, Replace	15	7	8	57250	SF	$2.00	$114,500									$114,500													**$114,500**
D7050	Office	4512463	Fire Alarm Panel, Fully Addressable, Replace	15	1	14	1	EA	$15,000.00	$15,000															$15,000							**$15,000**
D7050	Throughout building	4512359	Fire Alarm System, Full System Upgrade, Standard Addressable, Upgrade/Install	20	1	19	57250	SF	$3.00	$171,750																				$171,750		**$171,750**
D8010	Mechanical 162	4512364	BAS/HVAC Controls, Basic System or Legacy Upgrades, Upgrade/Install	15	2	13	57250	SF	$2.50	$143,125														$143,125								**$143,125**
E1030	Kitchen	4512473	Foodservice Equipment, Steamer, Tabletop, Replace	10	5	5	1	EA	$7,000.00	$7,000						$7,000										$7,000						**$14,000**
E1030	Kitchen	4512370	Foodservice Equipment, Convection Oven, Single, Replace	10	5	5	1	EA	$5,600.00	$5,600						$5,600										$5,600						**$11,200**
E1030	Kitchen	4512365	Foodservice Equipment, Exhaust Hood, 8 to 10 LF, Replace	15	7	8	1	EA	$4,500.00	$4,500									$4,500													**$4,500**
E1030	Kitchen	4512427	Foodservice Equipment, Freezer, Chest, Replace	15	7	8	1	EA	$1,800.00	$1,800									$1,800													**$1,800**
E1030	Kitchen	4512482	Foodservice Equipment, Food Warmer, Proofing Cabinet on Wheels, Replace	15	7	8	1	EA	$1,700.00	$1,700									$1,700													**$1,700**
E1030	Kitchen	4512420	Foodservice Equipment, Freezer, Chest, Replace	15	1	14	1	EA	$1,800.00	$1,800															$1,800							**$1,800**
E1030	Kitchen	4512412	Foodservice Equipment, Freezer, 2-Door Reach-In, Replace	15	0	15	1	EA	$5,100.00	$5,100																$5,100						**$5,100**
E1030	Kitchen	4512453	Foodservice Equipment, Refrigerator, 2-Door Reach-In, Replace	15	0	15	1	EA	$4,600.00	$4,600																$4,600						**$4,600**
E1040	Throughout building	4512434	Healthcare Equipment, Defibrillator (AED), Cabinet-Mounted, Replace	10	5	5	3	EA	$1,500.00	$4,500						$4,500										$4,500						**$9,000**
E2010	Throughout building	4512425	Casework, Cabinetry, Hardwood Standard, Replace	20	10	10	100	LF	$300.00	$30,000											$30,000											**$30,000**
F1020	Site	4512440	Ancillary Building, Wood-Framed or CMU, Standard, Replace	35	25	10	50	SF	$100.00	$5,000											$5,000											**$5,000**
F1020	Sugar House	4512417	Ancillary Building, Wood-Framed or CMU, Standard, Replace	35	20	15	100	SF	$100.00	$10,000																$10,000						**$10,000**
G2020	North Entrance Parking	4512349	Parking Lots, Pavement, Asphalt, Mill & Overlay	25	24	1	6000	SF	$3.50	$21,000		$21,000																				**$21,000**
G2020	Rear Parking	4512433	Parking Lots, Pavement, Asphalt, Mill & Overlay	25	24	1	20000	SF	$3.50	$70,000		$70,000																				**$70,000**
G2020	North Road Parking	4512416	Parking Lots, Pavement, Asphalt, Mill & Overlay	25	12	13	2800	SF	$3.50	$9,800														$9,800								**$9,800**
G2050	Site	4512423	Athletic Surfaces & Courts, Basketball/General, Asphalt Pavement, Mill & Overlay	25	24	1	2500	SF	$3.50	$8,750		$8,750																				**$8,750**
G2050	Site	4512392	Athletic Surfaces & Courts, Basketball/General, Asphalt Pavement, Mill & Overlay	25	24	1	2500	SF	$3.50	$8,750		$8,750																				**$8,750**
G2050	Site	4512355	Playfield Surfaces, Chips Wood, 3" Depth, Replace	3	1	2	4000	SF	$1.00	$4,000			$4,000			$4,000			$4,000			$4,000			$4,000			$4,000			$4,000	**$28,000**
G2050	Site	4512469	Play Structure, Multipurpose, Very Small, Replace	20	10	10	1	EA	$6,000.00	$6,000											$6,000											**$6,000**
G2050	Site	4512458	Play Structure, Multipurpose, Small, Replace	20	10	10	1	EA	$10,000.00	$10,000											$10,000											**$10,000**
G2050	Site	4512454	Play Structure, Swing Set, 4 Seats, Replace	20	10	10	2	EA	$2,500.00	$5,000											$5,000											**$5,000**

Replacement Reserves Report

1/25/2023

Uniformat Code	Location Description	ID	Cost Description	Lifespan (EUL)	EAge	RUL	Quantity	Unit	Unit Cost *	Subtotal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Deficiency Repair Estimate
G2050	Site	4512450	Play Structure, Multipurpose, Medium, Replace	20	10	10	1	EA	$20,000.00	$20,000											$20,000											**$20,000**
G2050	Site	4512398	Play Structure, Multipurpose, Very Small, Replace	20	0	20	1	EA	$6,000.00	$6,000																					$6,000	**$6,000**
G2050	Site	4512387	Play Structure, Swing Set, 4 Seats, Replace	20	0	20	1	EA	$2,500.00	$2,500																					$2,500	**$2,500**
G2060	Site	4512474	Bike Rack, Fixed 6-10 Bikes, Replace	20	10	10	2	EA	$800.00	$1,600											$1,600											**$1,600**
G2060	Site	4512386	Picnic Table, Wood/Composite/Fiberglass, Replace	20	10	10	2	EA	$600.00	$1,200											$1,200											**$1,200**
G2060	Site	4512379	Fences & Gates, Fence, Wood Board 4', Replace	20	5	15	1180	LF	$24.00	$28,320																$28,320						**$28,320**
G3020	Under Front Playground	4560844	Septic Tank, Precast Concrete, 1500 GAL, Replace	40	33	7	2	EA	$9,000.00	$18,000								$18,000														**$18,000**
G3030	Rear Playground Area	4512383	Storm Drainage System, Inlets & Underground Piping, All-Inclusive, Replace	40	40	0	300	LF	$350.00	$105,000	$105,000																					**$105,000**
G3060	Front Playground	4512479	Storage Tank, Site Fuel, Underground, Replace/Install	25	22	3	1	EA	$60,000.00	$60,000				$60,000																		**$60,000**
G4050	Site	4512391	Pole Light Fixture w/ Lamps, any type 30' High, w/ LED Replacement, Replace/Install	20	10	10	1	EA	$6,800.00	$6,800											$6,800											**$6,800**
G4050	Building exterior	4512406	Exterior Fixture w/ Lamp, any type, w/ LED Replacement, Replace	20	10	10	6	EA	$400.00	$2,400											$2,400											**$2,400**
Totals, Unescalated											**$613,750**	**$108,500**	**$7,500**	**$80,900**	**$2,100**	**$577,148**	**$77,574**	**$18,000**	**$245,700**	**$0**	**$316,400**	**$5,900**	**$0**	**$323,065**	**$20,800**	**$2,395,283**	**$85,875**	**$33,540**	**$85,000**	**$291,750**	**$606,335**	**$5,895,119**
Totals, Escalated (3.0% inflation, compounded annually)											**$613,750**	**$111,755**	**$7,957**	**$88,402**	**$2,364**	**$669,072**	**$92,627**	**$22,138**	**$311,245**	**$0**	**$425,215**	**$8,167**	**$0**	**$474,432**	**$31,462**	**$3,731,772**	**$137,804**	**$55,437**	**$144,707**	**$511,585**	**$1,095,108**	**$8,534,999**

Appendix G:
Equipment Inventory List

D10 Conveying

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512444	D1010	**Passenger Elevator**	Hydraulic, 3 Floors	2100 LB	Renovate	Marion Cross School / Buildings and Site	Elevator	Dover Elevators	EP-60-15	E-A3539				$70,000	2037

D20 Plumbing

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512388	D2010	**Water Heater**	Electric, Residential	50 GAL	Replace	Marion Cross School / Buildings and Site	164	Ruud	PR0UH50 T2 RU350 DCB	0451719639	2017			$900	2032
2	4512452	D2010	**Water Heater**	Oil	32 GAL	Replace	Marion Cross School / Buildings and Site	Mechanical room	Bock	32E	15081032	2015			$1,900	2033
3	4512419	D2010	**Drinking Fountain**	Wall-Mounted, Single-Level		Replace	Marion Cross School / Buildings and Site	Throughout building						4	$4,800	2030
4	4512366	D2010	**Sink/Lavatory**	Commercial Kitchen, 3-Bowl		Replace	Marion Cross School / Buildings and Site	Kitchen							$2,500	2037
5	4512397	D2010	**Sink/Lavatory**	Service Sink, Wall-Hung		Replace	Marion Cross School / Buildings and Site	Mechanical room						3	$4,200	2037
6	4512405	D2010	**Sink/Lavatory**	Vanity Top, Enameled Steel		Replace	Marion Cross School / Buildings and Site	Restrooms						18	$19,800	2037
7	4512350	D2010	**Sink/Lavatory**	Vanity Top, Stainless Steel		Replace	Marion Cross School / Buildings and Site	Throughout building						29	$34,800	2037
8	4512429	D2010	**Sink/Lavatory**	Wall-Hung, Enameled Steel		Replace	Marion Cross School / Buildings and Site	Restrooms							$1,700	2037
9	4512394	D2010	**Toilet**	Commercial Water Closet		Replace	Marion Cross School / Buildings and Site	Restrooms						5	$6,500	2037
10	4512431	D2010	**Toilet**	Residential Water Closet		Replace	Marion Cross School / Buildings and Site	Restrooms						14	$9,800	2037
11	4512371	D2010	**Urinal**	Standard		Replace	Marion Cross School / Buildings and Site	Restrooms						6	$6,600	2037

D30 HVAC

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512403	D3020	**Boiler**	Dual Fuel, HVAC	1356 MBH	Replace	Marion Cross School / Buildings and Site	Mechanical room	Weil-McLain	588	No tag/plate found				$60,000	2037
2	4512385	D3020	**Boiler**	Dual Fuel, HVAC	1356 MBH	Replace	Marion Cross School / Buildings and Site	Mechanical room	Weil-McLain	588	No tag/plate found	1989			$60,000	2028
3	4512368	D3020	**Boiler**	Dual Fuel, HVAC, 1000 to 2000 MBH	1438 MBH	Replace	Marion Cross School / Buildings and Site	Mechanical 162	Buderus	GE515/9	2530-104-000014-5086704	2011			$60,000	2041
4	4512357	D3020	**Boiler**	Dual Fuel, HVAC, 1000 to 2000 MBH	1438 MBH	Replace	Marion Cross School / Buildings and Site	Mechanical 162	Buderus	GE515/9	05086704-00 - 4327-0060	2011			$60,000	2041
5	4512432	D3020	**Radiator**	Hydronic, Baseboard (per LF)		Replace	Marion Cross School / Buildings and Site	Throughout building						32	$4,800	2027
6	4512467	D3020	**Unit Heater**	Hydronic	38 MBH	Replace	Marion Cross School / Buildings and Site	Kitchen	Trane	UHSA-038S-8C-AAC	D88D06236				$2,100	2026
7	4512380	D3020	**Boiler Supplemental Components**	Expansion Tank	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Mechanical 162	Amtrol	No tag/plate found	No tag/plate found	1999			$3,540	2039
8	4560837	D3030	**Split System Ductless**	Single Zone, 1.5 to 2 TON	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Mitsubishi	No tag/plate found	No tag/plate found			3	$14,400	2030

9	4512390	D3030	**Unit Ventilator**	approx/nominal 2 Ton	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Throughout building						22	$162,800	2027
10	4560804	D3050	**Air Handler** [AHU (SU-1)]	Interior AHU, Easy/Moderate Access, 401 to 800 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	MPR	Trane	Torrivents, Force-Flo	No tag/plate found	1989			$6,200	2027
11	4560806	D3050	**Air Handler** [AHU (SU-2)]	Interior AHU, Easy/Moderate Access, 401 to 800 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	MPR	Trane	Torrivents, Force-Flo	No tag/plate found				$6,200	2027
12	4560807	D3050	**Air Handler** [AHU-1]	Exterior AHU, 1201 to 2400 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Gym Roof	Trane	PCCA-100F-1F-BADA1UOABAFABACA1	No tag/plate found				$17,300	2027
13	4560808	D3050	**Air Handler** [AHU-2]	Exterior AHU, 1201 to 2400 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Gym Roof	Trane	PCCA-100F-1F-BADA1UOABAFABACA1	No tag/plate found				$17,300	2027
14	4560835	D3050	**Packaged Unit**	RTU, Pad or Roof-Mounted, 6 to 7.5 TON	7 Ton	Replace	Marion Cross School / Buildings and Site	Roof	AAON	RN-007-8-0-0000-000	202012-ANBG00503	2020			$15,000	2040
15	4560836	D3050	**Packaged Unit**	RTU, Pad or Roof-Mounted, 6 to 7.5 TON	7 Ton	Replace	Marion Cross School / Buildings and Site	Roof	AAON	RN-007-8-0-0000-000	202012-ANBG00502	2020			$15,000	2040
16	4560816	D3050	**Packaged Unit**	RTU, Pad or Roof-Mounted, 6 to 7.5 TON	7 Ton	Replace	Marion Cross School / Buildings and Site	Roof	AAON	RN-007-8-0-0000-000	202012-ANBG00504	2020			$15,000	2040
17	4515037	D3050	**Packaged Unit**	RTU, Pad or Roof-Mounted	10 TON	Replace	Marion Cross School / Buildings and Site	Gym Roof	Trane	Inaccessible	No tag/plate found	2020			$20,000	2040
18	4515035	D3050	**Packaged Unit**	RTU, Pad or Roof-Mounted	10 TON	Replace	Marion Cross School / Buildings and Site	Gym Roof	Trane	Inaccessible	No tag/plate found	2020			$20,000	2040
19	4560796	D3060	**Exhaust Fan** [EF-1]	Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Greenheck	GB-8-4	No tag/plate found				$1,400	2032
20	4560797	D3060	**Exhaust Fan** [EF-2]	Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Greenheck	GB-14-4	No tag/plate found				$1,400	2032
21	4560799	D3060	**Exhaust Fan** [EF-3]	Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Greenheck	GB 14-4	No tag/plate found				$1,400	2032
22	4560801	D3060	**Exhaust Fan** [EF-4]	Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Greenheck	GB 14-4	No tag/plate found				$1,400	2032
23	4560802	D3060	**Exhaust Fan** [EF-5]	Roof or Wall-Mounted, 12" Damper, 501 to 1000 CFM	No tag/plate found	Replace	Marion Cross School / Buildings and Site	Roof	Greenheck	GB 10-4	No tag/plate found				$1,400	2032

D40 Fire Protection

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512414	D4010	**Supplemental Components**	Fire Jockey Pump	.5 HP	Replace	Marion Cross School / Buildings and Site	Mechanical room	Bell & Gossett	No tag/plate found	No tag/plate found				$800	2028
2	4512441	D4010	**Supplemental Components**	Fire Jockey Pump	.5 HP	Replace	Marion Cross School / Buildings and Site	Mechanical room	Bell & Gossett	No tag/plate found	No tag/plate found				$800	2032
3	4512409	D4010	**Fire Suppression System**	Commercial Kitchen, per LF of Hood		Replace	Marion Cross School / Buildings and Site	Kitchen	No tag/plate found	No tag/plate found	No tag/plate found			10	$4,000	2032

D70 Electronic Safety & Security

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512463	D7050	**Fire Alarm Panel**	Fully Addressable		Replace	Marion Cross School / Buildings and Site	Office				2021			$15,000	2036

E10 Equipment

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4512370	E1030	**Foodservice Equipment**	Convection Oven, Single		Replace	Marion Cross School / Buildings and Site	Kitchen	Duke Manufacturing	E101-EV	09216730				$5,600	2027
2	4512365	E1030	**Foodservice Equipment**	Exhaust Hood, 8 to 10 LF		Replace	Marion Cross School / Buildings and Site	Kitchen	CaptiveAire Systems	4224 D	No tag/plate found				$4,500	2030

3	4512482	E1030	**Foodservice Equipment**	Food Warmer, Proofing Cabinet on Wheels		Replace	Marion Cross School / Buildings and Site	Kitchen	Win Holt	No tag/plate found	No tag/plate found				$1,700	2030
4	4512412	E1030	**Foodservice Equipment**	Freezer, 2-Door Reach-In		Replace	Marion Cross School / Buildings and Site	Kitchen	Avantco	178A49FHC	6119 1714 2204 2869				$5,100	2037
5	4512427	E1030	**Foodservice Equipment**	Freezer, Chest		Replace	Marion Cross School / Buildings and Site	Kitchen	Powers Equipment Co	780	D061824				$1,800	2030
6	4512420	E1030	**Foodservice Equipment**	Freezer, Chest		Replace	Marion Cross School / Buildings and Site	Kitchen	Avantco	178MC58HC	6570 4303 1811 1218	2021			$1,800	2036
7	4512453	E1030	**Foodservice Equipment**	Refrigerator, 2-Door Reach-In		Replace	Marion Cross School / Buildings and Site	Kitchen	Avantco	178A49RHC	592102612				$4,600	2037
8	4512473	E1030	**Foodservice Equipment**	Steamer, Tabletop		Replace	Marion Cross School / Buildings and Site	Kitchen	Vollrath	38217	I110-01047863-005				$7,000	2027
9	4512434	E1040	**Healthcare Equipment**	Defibrillator (AED), Cabinet-Mounted		Replace	Marion Cross School / Buildings and Site	Throughout building						3	$4,500	2027

G30 Liquid & Gas Site Utilities

Index	ID	UFCode	Component Description	Attributes	Capacity	Action	Building	Location Detail	Manufacturer	Model	Serial	Dataplate Yr	Barcode	Qty	Cost	Replacement Yr
1	4560844	G3020	**Septic Tank**	Precast Concrete, 1500 GAL		Replace	Marion Cross School / Buildings and Site	Under Front Playground				1989		2	$18,000	2029
2	4512479	G3060	**Storage Tank**	Site Fuel, Underground	10000 GAL	Replace/Install	Marion Cross School / Buildings and Site	Front Playground	No tag/plate found	No tag/plate found	No tag/plate found	1989			$60,000	2025

Appendix H:
Lighting System Schedule

Lighting Schedule - Existing

									Lamp Details				Fixture Details						Existing Consumptio	
Line No.	Building Name	Interior/ Exterior	Floor	Space Type	Room No.	Additional Area Description	Control Quantity	Existing Control	Technology	Sub-Technology	Lamp Type	Total Lamps	Fixture Type	Linear Fluorescent Fixture Lens	Fixture Mounting	Fixture Quantity	24x7 Fixture Count	Fixture Height	Annual Hours	Existing Annual kWh
1	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	28	Light Switch	Linear Fluorescent	T8	4' 32W T8	252	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	84	No	≥ 9	3,120	25,160
2	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classrooms	3	Light Switch	Linear Fluorescent	T8	4' 32W T8	36	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	18	No	≥ 9	3,120	3,594
3	Marion Cross School	Interior	1	Auditorium	MPR	MPR	2	Light Switch	LED	-	-	20	Pendant Direct	None		20	No	10-15	3,120	-
4	Marion Cross School	Interior	1	Auditorium	MPR	MPR	2	Light Switch	LED	-	-	6	Can - Recessed Vertical 6"	None	Recessed	6	No	≥ 9	3,120	-
5	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	5	Light Switch	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	8	No	≥ 9	3,120	2,396
6	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	5	Light Switch	Linear Fluorescent	T5	4' 31W T5	10	Cove Lighting	Egg Crate		10	No	≥ 9	3,120	967
7	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	5	Light Switch	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	12	No	≥ 9	3,120	2,396
8	Marion Cross School	Interior	1	Restroom - Private	Restroom	Unisex	1	Wall-Mounted Sensor	LED	-	-	2	Troffer - Recessed Indirect 2'x2'	Translucent White	Recessed	2	No	≥ 9	2,080	-
9	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	6	Light Switch	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	12	No	≥ 9	3,120	2,396
10	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	6	Light Switch	Linear Fluorescent	T8	4' 32W T8	16	Troffer - Surface Mounted Indirect 2'x4'	Prism	Surface Mount	4	No	≥ 9	3,120	1,597
11	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	6	Light Switch	CFL	CFL - Screw-in	CFL13	2	Can - Surface Mounted	Clear Acrylic	Surface Mount	2	No	≥ 9	3,120	81
12	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	28	Light Switch	CFL	CFL - Screw-in	CFL13	14	Can - Surface Mounted	Clear Acrylic	Surface Mount	14	No	≥ 9	3,120	568
13	Marion Cross School	Interior	1	Auditorium	Gym	Gym	5	Ceiling-Mounted Sensor	LED	-	-	24	Troffer - Surface Mounted Direct 2'x4'	None	Surface Mount	12	No	15-20	3,120	-
14	Marion Cross School	Interior	1	Auditorium	Gym	Gym	5	Light Switch	Linear Fluorescent	T8	4' 32W T8	18	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	9	No	≥ 9	3,120	1,797
15	Marion Cross School	Interior	2	Office- Support Staff	NA	cupational Thera	1	Light Switch	CFL	CFL - Screw-in	CFL13	12	Can - Recessed Vertical 4"	Clear Acrylic	Recessed	12	No	≥ 9	3,120	487
16	Marion Cross School	Interior	2	Office- Support Staff	NA	Reading	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	12	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	6	No	≥ 9	3,120	1,198
17	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	6	Troffer - Surface Mounted Indirect 2'x4'	Prism	Surface Mount	2	No	≥ 9	3,120	599
18	Marion Cross School	Interior	3	Open Office - Workstations	NA	Classroom	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	8	No	≥ 9	3,120	2,396
19	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	3	Light Switch	Linear Fluorescent	T8	4' 32W T8	18	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	9	No	≥ 9	3,120	1,797
20	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	18	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	6	No	≥ 9	3,120	1,797
21	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	4	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	2	No	≥ 9	3,120	399
22	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	3	Light Switch	Linear Fluorescent	T8	4' 32W T8	48	Troffer - Recessed Indirect 2'x4'	Prism	Recessed	24	No	≥ 9	3,120	4,792
23	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	2	Wall-Mounted Sensor	Linear Fluorescent	T8	4' 32W T8	4	Troffer - Recessed Indirect 1'x4'	Translucent White	Recessed	4	No	≥ 9	3,120	399
24	Marion Cross School	Interior	B	Open Office - Workstations	Music	Music	4	Wall-Mounted Sensor	Linear Fluorescent	T8	4' 32W T8	36	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	18	No	≥ 9	3,120	3,594
25	Marion Cross School	Interior	B	Open Office - Workstations	Maintenance	Maintenance	1	Wall-Mounted Sensor	Linear Fluorescent	T8	4' 32W T8	16	Troffer - Recessed Indirect 1'x4'	Translucent White	Recessed	8	No	≥ 9	3,120	1,597
26	Marion Cross School	Interior	B	Open Office - Workstations	Music	Music	4	Wall-Mounted Sensor	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Surface Mounted Indirect 2'x4'	Prism	Surface Mount	6	No	≥ 9	3,120	2,396
27	Marion Cross School	Interior	B	Utility	Mechanical	Mechanical utility	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	2	Troffer - Recessed Indirect 1'x4'	Prism	Recessed	1	No	≥ 9	2,080	133
28	Marion Cross School	Interior	Stairwell	Utility	Stair	Stair	2	Building Management Syst	Linear Fluorescent	T8	4' 32W T8	8	Troffer - Recessed Indirect 1'x4'	Prism	Recessed	4	No	≥ 9	2,080	532
29	Marion Cross School	Interior	B	Mechanical Room	Mechanical	Mechanical room	2	Light Switch	Linear Fluorescent	T8	4' 32W T8	6	Troffer - Recessed Indirect 1'x4'	Prism	Recessed	3	No	≥ 9	1,040	200
30	Marion Cross School	Interior	B	Mechanical Room	Mechanical	Mechanical room	2	Light Switch	LED	-	-	2	Socket Vertical	None		2	No	≥ 9	1,040	-
31	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	10	Light Switch	LED	-	-	12	Troffer - Recessed Indirect 2'x4'	Clear Acrylic	Recessed	12	No	≥ 9	3,120	-
32	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	10	Light Switch	Linear Fluorescent	T8	4' 32W T8	36	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	18	No	≥ 9	3,120	3,594
33	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	10	Light Switch	LED	-	-	4	Troffer - Surface Mounted Indirect 1'x4'	Clear Acrylic	Surface Mount	4	No	≥ 9	3,120	-
34	Marion Cross School	Interior	Stairwell	Stairwell	Stair	Stair	2	Building Management Syst	Linear Fluorescent	T8	4' 32W T8	16	Troffer - Recessed Indirect 1'x4'	Prism	Recessed	8	No	≥ 9	8,736	4,473
35	Marion Cross School	Interior	B	Mechanical Room	NA	Electrical room	1	Light Switch	LED	-	-	8	Socket Vertical	None		8	No	≥ 9	1,040	-
36	Marion Cross School	Interior	1	Utility	Storage	Storage	1	Light Switch	Linear Fluorescent	T8	4' 32W T8	2	Troffer - Recessed Indirect 1'x4'	Prism	Recessed	2	No	≥ 9	2,080	133
37	Marion Cross School	Interior	1	Kitchen	Kitchen	Kitchen	3	Light Switch	Linear Fluorescent	T8	4' 32W T8	18	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	9	No	≥ 9	3,120	1,797
38	Marion Cross School	Interior	1	Kitchen	Kitchen	Kitchen	3	Light Switch	LED	-	-	1	Troffer - Surface Mounted Indirect 1'x4'	Clear Acrylic	Surface Mount	1	No	≥ 9	3,120	-
39	Marion Cross School	Interior	1	Restroom - Male	Restroom	Restroom	6	Ceiling-Mounted Sensor	Linear Fluorescent	T8	4' 32W T8	24	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	12	No	≥ 9	4,368	3,355
40	Marion Cross School	Interior	2	Circulation-Hallway	Hallway	2nd floor	1	Building Management Syst	Linear Fluorescent	T8	4' 32W T8	48	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	24	No	≥ 9	3,120	4,792
41	Marion Cross School	Interior	1	Circulation-Hallway	Hallway	1st floor	1	Building Management Syst	Linear Fluorescent	T8	4' 32W T8	126	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	63	No	≥ 9	3,120	12,580
42	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	4	Light Switch	Linear Fluorescent	T8	4' 32W T8	14	Troffer - Surface Mounted Indirect 1'x4'	Prism	Surface Mount	7	No	≥ 9	3,120	1,398
43	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	4	Light Switch	CFL	CFL - Screw-in	CFL13	1	Can - Surface Mounted	Clear Acrylic	Surface Mount	1	No	≥ 9	3,120	41
44	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	4	Light Switch	LED	-	-	4	Can - Recessed Vertical 6"	None	Recessed	4	No	≥ 9	3,120	-
	Totals											1,026				501			133,744	95,434

Lighting Solutions - Proposed

								Fixture Details						Existing Consumption					Proposed- Post Retrofit				
Line No.	Building Name	Interior/ Exterior	Floor	Space Type	Room No.	Additional Area Description	Existing Control	Control Quantity	Technology	Sub-Technology	Lamp- Fixture	Fixture Quantity	Total Lamps	Fixture Height	Annual Hours	Existing Annual kWh	KW Reduction	ECM	ECM Type	Recommended Sensor	LED Lamp Retrofit	Annual Hours of Operation	Proposed Annual kWh	Annual Savings From LED Retrofit
																								kWh
1	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	Light Switch	28	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	84	252	≥ 9	3,120	25,160	8.06	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	13,366	11,794
2	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classrooms	Light Switch	3	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	18	36	≥ 9	3,120	3,594	1.15	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,909	1,685
3	Marion Cross School	Interior	1	Auditorium	MPR	MPR	Light Switch	2	LED	-		20	20	10-15	3,120		0.00	No ECM		Ceiling Mounted				
4	Marion Cross School	Interior	1	Auditorium	MPR	MPR	Light Switch	2	LED	-		6	6	≥ 9	3,120		0.00	No ECM		Ceiling Mounted				
5	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	Light Switch	5	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	8	24	≥ 9	3,120	2,396	0.77	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,273	1,123
6	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	Light Switch	5	Linear Fluorescent	T5	4' 31W T5; Cove Lighting	10	10	≥ 9	3,120	967	0.31	ECM	RB - Replace Bulb	Ceiling Mounted	4' 15W LED T5	3,120	468	499
7	Marion Cross School	Interior	1	Open Office - Workstations	Library	Library	Light Switch	5	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	12	24	≥ 9	3,120	2,396	0.77	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,273	1,123
8	Marion Cross School	Interior	1	Restroom - Private	Restroom	Unisex	Wall-Mounted Sensor	1	LED	-		2	2	≥ 9	2,080		0.00	No ECM		Retain Existing Controls				
9	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	Light Switch	6	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	12	24	≥ 9	3,120	2,396	0.77	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,273	1,123
10	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	Light Switch	6	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 2'x4'	4	16	≥ 9	3,120	1,597	0.51	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	849	749
11	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	Light Switch	6	CFL	CFL - Screw-in	CFL - Screw-in - CFL13	2	2	≥ 9	3,120	81	0.03	ECM	RB - Replace Bulb	Ceiling Mounted	9W LED A19	3,120	56	25
12	Marion Cross School	Interior	1	Open Office - Workstations	NA	Classroom	Light Switch	28	CFL	CFL - Screw-in	CFL - Screw-in - CFL13	14	14	≥ 9	3,120	568	0.18	ECM	RB - Replace Bulb	Ceiling Mounted	9W LED A19	3,120	393	175
13	Marion Cross School	Interior	1	Auditorium	Gym	Gym	Ceiling-Mounted Sensor	5	LED	-		12	24	15-20	3,120		0.00	No ECM		Retain Existing Controls				
14	Marion Cross School	Interior	1	Auditorium	Gym	Gym	Light Switch	5	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	9	18	≥ 9	3,120	1,797	0.58	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	3,120	955	842
15	Marion Cross School	Interior	2	Office- Support Staff	NA	Occupational Therapy	Light Switch	1	CFL	CFL - Screw-in	CFL - Screw-in - CFL13	12	12	≥ 9	3,120	487	0.16	ECM	RB - Replace Bulb	Wall Mounted	9W LED A19	3,120	337	150
16	Marion Cross School	Interior	2	Office- Support Staff	NA	Reading	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	6	12	≥ 9	3,120	1,198	0.38	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	636	562
17	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 2'x4'	2	6	≥ 9	3,120	599	0.19	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	3,120	318	281
18	Marion Cross School	Interior	3	Open Office - Workstations	NA	Classroom	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	8	24	≥ 9	3,120	2,396	0.77	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,273	1,123
19	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	Light Switch	3	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	9	18	≥ 9	3,120	1,797	0.58	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	3,120	955	842
20	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	6	18	≥ 9	3,120	1,797	0.58	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	3,120	955	842
21	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	2	4	≥ 9	3,120	399	0.13	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	3,120	212	187
22	Marion Cross School	Interior	2	Open Office - Workstations	NA	Classroom	Light Switch	3	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 2'x4'	24	48	≥ 9	3,120	4,792	1.54	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	2,546	2,246
23	Marion Cross School	Interior	2	Office- Support Staff	NA	Small classroom	Wall-Mounted Sensor	2	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	4	4	≥ 9	3,120	399	0.13	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	2,652	180	219
24	Marion Cross School	Interior	B	Open Office - Workstations	Music	Music	Wall-Mounted Sensor	4	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	18	36	≥ 9	3,120	3,594	1.15	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	2,652	1,623	1,971
25	Marion Cross School	Interior	B	Open Office - Workstations	Maintenance	Maintenance	Wall-Mounted Sensor	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	8	16	≥ 9	3,120	1,597	0.51	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	2,652	721	876
26	Marion Cross School	Interior	B	Open Office - Workstations	Music	Music	Wall-Mounted Sensor	4	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 2'x4'	6	24	≥ 9	3,120	2,396	0.77	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	2,652	1,082	1,314
27	Marion Cross School	Interior	B	Utility	Mechanical	Mechanical utility	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	1	2	≥ 9	2,080	133	0.06	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	2,080	71	62
28	Marion Cross School	Interior	Stairwell	Utility	Stair	Stair	Building Management System	2	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	4	8	≥ 9	2,080	532	0.26	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	2,080	283	250
29	Marion Cross School	Interior	B	Mechanical Room	Mechanical	Mechanical room	Light Switch	2	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	3	6	≥ 9	1,040	200	0.19	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	1,040	106	94
30	Marion Cross School	Interior	B	Mechanical Room	Mechanical	Mechanical room	Light Switch	2	LED	-		2	2	≥ 9	1,040		0.00	No ECM		Retain Existing Controls				
31	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	Light Switch	10	LED	-		12	12	≥ 9	3,120		0.00	No ECM		Ceiling Mounted				
32	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	Light Switch	10	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	18	36	≥ 9	3,120	3,594	1.15	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	1,909	1,685
33	Marion Cross School	Interior	1	Office - Receptionist	Office	Office	Light Switch	10	LED	-		4	4	≥ 9	3,120		0.00	No ECM		Ceiling Mounted				
34	Marion Cross School	Interior	Stairwell	Stairwell	Stair	Stair	Building Management System	2	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	8	16	≥ 9	8,736	4,473	0.51	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	8,736	2,376	2,097
35	Marion Cross School	Interior	B	Mechanical Room	NA	Electrical room	Light Switch	1	LED	-		8	8	≥ 9	1,040		0.00	No ECM		Retain Existing Controls				
36	Marion Cross School	Interior	1	Utility	Storage	Storage	Light Switch	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Recessed Indirect 1'x4'	2	2	≥ 9	2,080	133	0.06	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	2,080	71	62
37	Marion Cross School	Interior	1	Kitchen	Kitchen	Kitchen	Light Switch	3	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	9	18	≥ 9	3,120	1,797	0.58	ECM	RB - Replace Bulb	Ceiling Mounted	4' 17W LED T8	3,120	955	842
38	Marion Cross School	Interior	1	Kitchen	Kitchen	Kitchen	Light Switch	3	LED	-		1	1	≥ 9	3,120		0.00	No ECM		Ceiling Mounted				
39	Marion Cross School	Interior	1	Restroom - Male	Restroom	Restroom	Ceiling-Mounted Sensor	6	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	12	24	≥ 9	4,368	3,355	0.77	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	4,368	1,782	1,572
40	Marion Cross School	Interior	2	Circulation-Hallway	Hallway	2nd floor	Building Management System	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	24	48	≥ 9	3,120	4,792	1.54	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	3,120	2,546	2,246
41	Marion Cross School	Interior	1	Circulation-Hallway	Hallway	1st floor	Building Management System	1	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	63	126	≥ 9	3,120	12,580	4.03	ECM	RB - Replace Bulb	Retain Existing Controls	4' 17W LED T8	3,120	6,683	5,897
42	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	Light Switch	4	Linear Fluorescent	T8	4' 32W T8; Troffer - Surface Mounted Indirect 1'x4'	7	14	≥ 9	3,120	1,398	0.45	ECM	RB - Replace Bulb	Wall Mounted	4' 17W LED T8	3,120	743	655
43	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	Light Switch	4	CFL	CFL - Screw-in	CFL - Screw-in - CFL13	1	1	≥ 9	3,120	41	0.01	ECM	RB - Replace Bulb	Wall Mounted	9W LED A19	3,120	28	12
44	Marion Cross School	Interior	1	Office- Support Staff	Nurse	Nurse	Light Switch	4	LED	-		4	4	≥ 9	3,120		0.00	No ECM		Wall Mounted				
	Totals												1,026				30						50,206	45,228

Appendix I:
Energy Conservation Measures Calculation

UIC	Install Low Flow Faucet Aerators
EAP2-b	**Location**: Restrooms
Attributes:	Replace 18x 2GPM rated bathroom aerators with 0.5GPM WaterSense certified aerators

Property Type:	Commercial	Estimated No. of Operational Weeks	52
		Number of Occupied Days/Week (Max 7)	5

KITCHEN FAUCETS			BATHROOM FAUCETS		
Number of Occupants Affected By Retrofit	200		Number of Occupants Affected by Retrofit	200	
Do You Want To Replace Kitchen Faucets Aerators	No	*(Select)*	Do You Want To Replace Bathroom Faucets Aerators	Yes	*(Select)*
Total Number of Faucet Aerators To Be Replaced	0		Total Number of Faucet Aerators To Be Replaced	18	
Total Number of Faucets To Be Replaced:	0		Total Number of Faucets To Be Replaced:	0	
GPM of Existing Faucet Aerators	-	GPM	GPM of Existing Faucet Aerators	2	GPM
GPM of Proposed Faucet Aerator	-	GPM	GPM of Proposed Faucet Aerator	0.5	GPM
Estimated Number of Uses Per Day	4		Estimated Number of Uses Per Day	4	

Annual Water Savings From Installing Low Flow Aerators: 29.95 kGal

WATER & ENERGY SAVING CALCULATION			COST SAVING CALCULATION		
Select Type of Water Heater Fuel:	No. 2 Oil	(Select)	Property Location in United States	Northern Localities	
Energy Factor of Domestic Hot Water Heater:	0.59	EF	Heating Fuel Tariff	$1.95	$/Gal
Hot Water Discharge Temperature at Faucet	110.00	°F	Water Tariff ($/1000 Gal)	$12.59	$/kGal
Equivalent Heating Fuel Savings:	182	Gallons	Annual Cost Savings In Form of Water	$377	$
Savings Discounted by 15% to Account For Cold Water Use					
Annual Water Savings	29.95	kGal	Annual Energy Savings From Water Heater	$355	$

COST BENEFIT ANALYSIS					
Estimated Material Cost	$144		Estiamted Labor Cost	$125	
Estimated Total Annual Cost Savings	$732	$$	Estimated Total Installation Cost	$269	$$
Simple Payback Period	0.37	Years	*Type of Recommendation*	No/Low Cost ECM Recommendation	

ECM EXPLANATION:

By reducing the flow of water coming from the restroom faucets, aerators can generate energy savings at low cost and with easy installation. The savings generated would be in the form of reduced water and sewer costs and at the same time aerators would save energy by reducing the demand for hot water. The average faucet has a flow rate of about 2 to 4 GPM. Adding a screw-in faucet aerator reduces the flow to 0.5 to 1.5 GPM in the bathroom and 2.2 GPM in the kitchen. In addition to saving energy and water, the "foamier" water that comes from faucet aerators wets objects better than water from a faucet with no aerator, which tends to bounce off the object rather than thoroughly wetting it.

BV recommends replacing the proposed faucet aerators with new low flow aerators as mentioned above. The proposed ECM shall also result in an annual energy saving in form of reduction in water heating bills.

Summary:

Initial Investment: $269 Estimated Annual Cost Savings: $732 Simple Payback Period (Yrs): 0.37

UIC	Retrofit Flush Tank Toilets to Dual Flush
EAP3	Location: Restrooms
Attribute:	Retrofit 14x 1.6GPF toilets to dual-flush

EXISTING CONDITION

Total Occupants:	200	
Number of Water Closets To Be Replaced	14	
Number of Occupied Days Per Week (Max 7)	5	
Number of Occupied Weeks/Year (Max 52)	52	
Estimated Restroom Usage/Individual/Day	4	(Select)

5.05 flushes/person/day@American Water Works Association (AWWA)

PROPOSED RETROFIT/REPLACEMENT

Existing Gallons Per Flush Ratings For Water Closet Flushes		1.60	GPF
Replace or Retrofit Toilets With Dual Flush Toilets		Retrofit	
Replace			
Proposed Toilet	-		
GPF of Proposed New Low Flow Water Closet Fixture*		-	GPF
Retrofit			
Dual Flush - Retrofit Setup Valve for Flush Tank Toilet	*Solid Waste (20%)*	1.60	GPF
**(Federal Law Requires All Flushes Not To Exceed 1.6 GPF)*	*Liquid Waste (80%)*	1.28	GPF

Water & Cost Saving Calculations

Water Savings By The Use of Low Flow Water Closet Flush Valves/Day				204.80	gal
Total Annual Water Savings in gallons				53.25	kgal
Cost Savings Calculations					
Enter Water Tariff Rate ($/1000Gal)				$12.59	$
Estimated Cost Savings From Water				$670	$
Estimated Cost of Retrofit					
Estimated Total Cost For Retrofit	*Material*	$336	Total	$1,788	$
	Labor	$1,452			
Simple Pay Back Period				2.67	Yrs
Type of Recommendation	Capital Cost ECM Recommendation				

ECM EXPLANATION:

The highest water utilization at any home/office occurs in the restrooms. It is estimated that on an average a normal human being uses the restroom at least four times a day. Keeping with the global water conservation objectives, federal law prohibits use of any new water closet flushes over 1.6 GPF.

Existing toilets can be retrofitted with pressure-assisted flush technology to reduce the flush rate to 1.0 GPF or less. Though water efficient these toilets make considerable amount of noise as this involves release of pressurized air during the course of flushing. Thus making them unpopular among residential properties.

Thus BV recommends replacing the existing high flow toilets with new low flow 1.28GPF rated flush tank toilets, which are comparatively more water efficient at the same time considerably quiter as compared to the pressure assisted technology retrofitted toilets.

Summary:

Initial Investment: $1,788

Simple Payback: 2.67 Years

Annual Cost Savings: $670

UIC	**Upgrade Building Lighting to LED and Install Automatic Lighting Controls**
EAL10	**Location: Building Interior and Exterior - Marion Cross School**
Attributes:	**Replace CFL (29x) ;Linear Fluorescent (401x) ;**

	No. of ECMs	No. of Fixtures	No. of Lamps	KWh Saved	Energy Cost Saving	O & M Savings
Upgrade Lighting to LED	34	430	943	45,228	$8,140.95	$3,826.62

Existing Technology	**Sub-Technology**	No. of ECMs	No. of Fixtures	No. of Lamps	KWh Saved	Energy Cost Saving	O & M Savings
CFL	CFL - 2 Pin	0	0	0	0	$0	$0
CFL	CFL - 4 Pin	0	0	0	0	$0	$0
CFL	CFL - Screw-in	4	29	29	362	$65	$1,617
Circiline	T9	0	0	0	0	$0	$0
Incan/H/MR	H	0	0	0	0	$0	$0
Incan/H/MR	Incan	0	0	0	0	$0	$0
Incan/H/MR	MR	0	0	0	0	$0	$0
HID	HPS	0	0	0	0	$0	$0
HID	MH	0	0	0	0	$0	$0
HID	MV	0	0	0	0	$0	$0
HID	QL	0	0	0	0	$0	$0
Linear Fluorescent	T8	29	391	391	44,366	$7,986	$2,086
Linear Fluorescent	T12	0	0	0	0	$0	$0
Linear Fluorescent	T8 U	0	0	0	0	$0	$0
Linear Fluorescent	T12 U	0	0	0	0	$0	$0
Linear Fluorescent	T5	1	10	10	499	$90	$124
Linear Fluorescent	T6	0	0	0	0	$0	$0
Linear Fluorescent	T10	0	0	0	0	$0	$0

Proposed Controls	**No. of Controls**		**No. of Controls**
Photo Sensor	0	Ceiling Mounted	119
Wall Mounted	18		

Initial Investment			**Equipment Rentals**	
Material Cost	$20,902.71		Scissor Lift 26' - Interior Spaces	$0.00
Labor Cost	$24,486.19		Bucket Truck - Exterior Spaces	$0.00
Local Electric Rate:	$0.18	$/kWh	Estimated Annual Energy Savings:	45,228
			Estimated Demand Savings:	30
Hourly Labor Rate For Electrician:	$72.05		Estimated Annual Energy Cost Savings:	$8,141
Budgeted Initial Investment:	$45,389		Estimated Annual O&M Cost Savings:	$3,827
Estimated Return on Investment: *(Including O&M Savings)*	3.79	Years	Estimated Annual Cost Savings:	$11,968

Appendix J:
Solar Photovoltaic Feasibility Study

UIC	Install Fixed Tilt Solar Photovoltaic System
EAR1	Location: Roofs
Attributes:	Install fixed tilt 67.2KW Solar Photovoltaic System consisting of 67.2kW Rooftop Fixed Array PV System;

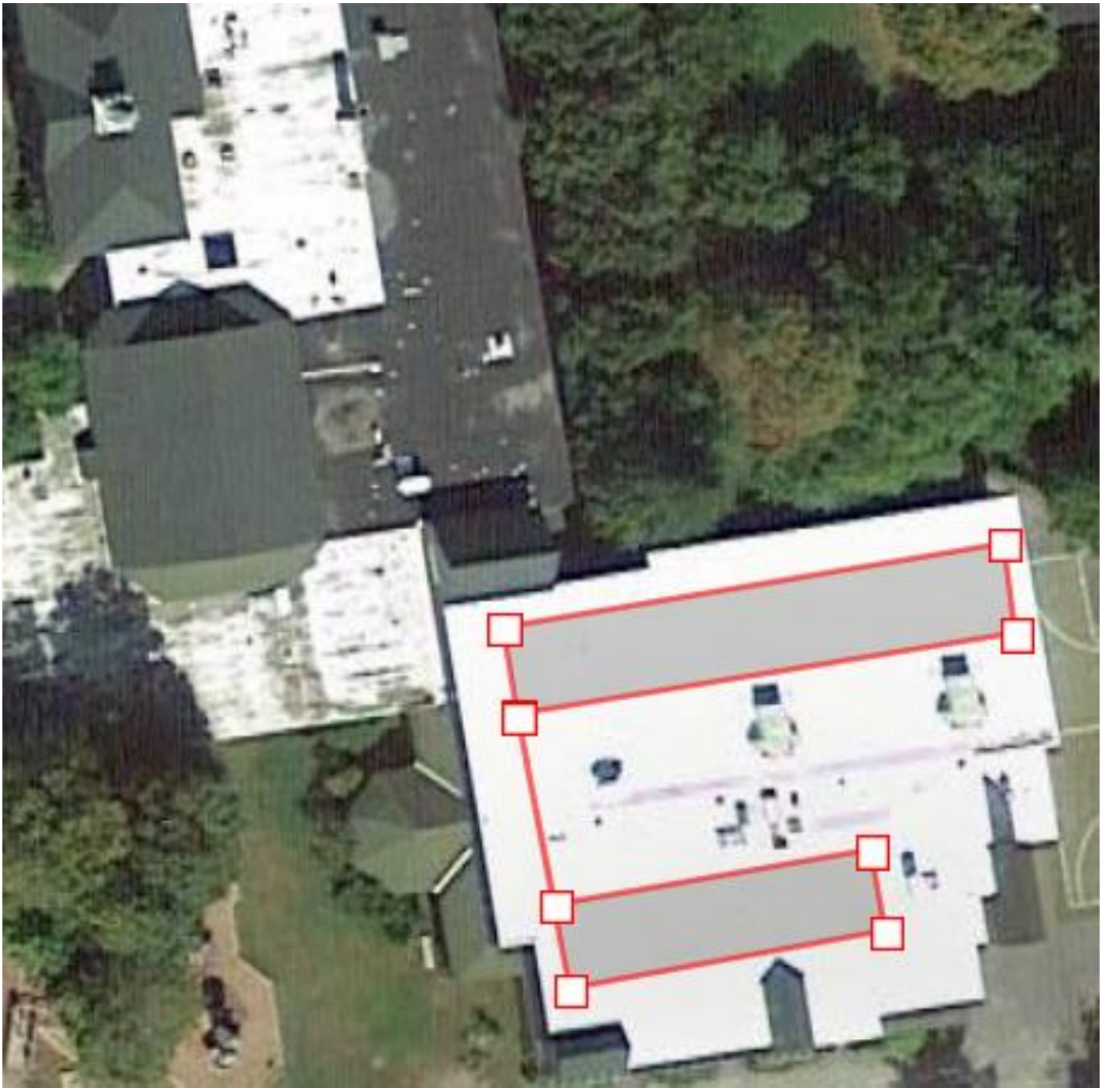
Select State: Vermont Electric Rate: $0.18 $/KWH Annual Electric Consumption: 109,548 KWh

Roof No.	Description	Location of the Array	DC System Size Per Roof	PV System Sizing For All Roofs	Estimated Number of 315 Watt PV Panels:	Total Estimated Annual Electricity Generated/ Roof	Total Estimated Electricity Generated (All Roofs)	Total Cost Savings	Installation Cost:	Simple Pay Back Period without Incentives	One Time Potential Utility or State Incentives	One Time Potential Federal Incentives	Annual Potential Incentives and Rebates		Simple Pay Back Period with All Incentives
			kW	kW		kWh	kWh			Yrs		Federal Tax Credit	Federal REPI Incentive	Solar Renewable Certificates (SRECS)- ($/MWH)	Years
												26%	$0.00	Varies by State	
1	Rooftop Fixed Array	Roof 1	14	14	46	17,253	17,253	$3,140	$73,990	23.6	$0	$19,237	$0	$0	17.4
2	Rooftop Fixed Array	Roof 2	53	53	168	63,227	63,227	$11,505	$271,297	23.6	$0	$70,537	$0	$0	17.4
3				0	0		0	$0	$0		$0	$0	$0	$0	
4				0	0		0	$0	$0		$0	$0	$0	$0	
5				0	0		0	$0	$0		$0	$0	$0	$0	
6				0	0		0	$0	$0		$0	$0	$0	$0	
7				0	0		0	$0	$0		$0	$0	$0	$0	
8				0	0		0	$0	$0		$0	$0	$0	$0	
9				0	0		0	$0	$0		$0	$0	$0	$0	
10				0	0		0	$0	$0		$0	$0	$0	$0	
		2		67	213	80,480.0	80,480	$14,645	$345,287	23.58	$0	$89,775	$0	$0	17.45

Solar Rooftop Photovoltaic Analysis		
Total Number of Roofs	2	
Estimated Number of Panels	213	
Estimated KW Rating	67	kW
Potential Annual KWh Produced	80,480	kWh
% of Current Electricity Load	73.5%	

Financial Analysis		
Investment Cost	$345,287	
Estimated Energy Cost Savings	$14,645	
Potential Rebates	$89,775	
Potential Annual Incentives	$0	
Payback without Incentives	23.6	years
Incentive Payback but without SRECS	17.4	years
Payback with All Incentives	17.4	years

Solar PV Layout – Roof 1



Project Number	Project Name
158531.22R000-002.379	Marion Cross School School Administrative Unit 70
Source	**On-Site Date**
PVWatts	November 17, 2022

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

17,253 kWh/Year*

System output may range from 16,451 to 18,016 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	2.70	1,029
February	3.60	1,235
March	4.90	1,788
April	4.98	1,640
May	5.58	1,837
June	5.79	1,815
July	5.72	1,842
August	5.30	1,718
September	4.76	1,525
October	3.25	1,129
November	2.50	877
December	2.17	818
Annual	4.27	17,253

Location and Station Identification

Requested Location	22 church street, norwich vt
Weather Data Source	Lat, Lng: 43.73, -72.3 1.2 mi
Latitude	43.73° N
Longitude	72.30° W

PV System Specifications

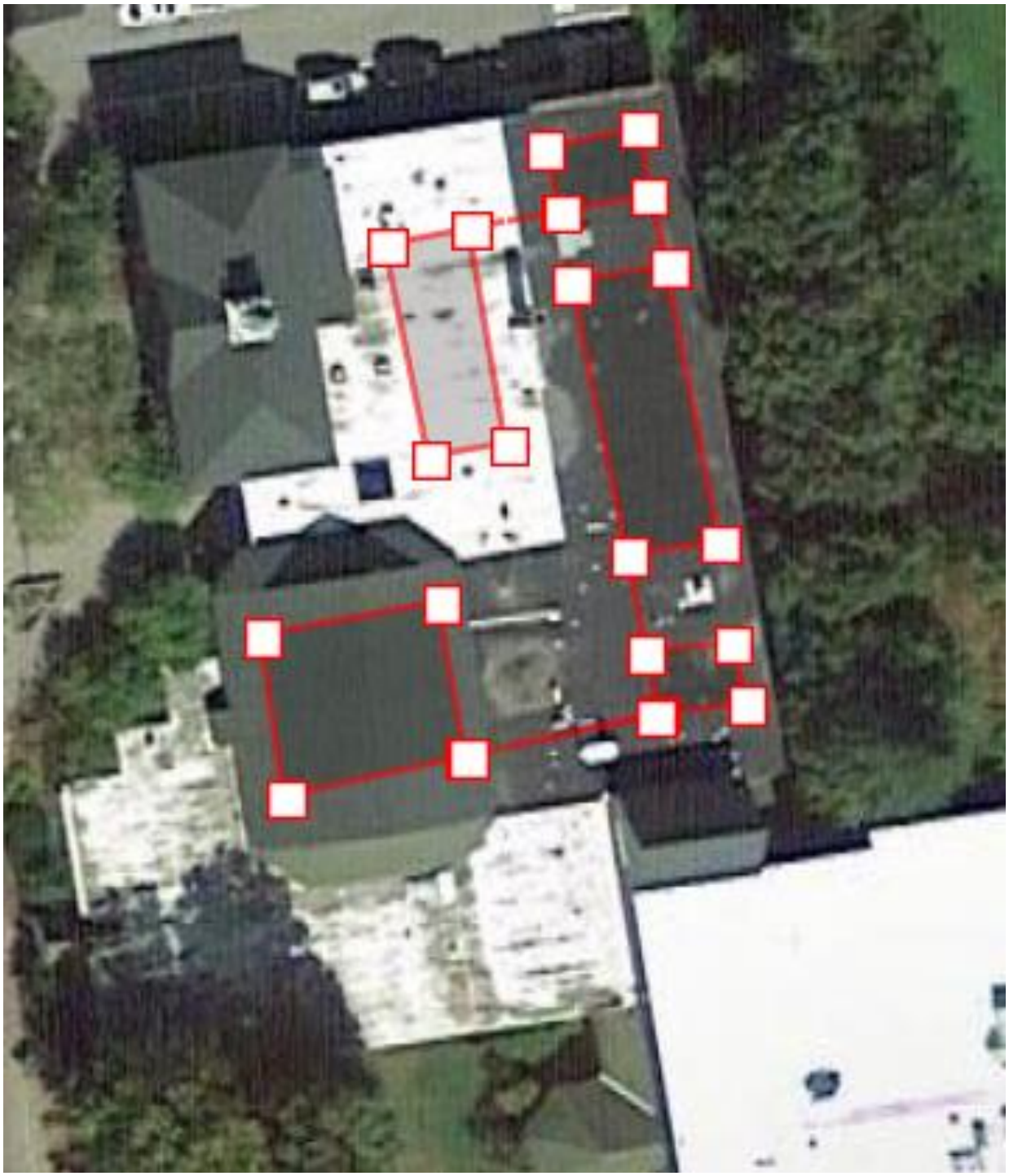
DC System Size	14.4 kW
Module Type	Standard
Array Type	Fixed (open rack)
System Losses	14.08%
Array Tilt	20°
Array Azimuth	180°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4%
Albedo	*From weather file*
Bifacial	No (0)

Monthly Irradiance Loss	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Performance Metrics

DC Capacity Factor	13.7%

Solar PV Layout – Roof 2



Project Number	Project Name
158531.22R000-002.379	Marion Cross School School Administrative Unit 70
Source	**On-Site Date**
PVWatts	November 17, 2022

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

63,227 kWh/Year*

System output may range from 60,287 to 66,021 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	2.69	3,768
February	3.60	4,524
March	4.89	6,549
April	4.98	6,011
May	5.58	6,735
June	5.78	6,654
July	5.72	6,752
August	5.30	6,297
September	4.75	5,591
October	3.25	4,139
November	2.50	3,215
December	2.16	2,992
Annual	4.27	63,227

Location and Station Identification

Requested Location	22 church street, norwich vt
Weather Data Source	Lat, Lng: 43.73, -72.3 1.2 mi
Latitude	43.73° N
Longitude	72.30° W

PV System Specifications

DC System Size	52.8 kW
Module Type	Standard
Array Type	Fixed (open rack)
System Losses	14.08%
Array Tilt	20°
Array Azimuth	180°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4%
Albedo	*From weather file*
Bifacial	No (0)

Monthly Irradiance Loss	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Performance Metrics

DC Capacity Factor	13.7%

Appendix K:
Energy Audit Glossary of Terms

Glossary of Terms and Acronyms

ECM – Energy Conservation Measures are projects recommended to reduce energy consumption. These can be No/Low cost items implemented as part of routine maintenance or Capital Cost items to be implemented as a capital improvement project.

Initial Investment – The estimated cost of implementing an ECM project. Estimates typically are based on R.S. Means Construction cost data and Industry Standards.

Annual Energy Savings – The reduction in energy consumption attributable to the implementation of a particular ECM. These savings values do not include the interactive effects of other ECMs.

Cost Savings – The expected reduction in utility or energy costs achieved through the corresponding reduction in energy consumption by implementation of an ECM.

Simple Payback Period –The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates.

EUL – Expected Useful Life is the estimated lifespan of a typical piece of equipment based on industry accepted standards.

RUL – Remaining Useful Life is the EUL minus the effective age of the equipment and reflects the estimated number of operating years remaining for the item.

SIR - The savings-to-investment ratio is the ratio of the present value savings to the present value costs of an energy or water conservation measure. The numerator of the ratio is the present value of net savings in energy or water and non-fuel or non-water operation and maintenance costs attributable to the proposed energy or water conservation measure. The denominator of the ratio is the present value of the net increase in investment and replacement costs less salvage value attributable to the proposed energy or water conservation measure. It is recommended that energy-efficiency recommendations be based on a calculated SIR, with larger SIRs receiving a higher priority. A project typically is recommended only if the SIR is greater than or equal to 1.0, unless other factors outweigh the financial benefit.

Life Cycle Cost - The sum of the present values of (a) Investment costs, less salvage values at the end of the study period; (b) Non-fuel operation and maintenance costs: (c) Replacement costs less salvage costs of replaced building systems; and (d) Energy and/or water costs.

Life Cycle Savings – The sum of the estimated annual cost savings over the EUL of the recommended ECM, expressed in present value dollars.

Building Site Energy Use Intensity - The sum of the total site energy use in thousands of Btu per unit of gross building area. Site energy accounts for all energy consumed at the building location only not the energy consumed during generation and transmission of the energy to the site.

Building Source Energy Use Intensity – The sum of the total source energy use in thousands of Btu per unit of gross building area. Source energy is the energy consumed during generation and transmission in supplying the energy to your site.

Building Cost Intensity - This metric is the sum of all energy use costs in dollars per unit of gross building area.

Greenhouse Gas Emissions - Although there are numerous gases that are classified as contributors to the total for Greenhouse Emissions, the scope of this energy audit focuses on carbon dioxide (CO_2). Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).