BAY MILLS INDIAN COMMUNITY
"*GNOOZHEKAANING*" PLACE OF THE PIKE

BAY MILLS TRIBAL ADMINISTRATION
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Brimley, Michigan 49715

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REQUEST FOR PROPOSALS

Request for Proposals for Bay Mills Resort and Casino Sustainability Project

The Bay Mills Indian Community is requesting proposals from qualified individuals and firms to provide technical assistance to develop materials management strategies and incorporate sustainable practices at Bay Mills Resort and Casino.

Background:

Bay Mills Indian Community (BMIC) has been awarded funding from the Environmental Protection Agency (EPA) Solid Waste Infrastructure for Recycling (SWIFR) grant. This grant funding enables BMIC to work with a consultant to receive technical assistance to implement sustainable practices and improve materials management at its Bay Mills Resort and Casino (BMRC).

BMIC is a federally recognized Native American Tribe located in the rural Eastern Upper Peninsula of Michigan on the shores of Lake Superior. The people of Bay Mills are Ojibwa (or Chippewa), and they have resided in this area for hundreds of years. BMIC was granted a federal Corporate Charter pursuant to Section 16 of the Indian Reorganization Act on June 18, 1934. BMIC is one of the four (4) original reservations established in Michigan. BMIC consists of 3,870 acres with two (2) separate inhabited reservation areas, approximately 25 miles apart, with a service district that includes Chippewa, Luce, and Mackinac Counties.

BMIC operates the Bay Mills Resort and Casino (BMRC) which includes two gaming floors, 143 hotel rooms, three restaurants, 124 RV sites and an 18-hole golf course. A 4,727 square foot conference center, which can accommodate up to 300 guests, is also located on the property. A $90 million dollar expansion project is currently under construction. This expansion will include additional hotel rooms, pool, splash pad, spa, and restaurant. The Resort and Casino address is 11386 West Lakeshore Drive, Brimley, MI 49715.

The Tribe is working toward more sustainable operations. BMIC completed a Green Community Assessment in 2022 (attached), installed EV chargers at BMRC, solar arrays have been installed on several government buildings and the tribe has received EPA funding to construct a solar array with battery storage which will offset tribal energy use. The Tribe has a solid waste management plan (SWMP) which was updated in 2022 (attached).

This Project Is Defined As Follows:

The Bay Mills Indian Community is interested in receiving technical assistance to implement strategies to improve sustainable practices and materials management at Bay Mills Resort and Casino. A sustainability consultant specializing in materials management and waste reduction, with experience working with casinos, hotels and similar entities, will tour the facility and meet with stakeholders to identify and assess sustainable practices and materials management approaches most viable for the BMRC.

A final report will contain a roadmap for the executing strategies and assistance in positioning the Bay Mills Indian Community to pursue further funding for the implementation.

Scope Of Work:

The successful Proposer shall perform the tasks listed below for the project and shall work closely with designated personnel to accomplish these goals:

Phase I: Research

Research as determined by the consultant. This may include but is not limited to a site visit, review of BMIC's Solid Waste Management Plan (SWMP), Green Community Assessment and other pertinent documents, collecting feedback from BMRC staff, community members, stakeholders, and the Executive Council. Research should also identify barriers to implementing sustainable practices, reducing waste and participating in materials management including recycling, experienced by both BMRC staff and guests. Research will also involve initial planning and discussion regarding the approach of this project and what BMIC wants to accomplish. Areas to be assessed are front of house operations and back of house operations including the casino areas, restaurants, kitchens, hotel and Maintenance Department.

Phase II: Final Report and Presentation

A final report should be completed to outline findings. The report will be presented to the BMIC Executive Council, BMRC Gaming Authority, BMRC management and other stakeholders. This deliverable may include a review of current operations, best practices in sustainability and materials management, actionable steps to move forward including technical assistance, recommendations for equipment and supplies needed to implement strategies, and options for further funding for implementing strategies beyond technical assistance.

The report will be tailored by the consultant and may include:

- Inventory of existing practices and conditions
- Analysis to determine waste reduction and recycling strategies such as but not limited to:
    - Source reduction/purchasing practices and purchase of greener products
    - Improved recycling practices
    - Single use items including to-go containers and cups
    - Reducing food waste
    - Strategies for implementing sustainability practices with current operations
    - Additional services/tasks not identified in this RFP that the consultant believes will improve the project, reduce costs and time, etc.
- Establish sustainability goals based on best practices
- Develop a sustainability action plan which includes strategies for waste reduction and materials management to meet goals
- Develop a system to measure and evaluate each strategy against each goal
- Economic Analysis and Feasibility
    - Estimations of cost savings that BMRC can expect from the proposed strategies

- Projections of expenses that BMRC can expect to incur in implementing strategies
- Other pertinent financial information the consultant deems appropriate.

Phase III: Technical Assistance

- Technical Assistance should be tailored by the consultant and provide guidance and tools for implementing findings in the final report. Technical assistance may include the following:
  - Practical steps to implement sustainable practices, waste reduction and materials management
  - Recommendations of supplies and equipment to implement practices
  - Recommendations for staff training/education.
  - Outreach and education for staff and guests to increase participation in sustainable practices

Proposals to assist with these services must be submitted to Bay Mills Tribal Administration by December 12, 2024, 12:00 pm EST.

Please email proposals in PDF format to Jennifer Satchell at jmsatchell@baymills.org. Proposals received after the deadline will not be accepted. Please contact Jennifer Satchell via email or at (906) 248-8655 with any questions regarding this Request for Proposals or any of the requirements outlined in the scope of work to be completed.

Proposal Requirements:

1. Cover letter
2. Resumes and/or Biographies: Please include resumes and/or bios of key principals and individuals overseeing or involved with this project.
3. Description of Experience related to feasibility studies:
   a. Please describe the firm's general experience, including the number of years the firm has been in operation.
   b. Please describe the firm's experience providing research consulting and sustainability studies services.
   c. Description of experience in Indian Country: Please describe any relevant experience of the firm, involved principals, and any assigned staff in projects located on Native American land.
4. Associations: Please describe any associations with other firms or any form of subcontracting planned for the project. Please include pertinent information as to subcontracted firms.
5. Certifications and Licenses: Please include a copy of any pertinent licenses or certifications.
6. References: Please include a minimum of three (3) references that the BMIC can contact.
7. Disclosure of Claims: Please disclose any claims, lawsuits, or formal disputes for work or

services previously or currently being performed.

8. Methodology: Please provide an explanation of the methodology for all services.
9. Cost proposal: Please detail all costs required to assist with these services and the required timelines for payments.
10. Native American Preference (Optional): Please provide any evidence to demonstrate that the firm is a qualified, Indian-owned enterprise, with at least 51% active ownership by a member of a federally recognized Indian tribe.

Project Award Rubric

	Score Received: 1-5	Weight	Weighted Scores
Demonstrated experience with environmental sustainability studies		20%	0.00
Approach to successfully complete each deliverable		20%	0.00
Qualifications- identification of key personnel and experience/capability		15%	0.00
Schedule- timeliness and value for money		15%	0.00
Cost- reasonableness of rate schedule and within grant budget		25%	0.00
Native American Preference		5%	0.00
Total	**0**	**100%**	**0.00**

Ratings:	
Clearly Outstanding-Above and Beyond Expectations	5
Well qualified	4
Average	3
Weak	2
Unsatisfactory	1
Insufficient Response	0

The Tribe, at its sole discretion, may elect to interview the selected firm(s). If a firm is requested to take part in an interview (via Tribal arranged remote means), the key proposed project staff will be expected to take part. The interview will be an opportunity for the Tribe's selection team to review the firm's proposal and other matters deemed relevant to the evaluation.

Compensation

The proposal should provide a cost for all work associated with the provision of these services. The final cost of services may be negotiated before the award contract.

Timeline:

November 12, 2024	RFP materials e-mailed to potential Respondents from BMIC list and posted on the BMIC website.
December 6, 2024	RFP questions received no later than 12:00pm EST
December 12, 2024	Proposals received by BMIC no later than 12:00pm EST
January 10, 2025	Intent to Award sent to final selection

Attachments:

Green Community Assessment
Solid Waste Management Plan

Solid Waste Management Plan

Bay Mills Indian Community

Updated by the Bay Mills Indian Community Biological Services Department
Created: September 2010
Recent Update: June 2022
Adopted by BMIC Executive Council July 11, 2022

Contents

Introduction

The following Solid Waste Management Plan is a guide to handling non-hazardous, non-medical municipal waste within Bay Mills Indian Community (BMIC). It focuses on environmental friendliness and economic efficiency via waste reduction, recycling and reuse. The five main elements of the planning method include: the Community Service Area; BMIC Solid Waste Management Program Structure and Administration; Current and Proposed Waste Management Practices; Long Term Funding and Sustainability; and Approval of the Plan. Important sub-factors are BMIC's waste stream characterization/waste generation, short and long term goals of waste reduction, and the overall feasibility of the current and proposed waste management practices.

BMIC consists of residential areas, gaming and tourist centers, and is home to a body of students from the Bay Mills Community College. The waste produced by these sectors of the community is highly recyclable and compostable. Open dump sites are cleaned in a collaborative effort between the biological services office and community volunteers throughout the year, in and around the community. The BMIC also implements a "dollar a bag" policy, in which residents could purchase designated green 30 gallon bags from Advanced Office Technologies for one dollar. Those bags can then be disposed of into the compactor at the BMIC Waste Transfer Station (WTS) for removal to the landfill. Also, Bay Mills provides 20 free bags to elders once every two months to help offset the cost and to dispose of trash at the BMIC transfer station. These efforts have succeeded, and continue to succeed, in minimizing illegal dumping and littering.

BMIC is heavily dependent on GFL Environmental Inc. (GLF Inc.), for waste collection and disposal services as it is the only refuse hauler in the area. GFL also owns the only landfill in the area. While recent efforts to divert much of this waste from landfills have been successful there still exist room for improvement with continued creation of reduction programs and policies. While such programs may require initial investment and costs, a solid waste management plan that includes reduction programs and policies can drastically cut waste disposal amounts, and improve economic efficiency, as will be shown later in this plan.

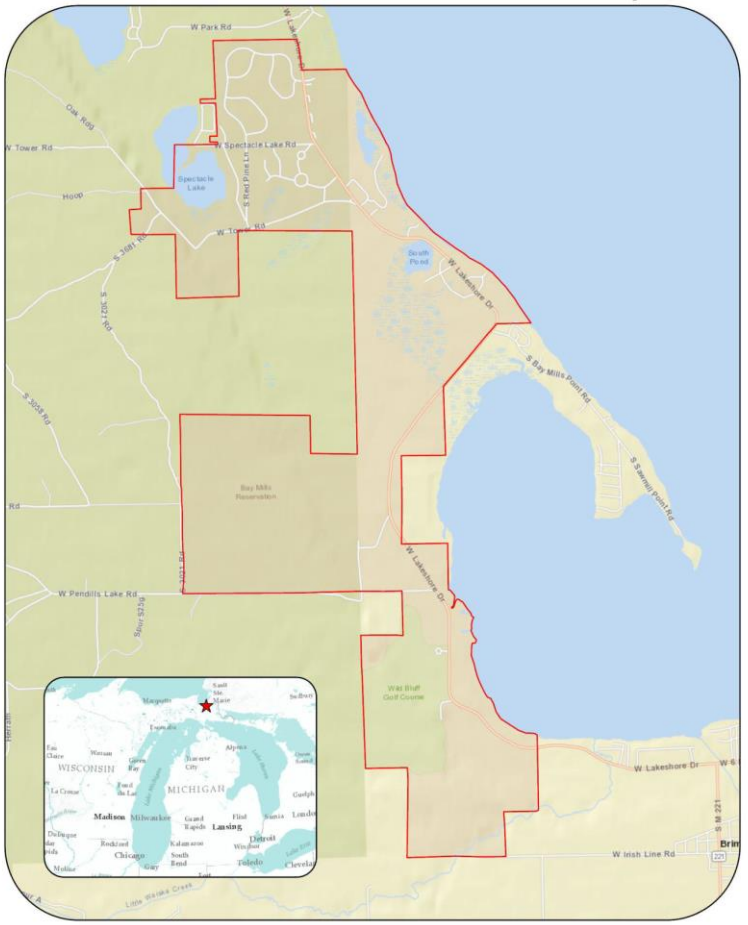
We will present the specific factors affecting BMIC waste management, display current and proposed waste management practices, the overall feasibility of those practices, and outline the proposed implementation of a new solid waste management plan.

1.0 Community Service Area

1.1 Population and Demographics

As of 2022, Bay Mills Indian Community has an enrollment of 2,342 tribal members, with 1,354 tribal members living within the Chippewa, Luce, Mackinac service area. 423 tribal members living in the service area are under the age of 18. There are approximately 600-700 students enrolled at the Bay Mills Community College in any given year. For the purposes of this plan, however, we will be using the numbers of on-reservation residents to calculate waste generated from the reservation.[1] Sault Ste. Marie is the closest city with a population of approximately 13,337 people (U.S. Census April 1, 2020) and is located approximately 25 miles from the Reservation.

Bay Mills Indian Community
Main Reservation Boundary



1.2 Community Assets and Resources

BMIC maintenance department handles numerous waste management responsibilities to include: running a recycling program consisting of collecting recyclables from 7 tribal buildings and transporting a community recycling trailer to the county recycling facility on average bi-weekly; and staffing the waste transfer station at the maintenance grounds. Maintenance equipment includes:

-1 30 yard compacting rollaway dumpster (maintained by GFL)
-2 20ft recycling trailers (with separated storage for glass, paper, plastic and cans)
-1 16ft enclosed trailer
-2 open 10ft trailers
-1 20ft ramped Fifth-wheel trailer
-1 cardboard compactor
-8 pickup trucks (with 5 plows)

[1] Retrieved from Tribal Action Plan see Appendix A

-1 Kubota heavy mover
-Light construction/maintenance resources and facilities.
-1 fluorescent light bulb crusher

The public works department provides construction services for all reservation facilities, and maintains heavy loading and transportation equipment.

Biological and Conservation Department offices are located at 11801 Plantation Rd, Brimley MI. Though neither specializes in solid waste management/reduction, the biological services department, in conjunction with the BMIC maintenance department, does provide a twice yearly Household Hazardous Waste (HHW) collection event where residents can drop off their stored oil, batteries, paint, and electronic waste for disposal at no cost to the resident.

The Bay Mills Community College incorporates an environmental science program on campus though it is not currently used for recycling/composting research or services. The community college also maintains the Waishkey Bay Farm properties which include several vacant outbuildings. These outbuildings have been used, as is discussed later in this paper, to conduct solid waste assessments.

Several volunteer/tribal community groups are located on-reservation, such as the cultural center and the boys and girls club. The boys and girls club has provided volunteers for previous studies related to solid waste and the Boys and Girls club and the Community college environmental students have expressed interest in being part of solid waste studies, cleanup efforts, and other planning efforts and should be considered as valuable potential resources for future work.

1.3 Households and Housing

BMIC housing consists of 3 residential areas/circles and 2 apartment complexes. These residential units are under the care of the BMIC Housing Authority and Individual tribal members. 33 housing units utilize curbside pickup. All other housing units drop off trash at the maintenance grounds transfer station as they deem necessary. The lack of curbside pickup causes some residents to hold garbage outside for long periods of time; this has raised concern of animal activity (specifically bears) due to the rural nature of the BMIC. Dumpsters are located at each apartment complex for those residents' use. For the purposes of this plan we will be using the BMIC residential areas. Private residents who do not dump trash at the transfer station will not be included in this plan's calculations and projections.

Infrastructure for additional housing is being built on Plantation road. Up to 150 homes are planned to be constructed there.

1.4 Population Projection and Estimated Growth

In recent decades there was dramatic growth of Bay Mills Indian Community when many families moved back to the Reservation. However, it appears that this dramatic growth was short lived and since that initial dramatic growth the Tribe is experiencing a moderate growth rate of approximately six percent per year. While this moderate growth rate of six percent per year is expected to continue it is important to note the punctuated growth events of the Community's past and plan for similar events.

1.5 Economy

The economy of BMIC relies mainly on casino enterprises, business holdings and tourism. There are five commercial enterprises on BMIC, namely: The Bay Mills Resort and Casino (BMRC), Wild Bluff Golf Course, Bay Mart gas station and store, Four Seasons Market & Deli, and Northern Lights Cannabis Company; there is also a RV Campground directly across from BMRC that can house approximately 120 RV's. The gambling and tourism industries create a huge influx of visitors in the tourist months, however the BMRC enterprises listed above maintain their own waste streams and use enterprise revenue to remove waste. No enterprise waste is regularly disposed of by the BMIC maintenance department.

There is also a fishing industry consisting of 12 subsistence and 63 commercial fishermen in BMIC as of 2022. This information was received by Justin Carrick, Bay Mills Public Safety Manager.

1.6 Climate

The Bay Mills Indian Community's climate is lake enhanced and is characterized by moderate temperatures in the summer and severe winters. The average annual precipitation is between 30 and 33 inches. Annual snowfall is between 90 and 110 inches. The average growing season is between 120 and 140 days, starting in early June and ending in late September.

1.7 Geography and Land Use

The Bay Mills Indian Community is located within a narrow strip of land between the shores of Lake Superior (at the St. Mary's River) and the Hiawatha National Forest in Chippewa County, Michigan. Sault Ste. Marie, Bay Mills' nearest city, is located approximately 25 miles east/northeast of the main reservation. Land owned by Bay Mills is geographically fragmented and divided among reservation, trust, and fee lands (see attachment: Bay Mills Community Locator Map). The majority of the land base lies northwest of Brimley, Michigan. The remainder of BMIC land, approximately 600 acres, is located on Sugar Island. The specific acreage distribution is as follows:

Bay Mills Acreage Breakdown:

Original Mission Area	527.85
IRA	1053.91
Sugar Island	607.75
Forest Service Exchange Land	842
Purchased Land	816.89
Total	**3848.40**

Historically, development on the BMIC Trust land has been extremely limited. Life on the Bay Mills Reservation, as on most Indian reservations, was in a basic survival mode for over 150 years until successful economic development took hold in the mid-1990s. Wetland areas made it difficult to build homes, to farm, or even travel throughout the Reservation. Unemployment had exceeded seventy percent. Most housing was at the bottom end of sub-standard. Social ills were the norm. Educational opportunities bypassed Indian children. Business opportunities other than commercial fishing were nearly non-existent.

The southwest portion of the Reservation was once farmed. An apple orchard once existed and an area of crops was maintained. A small cattle farm also existed until 1976 when the Bay Mills General Tribal Council mandated that it be discontinued because of difficulties associated with wetlands. Agriculture has discontinued on the Reservation with the exception of a few garden plots. Small isolated logging activities also took place on the Reservation throughout the years. These past activities have changed the hydrology, soils, and flora of the area.

Many of the existing homes in the southern portion of the Reservation were built on wetlands, as were many homes off the Reservation throughout the United States before there was any federal legislation protecting wetlands. The BMIC has practiced minimal degradation impact with all of its existing home sites. The homes that were built in wetland areas were constructed on small pads of fill with a density of less than one home per acre. This type of development tends to fragment wetland areas. The area that has probably suffered the greatest detrimental impact is a wetland along Lakeshore Drive that appears to have been completely filled in.

In the 1980s a renaissance was ignited. This resulted from a total community effort, guided by astute tribal officials who had a compelling vision of the future. A philosophy of self-determination was adopted to ensure the Tribe's future success. In 1984 the people of Bay Mills opened the very first Indian casino in the United States. This helped generate funds that were directed toward meeting community goals.

In October of 1993, the BMIC tribal leaders proposed a specific land management strategy that provided for future residential, commercial, and economic development, as well as wetlands preservation. A future development zone was proposed that consisted of a

combination of uplands and significantly altered, low quality wetlands. The area consists of approximately 116 acres and is located in an area in which residential and recreational development already exists. The boundary for the area runs parallel with Lakeshore Drive, 350 feet from the center of the road, on both sides. Any development within this zone would follow careful environmental assessment prior to any construction activities. In December 1993, the BMIC submitted applications to the U.S. Army Corps of Engineers for a block development permit for this proposed area for the purpose of permitting the discharge of new fill material, as well as After the Fact authorization for the unauthorized placement of fill on several new housing sites.

Bay Mills tribal leaders also set-aside approximately 460 acres of high quality wetlands to be preserved. This preservation area falls under all applicable preservation management objectives that the BMIC adopted, which includes wetland protection codes and ordinances. The area includes roughly 460 acres, which is four times the area proposed for development activities.

Throughout the 1990s major improvements were made in the social-economic fabric of the community. Housing steadily improved and sub-standard homes were replaced. Health care facilities and a medical clinic were constructed. Senior citizens assistance for the elders was developed. A community college was established. Young people learned more about their culture and traditions. Tribal businesses developed. A new state-of-the-art, all season, resort complex with casino, hotel, golf course, and marina was opened on the shores of the Back Bay.

In the summer of 1993, the last three homes built on wetlands occurred. The foundation fill was minimal, and the houses were placed on one-acre parcels. This was considered the last alternative for tribal housing due to the fact that most upland areas that are suitable for residential development have been utilized. The Bay Mills Indian Community had fully developed the land suitable for residential, commercial, economic, and recreational uses when the Tribe began working with the United States Forest Service. The USFS possesses almost the entire land holdings adjacent to the entire western boundary of the Reservation. In 1998, the Tribe successfully completed a land swap with the National Forest Services, which resulted in the Tribe securing 842 acres of new land adjacent to the current tribal boundaries. The land is broken into two separate parcels, one parcel located north of Spectacle Lake. This parcel allowed the Tribe to build 65 new homes for their growing population. The other parcel located adjacent to the southwest Reservation boundary and is earmarked for approximately 150 residential units.

Today existing land uses on Bay Mills land are chiefly comprised of: wooded (1,500 acres), wetlands (1014 acres), residential (520 acres), recreational (203 acres), and business/community services areas (50 acres).

1.8 Geology and Natural Resources

The Bay Mills Indian Community's physical environment can be characterized as mostly flat and wet. Bay Mills Indian Community land consists of glacial deposits and generally low, level terrain with an average slope of 5% and elevations between 600-700 feet. However, the Reservation does contain two ridges that dominant the area's flat landscape. Mission Ridge extends from the northwest to the southeast along the western boundary of the Reservation and has slopes up to 60% and rise 300 to 400 feet above the Reservation. Another small ridge is located in the northeast portion of the Reservation near the North Pond.

Soil types vary throughout the Reservation. According to the USDA Soil Survey of Chippewa County, many of the soil types on the Reservation are hydric. Hydric soils are indicative of wetland conditions. Wetlands account for approximately forty percent of BMIC land. This high percentage of wetland has had significant impacts on meeting housing needs and other development needs. Other areas of the Reservation exhibit soils that are highly permeable. Areas of high permeability have contributed to an excellent groundwater resource throughout the Reservation.

Northern hardwoods largely comprise the wooded lands on the Reservation. Hardwoods include: Sugar and Red Maple, Yellow and White Birch, Aspen, American Beech, and minor species. In the lowlands, Northern White Cedar, Balsam Fir, Black and White Spruce, and Tamarack predominate. On the sandy plains and uplands farther inland, Jack and Red Pine plantations predominate. Some of the timberlands are quite valuable, especially those containing Red Pine pole and saw timber and northern hardwood veneer and saw timber. The Aspen-Birch stands, conifer swamps, and wetlands are of less economic importance.

2.0 Description of BMIC Solid Waste Program Structure and Administration

2.1 Program Administration

The Maintenance Department, located at 5414 S. Nbiish Rd, is responsible for the current solid waste and recycling efforts. As will be described in more detail throughout the plan, GFL Environmental Inc., of Northern Michigan, headquartered in Southfield Michigan and with a local office located at M-28 and I-75, is the primary waste management provider for BMIC. The Conservation Department, located at 11801 Plantation Rd., is responsible for regulating illegal waste dumping due to its occurrence on forested lands throughout the BMIC reservation.

A Solid Waste committee, composed of Tribal Administrative, Biological Services, Maintenance, staff from Bay Mills Resort and Casino and other Tribal department staff as requested, are responsible for the continued updating and maintaining of current solid waste practices and plans.

2.2 Regulatory Requirements and Enforcement

The Bay Mills Conservation Departmnet enforces the following ordinances against illegal dumping:

> **625. Disposal of trash.**
>
> A. Littering. Any person who unlawfully deposits garbage, rubbish, the body of a dead animal, including destruction of a pet, or other litter in or upon any street, tribal waters or the ice thereon or tribal lands, is guilty of littering and may be sentenced to payment of a fine not to exceed $500 and/or community service to the tribe.
>
> B. Unauthorized dumping. Any person who, without authorization, disposes of any litter, garbage, construction material, or other waste in a refuse container which is not maintained for public use by the Bay Mills Indian Community or any agency thereof, is guilty of unauthorized dumping and may be sentence to a fine not to exceed $100 for each occurrence.

3.0 Description of Current and Proposed Waste Management Practices

3.1 Current Waste Management Practices

While BMIC is concerned with all waste generated on the reservation, the waste service areas that the tribe is directly responsible for and comprises the majority of the waste generated in the community consists of 3 residential circles/areas, 2 apartment complexes,15 tribal service buildings and 5 commercial locations. BMIC businesses like the Bay Mills Resort and Casino (and its associated enterprises) are responsible for their own waste collection and do not utilize the BMIC Transfer station services. Currently the BMRC has its own compactor and several 4, 6, and 8 yard dumpsters which it uses for waste; these are also maintained and emptied by GFL.

Solid Waste

The solid waste program in place consists of a waste transfer station, which is staffed 8 hours a day from Tuesday to Saturday and located at the Maintenance grounds. Maintenance staff performs curbside pickup at 7 locations including BMIC Administration offices and buildings. For all other residents waste is disposed of using the "dollar a bag" policy[2]. Once waste is collected at the transfer station and compacted, it is collected by GFL Environmental and taken to the Dafter Landfill.

General Recycling

There is currently stationed at the BMIC Maintenance Transfer Station a self-sort recycling trailer. Residents can self-sort plastic, metal, glass and paper at this unit. Users must hoist their recyclables to the 6ft-high opening, then squash them into the small opening; this poses as challenge for any persons under 6 ft tall. Recycled materials are taken to Chippewa County Recycling in Sault Ste. Marie and recycled at no cost to BMIC. There exists a second recycling trailer that is rotated into place while the first is being taken into Sault Ste. Marie to be emptied or undergoing maintenance.

Cardboard Recycling

Starting in 2017 the BMIC initiated a corrugated cardboard recycling program. The cardboard is bailed and stacked, then ultimately loaded into a semi for transportation to the recycling facility. The frequency of pickup of this cardboard is variable and determined by several factors including, how much storage room is present, weather conditions for storage, and pickup availability. This endeavor has and will continue to eliminate cardboard from entering into the waste stream. Due to the size of the current baler, full bales cannot be made which ultimately reduces the value of the cardboard. Due to space

[2] See Introduction, Paragraph 2

constraints, the cardboard must be stored outside which reduces the already limited space in the multi-duty Maintenance/WTS area and also lowers the quality and value of the cardboard. These factors reduce the overall quality of the cardboard, thereby reducing the price per bale.

Special Collections

Currently there are several special collection events that happen at the BMIC on a recurring basis, supported by GLRI grants. There is a spring and fall cleanup available for residents where they can dispose of large or bulky items at no cost to themselves. These are large events which are widely participated in. Additionally, there is a regular Household Hazardous Waste and appliance collection event which is held in the spring and fall each year where residents can, at no charge, drop off these materials to the BMIC Biological staff for appropriate disposal. Drop-off for the recycling of tires is available to residents from spring to October 15 at the Maintenance Building. Scrap metal and electronic waste recycling is available to BMIC residents throughout the year.

3.1.1 Waste Generators

The following tribal buildings and residential areas have been identified as the main "waste generators"[3] at the BMIC. These generators utilize 13 waste disposal containers, including 4, 6, and 8 yard dumpsters, as well as 2 trash compactors and a cardboard recycling compactor. As mentioned in section 3.1 many of these generators are responsible for their own waste collection and do not currently utilize the facilities at the BMIC Waste Transfer Station.

Table of Waste Generator Locations and Fate of Waste Generated

Maintenance Department	Maintenance Transfer Station Compactor
Advanced Office Technologies	Maintenance Transfer Station Compactor
Boys & Girls Club	Maintenance Transfer Station Compactor
Ellen Marshall Memorial Building	Maintenance Transfer Station Compactor
Tribal Administration Building	Maintenance Transfer Station Compactor
Commodities Distribution Building	Maintenance Transfer Station Compactor
Senior Center	Maintenance Transfer Station Compactor
Ojibway Charter School	GFL pickup
Bay Mart Store	GFL pickup, Cardboard to Maintenance Transfer Station
Bay Mills Resort and Casino	BMRC Compactor
Laundry and Linen	BMRC Pickup
Health Center	GFL pickup
Northern Lights Cannabis Company	GFL pickup

[3] See above table

Four Seasons Market and Deli	GFL pickup
Wild Bluff Golf Course	GFL pickup
Child Development Center	GFL pickup
Community College	GFL pickup
Cultural Center	GFL pickup
Emergency Medical Connection	GFL pickup
Housing Authority	GFL pickup
Public Works/Construction	GFL pickup
Residential Curbside Pickup	GFL pickup

The dumpsters and compactors are emptied by GFL Inc. on either a weekly or bi-weekly basis. Each container, after conducting walk through examinations, averaged 70% capacities prior to pick up.

Below, Figures 1 and 2, show a yearly total of the amount of waste generated by the key generators on the BMIC; those being the Bay Mills Resort and Casino Enterprises (BMRC) and the Municipal Waste Transfer Station located at the Bay Mills Maintenance Department. The records here comprise a 12-month period from December 2018 to December 2019. The Municipal Waste Transfer Station disposes between 14.11 and 52.01 tons of waste per month. Figure 3 shows the cost of waste disposal per ton for the BMIC Waste Transfer Station, costing anywhere from $68.02/ton to $167.09/ton. This equates to an average monthly cost of $3,139.27, or roughly $37,671.28 annually.

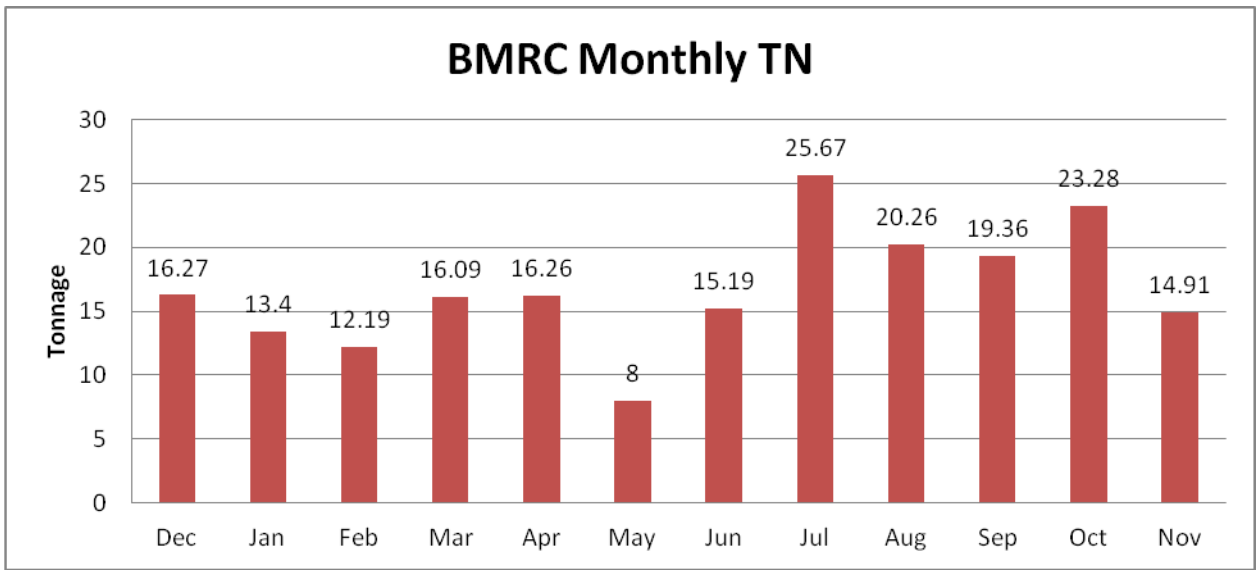


Figure 1: Bay Mills Resort and Casino Monthly Tonnages of Waste

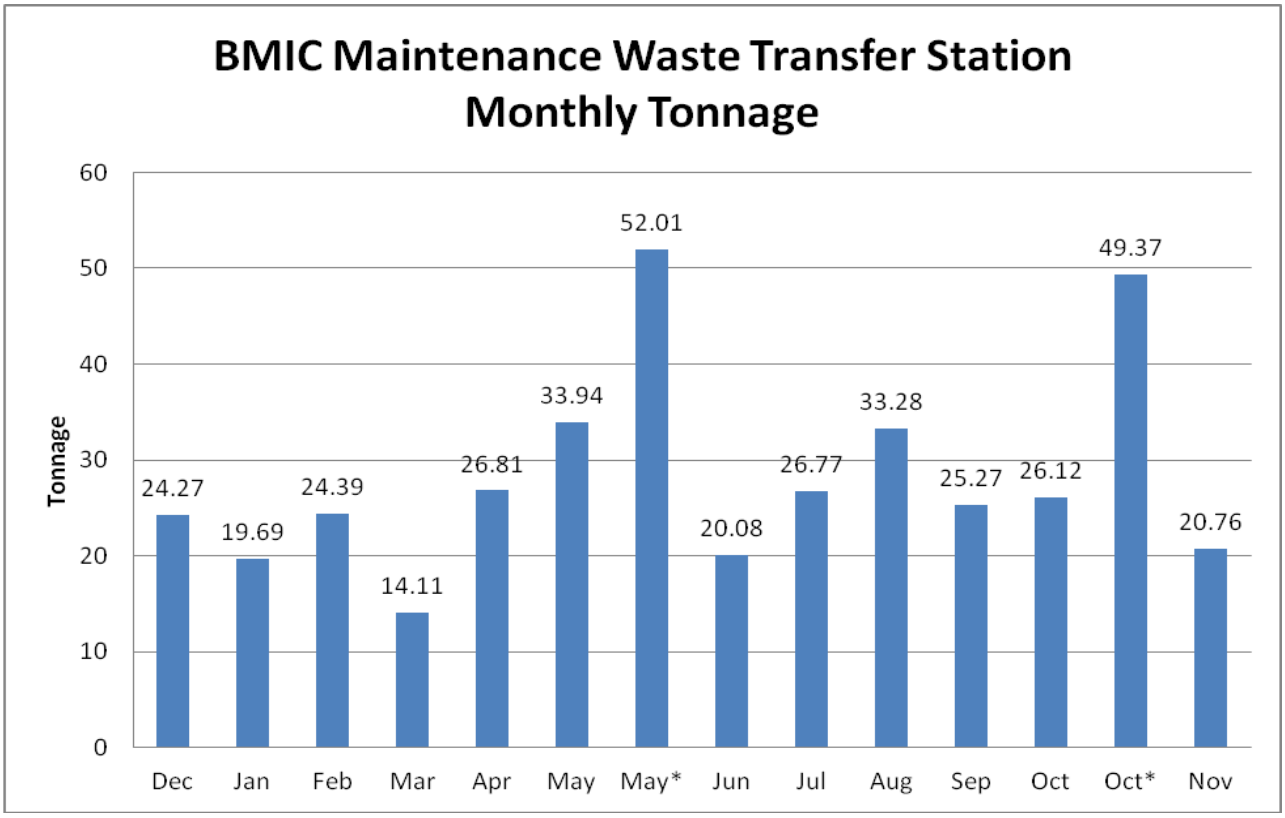


Figure 2: Monthly Tonnage of waste disposed of (* denotes a special cleanup event)

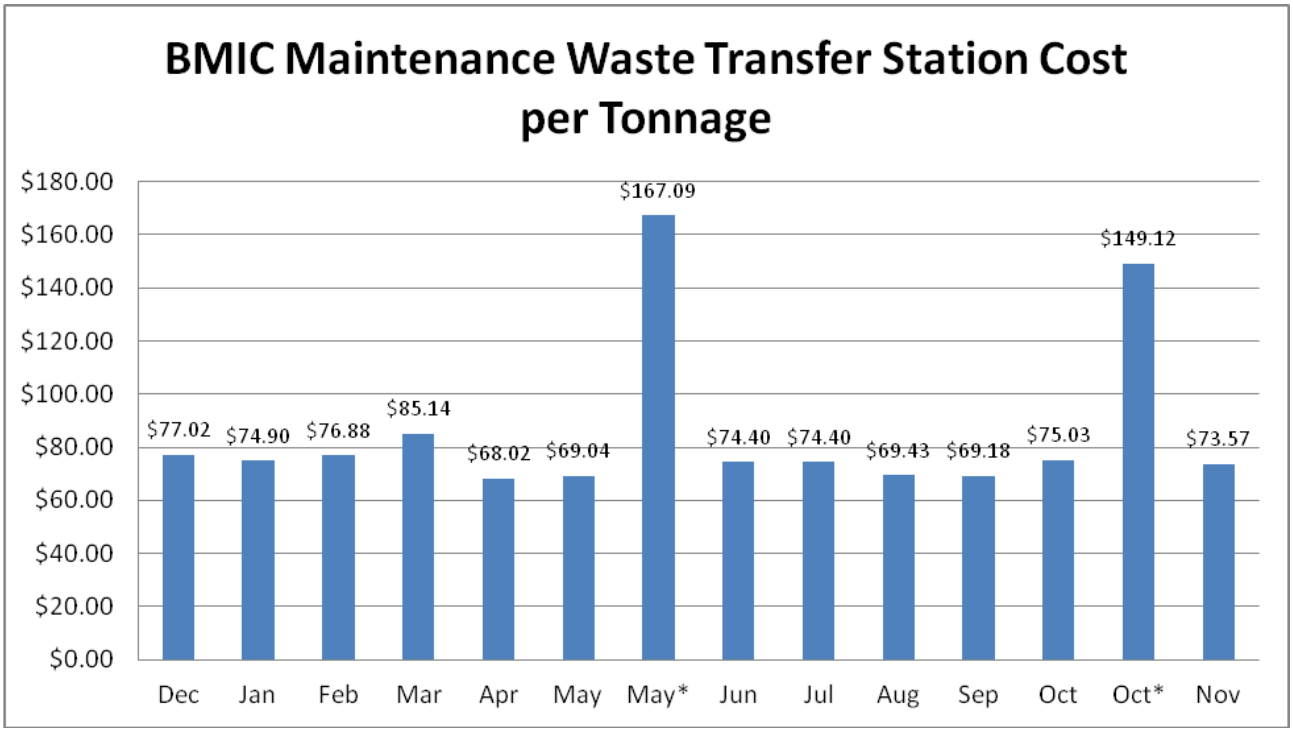


Figure 3: Price per ton of waste disposed of (* denotes a special cleanup event)

3.1.1.2 Weight/Volume

Community Waste Audit 2020

In September of 2020 a waste audit was conducted with waste from the BMIC Maintenance Waste Transfer Station. The waste audit performed was intended to characterize the amount of waste being disposed of at the facility, and to determine if, and to what extent, recycling and other waste sorting practices were being utilized by BMIC residents.

It should a be noted that the sort took place during the Covid-19 pandemic; it was determined that since the bulk of waste is from private residences, that the waste stream obtained from the Maintenance Waste Transfer station would be representative of typical use.

Waste was collected in a 16ft enclosed trailer for the week leading up to the sort. In all a total of 9 volunteers composed of BMIC, ITCMI, and EPA staff were able to sort through a total of 677lbs of waste over the course of an 8-hour day. The waste was sorted into 26 categories. These categories were chosen to determine what waste could potential be removed from the waste stream and recycled with increased infrastructure, outreach, and/or education. The categories that were used as part of the study were chosen to identify recycling facilities that could be immediately available to the BMIC through outside contracts and to determine what types of alternative waste disposal could be feasible for the BMIC to implement directly.

BMIC Maintenace Transfer Station Waste Audit
14 September 2020

Audit Locaiton and Date: Waishkey Bay Farm, 14 Sep 2020
Individuals in attendance: Anthony Rinna and Greg Schubel (ITCMI), Aubrey Maccoux-LeDuc, Angela Johnston, Britney Weaver, Ryan Sprague, Shannon Russel, Brian Wesolek (BMIC), Jennifer Manville (EPA)

Category	Material	Final Weight (lbs.)	Percent
Paper	Old Corrugated Cardboard (OCC)	4.1	0.61
	Old Newsprint (ONP), Paper, Magazines	25.6	3.78
	Other Mixed Recyclable Paper/Kraft/Paperboard	26.6	3.93
	Non-recyclable Paper Products	41.1	6.07
Plastic	PET Bottles and Containers	21.1	3.11
	HDPE (#2)	17.6	2.60
	Mixed Bottles/Containers (#3-#7)	13.1	1.93
	EPS Foam (#6)	11.1	1.64
	Film & Flexible Packaging	54.1	7.99
	Rigid Bulky	10.6	1.56
Glass	Recyclable Glass	36.1	5.33
	Non-Recyclable Glass	7.6	1.12
Metals	Ferrous Metal Containers	21.1	3.11
	Aluminum Cans (UBC)	6.1	0.90
	Other Metals/Scrap Metals	8.6	1.27
Organics	Food/Putrescible Waste	152.6	22.53
	Compostable Fibers (Napkins, Papertowels, Etc.)	73.6	10.87
	Other Organics	1.6	0.24
Textiles	Textiles	12.6	1.86
	Leather & Rubber	6.6	0.97
Electronics	All Electronics	2.6	0.38
HHHW	Household Hazardous Waste	2.6	0.38
C&D	C&D	10.1	1.49
Other	Fines/.Residual Refuse	101	14.91
	Other Bulky	N/A	N/A
	Composite Items	9.6	1.42
Total		677.4	100.00

3.1.1.2 Weight/Volume (cont.)

Below is a more detailed analysis of the main waste categories identified in the sort.

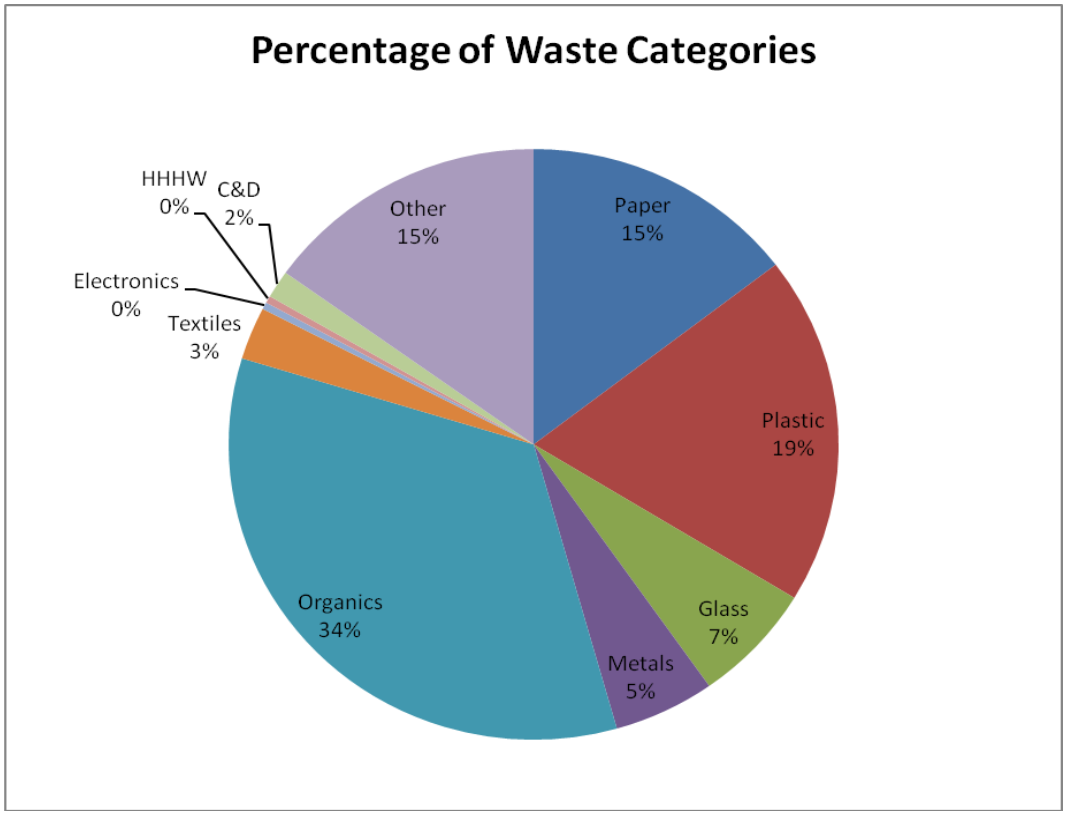


Figure 4: Percentage of Major Waste Categories

Paper

The paper stream was almost completely free of corrugated cardboard. Newsprint/paper and recyclable paper/craft/paperboard was approximately 50lbs and 7.5 percent of the total waste stream. Non-recyclable paper was represented by plastic coated paper, mostly in the form of packaging of food/medicines. Even with these non-recyclable paper products over 50% of the total 97lbs of paper waste is considered to be recyclable.

Plastic Waste

While plastics made up 19 percent of the total waste in the study there was a minimal amount of recyclable materials found. Only approximately 2% each of total waste was easily recyclable plastic (HDPE, PET, and #3-7 plastics). Most of the plastic in the general waste stream (54 of a total of 127lbs of plastic) was attributed to film and flexible packaging, which is not generally considered recyclable with typical facilities. Most of the EPS foam identified in the waste stream is attributed to foam food service containers which were identified to be from home meal delivery to school age children and elders during the Covid-19 pandemic; thus this amount of EPS foam in the waste stream is not considered

typical. Due to a lack of PET, HDPE and other plastic containers in the waste stream it seems that the recycling efforts at the BMIC are being utilized effectively by residents.

Organic waste

As is shown in the totals from the waste audit conducted the largest category of waste that was represented was organic waste. At ~33% of the total waste stream the vast majority of waste is organic in nature. Two thirds of the organic waste is food scraps while approximately one third of all organic waste is compostable fibers (napkins, paper towels, etc.). While much of the organic waste was not of a composition that could be recycled by conventional means there was a large amount of food waste that could be reused through the use of a digester. There were many materials, such as paper-based materials, and coffee grounds that, if separated from the main waste stream, could potentially be part of a community recycling program.

BMRC Waste Audit 2022

In June 2022 a waste audit was conducted with waste from the Bay Mills Resort and Casino (BMRC). The waste audit performed was intended to characterize the amount of waste being disposed of by the hotel, casino, kitchen/restaurants and offices at BMRC and to determine if, and to what extent, recycling and other waste sorting practices were being utilized by BMRC.

Waste was collected in a 16ft enclosed trailer during the weekend leading up to the sort. BMRC was at approximately 50% capacity during the weekend that the waste was collected for the audit. In all, a total of 9 volunteers composed of BMIC staff and the Great Lakes Climate Corps members were able to sort through a total of 976.5 lbs of waste over the course of 6 hours. The waste was sorted into 26 categories. These categories were chosen to determine what waste could potentially be removed from the waste stream and recycled with increased infrastructure, outreach, and education. The categories that were used as part of the study were chosen to identify recycling facilities that could be immediately available to BMRC through outside contracts and to determine what types of alternative waste disposal could be feasible for the BMRC to implement directly.

BMRC Waste Audit June 20-21, 2022			
Audit Location and Date: Farmer's Market Pavilian June 20-21, 2022 Individuals in attendance: GLCC Crew: Luke, Ari, Kyle, Neveya; BMIC Technicians: James, Kyle, Charlotte, Cameron; BMIC Environmental Coordinator: Jen Parks			
Category	Material	**Final Weight**	**Percent**
Paper	Old Corrugated Cardboard (OCC)	10	1.02%
	Old Newsprint (ONP), Paper, Magazines	31	3.17%
	Other Mixed Recyclable Paper/Kraft/Paperboard	57	5.84%
	Non-recyclable Paper Products (greasy food containers)	27.5	2.82%
Plastic	PET Bottles and Containers (clear bottles/water bottles)	83.5	8.55%
	HDPE (#2)	11	1.13%
	Mixed Bottles/Containers (#3-#7)	41.5	4.25%
	EPS Foam (#6)	4.5	0.46%
	Film & Flexible Packaging (plastic wrap, food packaging)	32	3.28%
	Non-Recyclable Rigid Plastic/Mixed Rigid Bulky	0.5	0.05%
Glass	Recyclable Glass	88.5	9.06%
	Non-Recyclable Glass	0	0.00%
Metals	Ferrous Metal Containers (tin food cans)	2	0.20%
	Aluminum Cans (UBC)	24	2.46%
	Other Metals/Scrap Metals	3.5	0.36%
Organics	Food/Putrescible Waste	163.5	16.74%
	towels from restrooms)	120.5	12.34%
	Other Organics (coffee grounds)	18	1.84%
Textiles	Textiles	24.5	2.51%
	Leather & Rubber	0	0.00%
HHW	Household Hazardous Waste	22	2.25%
Electronics	All Electronics	0	0.00%
C&D	Construction & Demolition	12	1.23%
Other	Fines/Residual Refuse	199.5	20.43%
	Other Bulky	0	0
	Composite Items	0	0
Total		976.5	100.00%

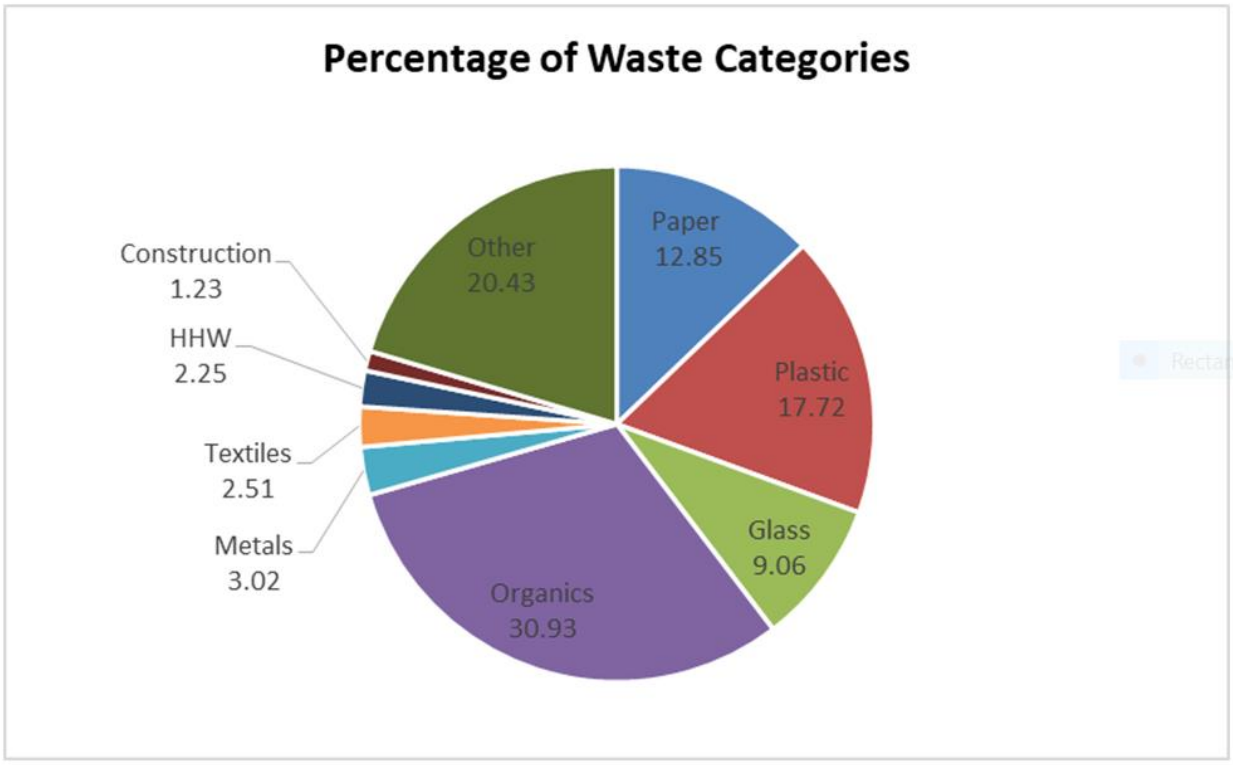


Figure 5: Percentage of Major Waste Categories

Organic waste

As shown in the totals from the waste audit conducted at BMRC, the largest category of waste that was represented was organic at approximately 31% of the total waste stream. Approximately one half of the organic waste was food scraps while the other half was compostable fibers, mainly brown paper towels from the public restrooms. While much of the organic waste was not of a composition that could be recycled by conventional means there was a large amount of organic waste that could be diverted from the landfill through the use of a digester.

Other waste

Other waste comprised approximately 20% of the total waste at BMIC. This included items that could not be diverted from a landfill. Examples include diapers, trash bags, and other non-recyclable or non-compostable materials.

Plastic Waste

Plastics made up 18 percent of the total waste in the study. The majority of plastics included materials that could be recycled at the Chippewa County Recycling Facility such as Plastics # 2-7 and PET. PET was mainly clear plastic bottles including water bottles. Much of the plastic by volume included film and flexible packaging, which is not generally

considered recyclable with typical facilities. Most of the EPS foam identified in the waste stream was attributed to foam food service to-go containers.

Special Collection Events

There are spring and fall cleanup efforts held every year. At these special collection events HHW can be disposed of at no cost to residents. See the tables below for historical totals of special collections waste.

Additionally, the BMIC Maintenance Transfer Station holds a spring and fall cleanup event where residents can dispose of large and bulky items which would not be able to go in the compactor. For total tonnages of these events and the cost of disposal of these events see Figures 1 and 2 in section 3.1.1.

HOUSEHOLD HAZARDOUS WASTE COLLECTION ALL

(Drug and Laboratory Disposal, LLC)

Reporting Period	FY	waste type	HHW lbs	Bulbs	Total lbs	Total $$
April-Sept 2013	FY13	HHW	0			$0.00
Oct-March 2014	FY13	HHW	0			$0.00
April-Sept 2014	FY14	HHW	0			$0.00
Oct-March 2015	FY14	HHW	2690			$3,741.20
April-Sept 2015	FY15	HHW	1329			$1,302.42
Oct-March 2016	FY15	HHW	2214			$2,169.72
April-Sept 2016	FY16	HHW	3483			$4,550.84
Oct-March 2017	FY16	HHW	0			$0.00
April-Sept 2017	FY17	HHW	1943	371	2314	$3,691.99
Oct 2017-March 2018	FY17	HHW	1173		1173	$2,451.99
April-Sept 2018	FY18	HHW	2616	405	3021	$4,436.64
Oct 2018-Mar2019	FY18	HHW	819		819	$1,992.88
Oct 2019-Mar 2020	FY19	HHW	3109	512	3621	$5,100.94
Oct 2020-Mar 2021	FY20	HHW	3568	540	4108	$4,767.44
April 2021-Sept 2021	FY21	HHW	2750	300	3050	$4,269.94
Oct 2021-March 2022	FY21	HHW	1046	0	1046	$2,160.70
March 2022 - Sept 2022	FY22	HHW	3244	0	3244	$4,316.62

Tire Recycling Total					
(Mark's Tire of Brimley, MI)					
Reporting Period	**FY**	**waste type**	**# tires**	**Total lbs**	**Total $$**
April-Sept 2013	FY13	tires		0	$0.00
Oct-March 2014	FY13	tires		0	$0.00
April-Sept 2014	FY14	tires		3265	$0.00
Oct-March 2015	FY14	tires		1365	$0.00
April-Sept 2015	FY15	tires		6700	$737.00
Oct-March 2016	FY15	tires		495	$54.45
April-Sept 2016	FY16	tires		11,675	$1,223.00
Oct 2016-March 2017	FY16	tires		2575	$354.00
April-Sept 2017	FY17	tires		5325	$732.09
Oct2017 -March 2018	FY17	tires		7870	$587.25
April-Sept 2018	FY18	tires		5750	$661.50
Oct 2018-March 2019	FY18	tires		2025	$362.00
April 2019-Sept 2019	FY19	tires		1349.87	$490.86
Oct 2019-Mar 2020	FY19	tires		288.86	$105.04
April 2020-Sept 2020	FY20	tires	286	7150	$1,667.12
Oct 2020-Mar 2021	FY20	tires	63	1575	$488.84
April 2021-Sept 2021	FY21	tires	721.64	18041	$1,984.51

3.1.2 Future Generation and Growth Rate

The growth rate for the on-reservation residents is increasing at a rate of approximately 6% annually. Housing is in extremely high demand and the Tribe is building another housing area on Plantation Road where up to 150 housing units will be built. The increasing population rate and future housing plans for the Reservation may significantly affect future waste management activities, and it is important to implement a comprehensive plan for the current population, and for future residents.

3.1.2.1 Open Dumps and Uncontrolled Waste Sites

Open dumping of difficult-to-dispose-of wastes is prevalent in forested lands in the tri-county area. Open dumping in undesignated sites does occur on the Bay Mills Reservation. In instances where illegally disposed of trash is discovered, BMIC law enforcement and the Biological Services Department work with other organizations and agencies to clean up these sites. Tribal members are often more than willing to be involved in cleanup efforts to help keep their community clean. There are large open dump sites on Sugar Island and in the Gumshoes area of the reservation on the mainland that require cleanup. Current efforts with spring and fall drop-offs for large waste items (mattresses, appliances, etc.) have been effective in deterring regular open dumping on BMIC lands.

3.1.3 Waste Collection, Transport and Disposal

On a weekly and bi-weekly basic, GFL, Inc., collects from all tribal buildings and residential areas, and provides curbside pickup to 33 homes. Waste is ultimately transported to the Dafter Landfill in Dafter, MI.

3.1.5 Waste Reduction: Recycling, Reuse, and Composting

Waste reduction is practiced in some departments and buildings within the community, but not extensively. Despite many past and current efforts to implement a more comprehensive waste reduction program, effectiveness has remained inconsistent.[4] Based on community reduction effort surveys, facility walkthroughs, and past reports, participation and lack of following prescribed guidelines are responsible for hampering reduction efforts. Also, numerous buildings and tribal members have no recycling immediately available at the point of use.

3.1.6 Facility Descriptions and Capacities

Aside from various 6, 8, and 10-yard dumpsters located throughout the BMIC Reservation, the only waste transfer facility located on the BMIC Reservation is at the BMIC Maintenance department. In 2019, Executive Council and Tribal Administration made the decision to move Bay Mills Maintenance and the undersized Waste Transfer Station from its location on Lakeshore Drive to Nbiish Road, making room for another much-needed facility. The Nbiish Road location was selected as a temporary site (2-5 years) due to its proximity to the newly constructed Maintenance Department building until a new, adequately-sized Waste Transfer Station can be developed. The current facility houses a trash compactor, cardboard baler, recycling trailer, and a building where electronic waste is stored. A trailer is available six months of the year for collecting tires.

All other downstream facilities such as bulk transfer facilities and final disposal/landfill facilities are maintained by GFL, Inc.

3.1.7 Regional Infrastructure

Other than the previously described community transfer station, the final components of the local waste infrastructure are the Dafter Landfill in Dafter, Michigan.

[4] Based on Facility Waste Reduction Surveys

3.1.8 Current Partnerships

As previously described, GFL Environmental Inc., of Northern Michigan is BMIC's waste services provider. The Chippewa County Recycling Center has been the main drop off point for BMIC's recyclables.

BMIC is participating in an electronic waste recycling program with the Michigan Department of Environment, Great Lakes and Energy. Through this program, certain electronic waste categories are disposed of free of charge while other categories are disposed of at a reduced cost. Transportation to the recycling facility, pallets and Gaylord boxes are all provided at no cost.

BMIC also partners with various non-profit organizations on a variety of opportunities. These include:

- Community Clean Up events with Michigan United Conservation Clubs (MUCC), the Center for Freshwater Research and Education and the Boys and Girls Club.
- Shoreline and inland trash and debris removal with Great Lakes Climate Corps and funded by NOAA.
- Scrap tire disposal through Superior Watershed Partnership.

In past years, as well as currently, the ITCM has contributed to numerous health and environmental programs, among other sectors of service. The EPA is a main source of tribal grants and funding for similar programs and services and Indian Health Services has been identified as a valuable source for technical assistance and supplemental project funding.

3.1.9 Past/Current Public Involvement and Community Education

In 1996-97, the BMIC received funding from the EPA Region 5 for a recycling program. Within the program's goals was community education. Quarterly newspaper articles were submitted and postings promoting recycling in the community were distributed in support of the program.

For the most part the public does involve itself in recycling via independent efforts. The recycling trailer, located at the waste transfer station, receives regular drop offs.

Other grant-funded, special collection events have also increased community awareness. The HHW and eWaste collection events conducted by the BMIC Biological Services, funded by GLRI, are popular. In 2021 BMIC partnered with EGLE to provide electronic recycling services to Residents. Nearly 30,000 pounds of electronic waste was collected. BMIC Biological staff is available at these collection events to answer any questions residents have related to waste streams and other waste management practices. These programs have been proactive in providing residents with information related to HHW and new electronic recycling efforts. These services as well as composting and

recycling in general are communicated to the community through the use of newsletters, Bay Mills News, social media and an all-users email.

Recycling Trailer Located at BMIC Maintenance

3.2 Proposed Waste Management Practices

3.2.1.1 Limitations and Inefficiencies of the Current Program

Due to a low operational budget, the BMIC waste transfer station has always been inadequate and undersized. These same issues persist at the temporary location. Bay Mills Indian Community is not able to afford expenditures for waste reduction efforts or building a new waste transfer station to replace the current temporary station. A new facility on Plantation road has been proposed and will only be able to be constructed through heavy funding of government infrastructure grants.

The current facility was moved to its location on short notice and on a temporary basis when an expansion near the former Maintenance Department made moving necessary. The temporary site hosts the trash compactor, baler and recycling trailer. There are a significantly limited number of waste stream disposal options in the area. Staff are striving to appropriately sort community waste on site—accepting trash, glass, paper, cardboard, plastic, metal, eWaste, light bulbs, batteries, household hazardous waste, tires, white goods. Many of these services are non-existent in the tri-county area. However, the site is located in the storage and staff yard areas of the Public Works and Maintenance Departments. Equipment, large vehicles and various departmental materials are stored in these areas. Residents have to drive through the parking areas of the two departments and past the buildings, storage, and operational yards to the WTS site. Safety is a concern for residents driving to the WTS location due to the heavy equipment and service vehicles moving throughout the area. There are concerns about public access to equipment that could be damaged or cause injury. Due to space limitations, equipment is parked and

interspersed throughout parking spaces for staff and the public which has caused there to be an insufficient amount of parking/ operational space. The area is not suitable for Elders and people with disabilities due to the location, uneven surfaces and traffic flow. Weather at BMIC is extreme and staff and residents unload vehicles and sort waste and recycling in the elements and often under icy and windy conditions which could cause injury. These conditions also make is possible for waste to blow away during handling, thereby becoming litter in the environment. Snow plowing and snow removal is a challenge in the area due to limited space and where the compactor and recycling trailer need to be located. Hydrologic features of the site also limit expansion.

In previous years, recycling services, grant-funded special collections were held hither and yon across the community, sometimes miles apart, with services available at irregular intervals. This led to much confusion across the community. Great efforts were made to relocate all of these services at one central location (the current, temporary WTS) but the site was never designed to accommodate all of these services. Waste storage encroaches on space needed for machine maintenance, mowing, snow removal, and other required department duties. Currently, operation of the WTS in its temporary location occupies 25% of the working space while only occupying 9% of the department staff responsibilities.

Design, layout, and organization is additionally wasteful of precious staff time. Staff must babysit drop-off areas that are hazardous to the public and poorly signed. Staff must handle waste items two to three times, opening and closing multiple doors. This is compounded by the multiple new waste streams now located on site. Staffing is such a challenge that for special collection events, staffing must be bolstered by Biological Services Department biologists. This again leads to community confusion of roles and duties of different departments. Ideally, waste drop-off containers should be safe enough for the majority of the public to unload themselves and allowing the WTS to be overseen by a single Maintenance staff person.

The equipment is located outside which limits lifespan and makes repairs challenging. The compactor was purchased used from GFL and frequently breaks down, limiting access for the community. BMIC is planning to expand by up to 150 residential homes in the coming years and this temporary site with minimal space currently does not, and will not serve the needs of the community. BMIC has a goal of diverting as much waste as possible from the landfill in an effort to eliminate illegal open dumping of difficult-to-dispose-of-items, adopt more environmentally-friendly practices and reduce disposal costs. The limitations of the current WTS site make this a challenging goal to meet. To reach these goals, BMIC is also wanting to expand solid waste services to include year-round electronic waste and household hazardous waste collection and composting of organic material including, food waste and yard waste. The BMIC Maintenance building and waste transfer station have very limited working space for staff. With no dedicated space for waste transfer station personnel, in order to stay protected from the elements they are often

forced to wait for patrons in the Maintenance building break room which does not offer clear sight to the waste transfer station equipment. This has led to patron and staff frustration. The WTS has never had a point of sale system on site, but desperately needs one to capture fees, support the facility's operations and open up electronic waste disposal to the broader community. These logistical issues have proved difficult over the past years, and must be remedied with the development of the new waste transfer station.

A large inefficiency of the current program is the total lack of composting or recycling of organic waste. This waste component is extremely expensive contributing over one third of the total tonnage of waste disposed of during typical waste collection. It is also, however, very reducible with the implementation of a composting program. Also, a successful composting program can provide a gardening, landscaping and agricultural resource, thereby providing another money-saving resource.

The main industry in the community, tourism, restricts the location of waste transfer and compost sites. There is potential to include composting facilities at the proposed WTS site. Composting activities must also consider numerous vectors, such as bears and seagulls, which could become a nuisance and/or hazard to the community, in which case the Conservation Department may need to also take an active role. Depending on the system utilized, composting can become a laborious endeavor; therefore, finding a system that reduces staffing burden is of the utmost importance. Due to these reasons, BMIC has been investigating the purchase of an aerobic digester to handle compostable materials.

Community support and participation is very important to Bay Mills' solid waste reduction. The community may not comply or agree with some disposal methods if they are expensive or inconvenient, such as self-sorting, self-transport to facilities, or increased personal cost of disposal.

The current recycling efforts by the Maintenance Department, which consist of two recycling trailers and pickup of certain recyclables like cardboard at tribal offices, is not sufficient to collect the immense amounts of everyday recyclable waste. This is partially due to the need for staff time to haul the recycling trailer into town to unload it. Often times when this is unloaded at a frequency of one to two times a week, some of the containers within the trailer are full. A freight trailer would allow better efficiency in storing and offloading that waste; thereby reducing operational expenses.

3.2.1.2 Equipment and Facility Needs

The facility used for waste disposal is inconvenient and unsafe both for the community and staff, as it was developed as a temporary location. Equipment used for waste disposal are in fair condition. The purchase of a larger cardboard baler, aerobic digester and new trash compactor would immensely improve services, reduce waste disposed in the landfill and reduce the costs of the waste disposal program. Purchasing a

freight trailer to collect and transport recycling and other materials would benefit the program so that more recycling could be collected and transported efficiently; thereby reducing overhead costs. The Maintenance staff and equipment responsible for collecting trash from locations with no containers is efficient in their role, although the staff time at the Maintenance Department is often stressed by inefficiencies previously mentioned in section 3.2.1.1.

The current recycling program consists of the collection of some recyclables by the Maintenance staff, a recycling trailer located at the Maintenance grounds open to the community, and transport of the trailer to the Sault Recycling Center bi-weekly. This program, however, has several inefficiencies that restrict the amount of waste that can be reduced throughout the community. Use of recycling trailers have proved to be a challenge, as patrons co-mingle recyclables as the trailers get full. This either leads to Maintenance staff hand sorting recycling in the trailer, or the country recycling facility staff sorting the recyclables. Providing a recycling system that will 1) allow Maintenance staff to easily oversee recycling sorting and 2) will provide enough space, both for collection and storage, to prevent co-mingling, is a key consideration in the development of the new waste transfer station, As evidenced by facility walk throughs and waste composition data, there is little use and/or availability of designated recycling containers in community buildings and areas. It is necessary to have containers present and easily accessible as a first step to proper recycling.

As mentioned in part 3.2.1.2 a freight trailer would free up more maintenance staff time by holding more recyclables and reducing the number of trips made to Sault Ste. Marie to offload recyclables.

3.2.2 Alternatives Analysis

In this section we will evaluate 6 alternatives/supplements to the current waste management practices that can increase financial and environmental efficiency.

Based on the data from the community waste stream assessments conducted in 2020 it is estimated that up to 65% of all waste that is disposed of at the BMIC Maintenance waste transfer station is capable of being recycled. This is down from approximately 95% in 2010 when the last solid waste assessment was performed. This tells us that while there has been significant improvement in recycling in the last decade that there is still room for improvement. The waste stream assessment for BMRC in 2022 also points to efficiencies that can be obtained through improved recycling efforts. The following alternatives are presented due to their ability to significantly decrease and redirect the total waste via recycling and composting.

Each alternative requires its own Capital, Costs, and Maintenance estimate, and a Cost-Effective Analysis; as will be displayed in sections 3.2.2.1 and 3.2.2.2. These estimates address the different financial issues inherent with each alternative. The actual costs for

services and equipment to BMIC for any of the following alternatives cannot be accurately summed up here without the BMIC Administration's independent research in regards to its own resources and dialogue between BMIC and any potential provider of services and/or equipment. With that being stated, the sections outlining Capitol, Costs and Maintenance, and Cost-Effectiveness, are outside estimates that must not be viewed as a last amount.

#1 - Community Education and Policy Making

Education and outreach is a continuous process in keeping the community engaged, informed and utilizing the services of a WTS. Many strategies should be used to engage the community including social media, printed media, signage, public meetings, youth education, and public open houses and tours of the WTS. Providing a safe way to view waste transfer station operations is an important part of community education and outreach.

As seen during a facility walk through, recycling activities are not consistent throughout BMIC, nor is buying recycled goods a pursued policy. As previously stated, some residents and facilities undergo independent procedures of reuse. As encouraging as it is to see autonomous community involvement in waste reduction, it is necessary that tribal buildings undergo an in-depth inspection and implementation of waste reduction policy.

#2 - Comprehensive Recyclable Collection Network:

This alternative would increase recycling by departments by providing bins for recycling collection. It would also provide recycling bins to residents to encourage recycling collection in their homes. The most valuable materials include plastics (1+2), mixed magazine and newsprint paper, office/white paper, corrugated cardboard, and tin. A major requirement of this alternative is continuous community education and, in some instances, new policy on waste disposal. Community education and policy advising is extremely important if an effective amount of recyclables are to be properly placed in designated areas and collected without hindrances. Misuse of recycling bins or a low compliance to policy can be curbed by constant education and monitoring. In order to employ this option new staff must be hired or staff capable of taking on these additional responsibilities identified. A freight trailer for collection and transport to Sault Ste Marie, or other locations would streamline the recycling system.

#3 - Composting Program:

As shown by the previous data, an estimated 34% of all waste generated on BMIC is organic or compostable. A compost program consisting of the above described collection

network and composting equipment can create a significant decrease in overall waste. The final product is also a resource of landscaping/gardening, as well as revenue should BMIC engage in compost sales. Some of the requirements of this program are available collection bins for households and departments, and community education and a focus on the food service industry. Additionally, due to the physical nature of most of the organic material (putrescible waste/high oil content) generated by residential and commercial facilities in BMIC and limited space, it would be necessary to procure an aerobic digester to effectively compost most of this waste.

BMRC could also benefit from an aerobic digester located in the kitchen for food preparation waste, plate scrapings and other compostable fibers. This would reduce disposal costs significantly.

#4 - Additional Transport Trailer:

As amounts of recyclables collected increases, it may be necessary to allocate additional storage space. A transport or freight trailer not only provides suitable storage, but is a critical component of freight transport. An increase in load tonnage raises the value of any future loads to paying recycling facilities. Two valuable recyclables found in BMIC that can use extra storage space are cardboard and mixed paper, which make up 17 tons of the total monthly waste stream. The value of this waste is estimated at $2,500 per month depending on market price. With sufficient storage space and easy transport, a freight trailer can facilitate waste reduction and create revenue.

Average prices for standard freight trailers $3,000 to $6,000[5]. Maintenance is minimal due to the probability of infrequent use/loads, and may be $500-$1,000 a year. [6] A freight trailer will also require a 6" to 8" concrete pad for storage, due to the extreme weight of the trailer and loaded material.

Note: at the time of this writing due to various economic variables these products do not have a positive market value. Having a large transport/freight trailer will allow for longer term storage of these materials until the market fluctuates in the favor of the BMIC or at the least will allow savings to be accumulated by reducing the number of times and thus the staff time required to unload and transport these materials.

#5 – New Waste Transfer Station, Outdoor Yard and Supporting Equipment:

[5] http://www.truckpaper.com averages taken from 20 used trailer advertisements. Accessed 8/12/10

[6] Maintenance Quote from Tandem Shipping, Inc. 8/12/10

The current waste transfer station area is meant to be a temporary site until funding for a dedicated WTS can be secured. A new waste transfer station including an indoor facility with a yard area would provide safe, efficient operation of a WTS that supports a comprehensive waste disposal and recycling program. Office space within the WTS would be used for waste transfer station personnel. A conference room would provide a location for meetings and educational events related to recycling and waste disposal, which is an important component of a successful program.

#6 No-Action Alternative:

This alternative indicates that the BMIC will refer to its current waste management practices in the future, rather than the presented alternatives.
While the present waste management practices have been outlined previously, the key points are as follows:

-GFL provides all waste collection and disposal services at main trash generation locations
-The maintenance department collects at 7 locations and stores at the transfer station
-Cost for services average $12,000 per Month
-Environmental Affects – 41.36 tons of solid waste are land filled every month, up to 65% of which is recyclable or compostable
-Current recycling/composting activities exist in BMIC, which if increased through public awareness and outreach, can save money exponentially and create jobs in the community
-The current Waste Transfer Station, which hosts several safety concerns, lacks space and is inconveniently, located remains as is.

3.2.2.1 Capital, Operational and Maintenance Costs

Below are the basic capital, operation and maintenance costs estimates for the stated alternatives.

#1 - Community Education and Policy Making:

It is difficult to track the costs of a community education and policy program. Changing policy in regards to daily solid waste reduction activities is an internal action. Assistance/consultation may be required from the EPA Region 5, ITCM or a private consultant.

#2 - Comprehensive Recycling Program:

(Costs estimated based on necessary employment, supplies, vehicles and equipment)
Supplies: Multiple Material Recycling Bins for 20 departments/buildings - Estimated capitol for 20 bins is $2000, at $100 per bin for a total of $2000.

Household recycling bins for 380 homes: $20/bin for a total of $7600
Total Capitol: $9600

Permanent/Part Time Staff: Additional Staff would not be needed to support this as current staff can be reallocated.

Vehicle: The availability of vehicles in the Maintenance Department makes purchase unnecessary. Monthly costs are negligible due to minimal gas usage or maintenance needs.
Equipment: The Maintenance Department has sufficient equipment and materials for additional staff and duties. The only increase in supplies is heavy duty clear trash bags to line the department recycling containers. 320 trash bags per month will costs $150.

#3 - Composting Program:

The price of an aerobic digester sized for BMIC needs is approximately $120,000.
Composting bins for 380 homes: $30/bin for a total of $11,400
Additional Staff would not be needed to support this as current staff can be reallocated.

Total Capital:	$131,400
Monthly Costs:	$0

#4 - Additional Transport Trailer:

Average prices for standard freight trailers are $3,000 to $6,000[7]. Maintenance is minimal due to the probability of infrequent use/loads, and may be $500-$1,000 a year. [8]

Total Capitol: $3,000-$6,000

Maintenance: $500-$1,000 (depending on condition and possible breakdowns)

[7] http://www.truckpaper.com averages taken from 20 used trailer advertisements. Accessed 8/12/10
[8] Maintenance Quote from Tandem Shipping, Inc. 8/12/10

#5 – New Waste Transfer Station, Outdoor Yard and Supporting Equipment:

A Preliminary Engineering Report prepared in 2022 provided for a new WTS facility, outdoor yard and supporting equipment.

Building and Yard: $2,665,000
Equipment: $472,000
Misc (furniture, storage, geotechnical report, outdoor lighting, security system): $117,000
Design & Construction oversight: $320,530

Total Capitol: $3,694, 530

#6 - No-Action Alternative:

See description in “Alternative Analysis”.

3.2.2.2 Closure Care and Costs:

Due to the absence of landfills or municipal waste management facilities on reservation or under the responsibility of BMIC, there are no closure care or cost issues. Depending on the amount of waste reduced, Green For Life Inc. containers may have to be removed from some locations, or be collected less frequently; in which case BMIC will spend less in removal fees and total tipping fees.

3.2.2.3 Real Cost of In-Kind, Off-the-Book Transactions:

There are not currently in-kind transactions that are a significant contributor to the BMIC waste reduction strategy. The BMIC Maintenance Transfer Station is a self sufficient operation that relies only on revenue generated and BMIC general funds to supply staff time/equipment for the day to day maintenance operations. There exist however the potential to pursue opportunities for BMIC staff to receive free and frequent training through state and federal avenues which could in and of itself be very valuable.

3.2.2.4 Cost-effective Analysis:

Here the alternatives described in “Capital, Operational, and Maintenance Costs” and the costs associated with those alternatives will be reviewed for costs effectiveness. The following are the cost, returns and final returns of each alternative on a monthly basis.

> Note: The data supporting this analysis is largely based on estimates. Without a direct evaluation of the alternatives being implemented on BMIC and an independent review of BMIC resources and capabilities, the actual amount of cost

savings and benefits will differ from the estimates presented. The data below is meant to provide a base estimate for the effectiveness of each alternative.

#1 - Community Education and Policy Making:

Community education and consulting can be provided by outside entities, such as the EPA, ITCM or a private consultant. Policy making, however, is an internal activity. Costs include an indeterminable amount of work hours dedicated to policy writing, posting, and supervision. These activities are inherent to any managerial position.

Costs: Indeterminable/ None

Benefits: Benefits are indeterminable, but education and policy promote recycling and decreases some waste dumping in BMIC.

#2 - Comprehensive Recycling Program: (including containers, staff, vehicles and equipment)

Costs: $9600 Initial Capital

Returns: $1100 to $2040 per month

Note: A reduction of 35% to 65% of the waste, which is recyclable or compostable, equates to matching decrease in garbage pickup and disposal costs; the total of which averages $3139 per month.

Final Benefit: $1100 to $2040 per month

#3 - Compost Program:

Costs: $131,400 Initial Capital

Returns: $1,100 per month reduced landfill fees
$1,100 per month compost sales

Final Benefit: $2,200

#4 - Additional Transport Trailer:

Costs: $5,000 Initial Capital

$50-$100 per month Maintenance

Returns: $3,950 to $10,850 per month

Final Benefit: (-) $1050 to $5,850 (initial month)
$3,900 to $5,750 (final monthly)

#5 - New Waste Transfer Station, Outdoor Yard and Supporting Equipment:

Costs: $3,694, 530 Initial Capital

Returns: $ 1,100 per month in reduced disposal fees with composting system
$1,100 to $2,040 per month reduced disposal fees from improved recycling
$1,100 per month compost sales
$500 per month reduced fees and staff time due to reduced dumping
$200 per month from electronic waste collection
$250 per month reduced cost of HHW transportation

Final Benefit: $5,190 per month

#6– No-Action Alternative

See description in "Alternative Analysis".

3.2.2.5 Overall Feasibility:

Community education and policy making and enhancing the recycling program are feasible short-term options. Based on the cost benefit, the implementation of all three can save funds spent on waste management and significantly reduce land filled waste

The additional transport trailer, transport of valuable materials, implementing a composting program, and a new waste transfer station are all long-term options. They require large initial capital, and more extensive management structure. They are not feasible with the current economic status or administrative structure of BMIC unless outside funding sources are secured.

A no-action alternative is not feasible if BMIC wants to increase environmental and economic efficiency. Future GLF costs and land filling will increase with the population, making it more difficult and costly to implement other alternatives.

3.2.2.6 Selected Alternatives:

Here we have selected 4 alternatives based on cost-effective analysis data, overall feasibility, sustainability and need.

Community Education and Policy Making:

This alternative is economically feasible due to minimal cost and the probability of immediate results. It includes a review of current reduction efforts, education/consulting on more successful future policies. New policies can include more diligent waste sorting, storage of recyclables for regular pickup rather than dumping, ordering recycled materials, and other steps that reduce material use in commercial, residential and office areas. This alternative can increase general efficiency by acting at the source of waste generation. Cost/Benefit Analysis is indeterminable. Implementation can take place immediately, and is sustainable as long as policy is followed.

Composting Program:

This alternative can significantly reduce the landfill costs but requires a significant amount of capital. The final product can provide a necessary landscaping/gardening resource, and possible revenue.

Comprehensive Recycling Network:

This alternative has the potential to operate with a solid cost benefit ratio; however, it requires capital. There are no potential partnerships available at this time to share these expenses. This alternative can be self-sustaining, or operate at low cost to BMIC.

New Waste Transfer Station, Outdoor Yard and Equipment:

This alternative requires a significant amount of capital which BMIC is not able to support without outside funding. However, there is a strong need for this facility due to the temporary nature of the current waste transfer station and the concerns that have been stated previously. Due to these reasons, BMIC should consider outside funding sources.

3.2.3 Proposed and Future Waste Management Practices

The current waste management is ineffective due to the location and safety concerns associated with the temporary Waste Transfer Station and a permanent facility is needed. Other future improvements lie in waste reduction. Chosen waste reduction programs may or may not fit the alternatives previously described, however, reduction via composting and recycling are the two most feasible practices.

Recycling is already present via the maintenance department's efforts. The main requirements for better recycling are further participation throughout BMIC and organization.

3.2.3.1 Proposed Waste Collection, Transfer and Disposal

Recycling, as an activity, needs an increase in participation and organization throughout the community. This is especially true because the disposal of recyclable materials does not cost the BMIC anything but the time of maintenance staff to drop-off recycling to the Chippewa County Recycling center. Recyclables are already collected at 7 locations by the maintenance department; however, the other waste generation sites[9] and BMRC sites should be better included.

Composting may be more successful (initially) if collection is limited to major food generators, such as the Resort and Casino restaurant although it is not thought that the waste generated at these sites is likely to be compostable through traditional means. Due to the use of oil and high protein foods at the casino and the oil and high levels of animal products identified in the waste characterization study, it is likely that composting of food will need to be done with the aid of an aerobic digester. There is however the potential to compost other organic materials from the main waste stream such as coffee grounds, compostable fiber materials, fruits and vegetables, etc.

3.2.3.2 Proposed Special/Hazardous Waste:

Continue with annual hazardous waste, E-waste and tire collection and continue public outreach to make aware of these events.

3.2.3.3 Proposed Waste Reduction: Source Reduction, Recycling, and Composting

The majority of this plan outlines waste reduction as the primary future solid waste action. To provide a detailed plan of waste reduction in this section is redundant.

3.2.3.4 Potential Partnerships

The EPA is the most productive potential partnership, in regards to resources and funding. Indian Health Services is another potential partner for funding a new facility.

[9] See Waste Generators

Recycling centers can become valuable partnerships in regards to purchase and drop off of materials. Numerous recycling collectors can be found on the Michigan Department of Environmental Quality's Recycled Materials Market Directory. [10]

3.2.3.5 Compliance and Enforcement

The current ordinances against unauthorized dumping and littering are sufficient to enforce environmentally harmful dumping. In order to maintain compliance community education, office policy and regular supervision of reducible materials dumping are necessary. These activities must be conducted by proposed staff and workplace supervisors.

3.2.3.6 Proposed Public Involvement and Community Education

Community Education and Public Involvement are essential to Recycling/Composting efforts in BMIC. Employees and managers should receive in person education on daily reduction actions in the workplace. To supplement education, postings that clearly display sorting and disposal instructions, and policies for reduction need to be placed in common areas and near waste disposal containers. Another educational activity is school visits and/or field trips to recycling/composting sites.

Monthly or quarterly reports should be provided to the executive board. Reports should include core information such as comprehensive waste reduction results, financial expenditures, and cost-benefit analysis.

Public involvement can include assistance from volunteer/community service organizations like the senior center, boys and girls club, and the cultural center. Quarterly business/workplace and community surveys are a good means to not only gain information from the public, but to educate on waste reduction activities.

3.2.4 Implementation

Implementing the SWMP is dependent on community discussion and involvement; however, there are general guidelines of implementing a plan that we will suggest here.

The BMIC Executive Council is the administrative body responsible for approving and implementing all administrative actions on the BMIC. During regular working and planning meetings, it is necessary that they examine the plan in detail and edit/add to the plan appropriately. It is currently the practice that the executive council has delegated the day to day operations of the SWMP to tribal administrative staff and the Solid Waste Committee. The Solid Waste Committee is composed of tribal administrators, biological and

[10] See References and Resources

environmental staff, and Bay Mills maintenance staff, and other tribal departments as necessary.

Once the plan is reviewed and updated, the community needs to choose alternatives/improvements to current practices. Alternatives must be based on BMIC's resources and capabilities, overall feasibility and cost-effectiveness; as displayed in previous sections. The successful employment of the chosen alternative(s) is the final goal of the SWMP.

The administration must then create short and long term goals for the chosen alternative(s). Those goals include fully constructing and launching the alternative, attaining a desired effect on the waste stream, instilling an administrative structure/monitoring progress, and improving the plan (if needed). After the establishment of goals, the community must create a timetable of attaining objectives. A typical timetable will include: The allocation of the needed supplies, facilities, staff and revenue for future expenditures; physically implementing the alternative throughout the community; and putting a process of review and updating must in place.

A summarized model of implementation, based on the Compost Alternative, is as follows:

-The Solid Waste Committee Members will review the SWMP. They will clarify the designated resources and capabilities of BMIC in relation to the proposed waste management practices.

-The Waste Committee will choose a composting program as an alternative based on high cost-effectiveness.

-The Executive Board must form an administrative structure responsible for the direction of the proposed program and its goals

The overall goals are:

-Purchase of composting equipment and compost bins for departments and residences.

-Begin accepting compostable materials.

-Waste reduction resulting from the compost program must significantly decrease the frequency of pickup and/or size of waste containers on BMIC. The compost program must produce useable compost, suitable for use in gardening and landscaping.

3.2.5 Tribal SWMP review and updating

The EPA suggests that a review of the SWMP should be conducted every 5-10 years. The solid waste committee has been effective in implementing several recycling efforts, and making possible the building of a new facility through regular monthly or bi-monthly meetings. It is suggested that this group continue to meet as they have and to implement the day to day operations and goals of the SWMP and that they review the SWMP every two

years and submit it to the Executive Council for approval. In this way the quarterly meetings of the solid waste committee can quickly make progress in areas of identified improvement while the 2 year reports provide more comprehensive data and patterns over a longer time period. With current information, the staff and administrators can more quickly adjust the program to increase productivity and decrease cost.

The SWMP is a working plan; in that it is continuously changing, as the service area and its waste stream is continuously evolving. Information taken from quarterly and yearly reviews will affect the editing of the applicable section(s) of the plan. The Executive council, through the Solid Waste Committee, should maintain a working plan, in which they can record changes/proposed changes. Updating the plan every two years is suggested.

3.3 Waste Reduction Success: Mackinaw Island Waste Facility

To support the projected cost effectiveness and feasibility, we will address information taken from a report on the Mackinaw Island Waste Facility[11] and statistics provided by manager Paul Wandrie. The Island's waste facility has adopted multiple alternatives to land filling, such as composting, extensive recycling, baling and transfer. These practices decrease incredible amounts of waste, and are extremely efficient, both economically and environmentally.

Note: Mackinaw Island's waste reduction statistics and BMIC projected cost effective analysis will differ according to geographical factors.

Mackinac Island Waste Facility Tour Report 7/29/10

The Mackinac Island Waste Facility provides recycling and composting services for over 100 business and residential areas. Four staff members, working full time on week days and part time on weekends, process organic materials into sellable compost (. Within a 60 process, the organic materials are mixed, shifted from one of six bays during maturation, sorted, stored and sold. The use of heavy machinery, a shredder, and the sorting machine is extensive.

Compostable Materials are not only food scraps and other kitchen waste, but various paper materials, kitchen grease, and many other materials commonly thrown away. The bulking agents are manure, which is abundant, and woodchips from shredded landscape and construction debris. Other bulking materials are yard clippings, and the manager suggested worm composting for less use of facilities and equipment.
To address vectors, many larger carnivores do not live on the island, so seagulls are the largest nuisance to composting operations. They are neutralized by constant mixing/movement and burying of edible organics in the piles. The composting program is

[11] Mackinaw Island Waste Facility Tour Report. Seth Allard. 7/29/10.

extremely successful, each year selling out quality compost which is inspected by the DEQ. (Details will follow at a later date).

The staff provides separate organic waste and recycling bags to the community, which are later sorted at the facility. They utilize bagging prices as an incentive to recycle; recycling bags being $1.50 and trash being $8 per bag. Community education and participation also help make this program successful, though the presence of full time employees ensuring collection, transfer and proper recycling/composting is the key component of the success of this facility.

The facility sells recyclables by the ton and compost/wood chippings by the yard. Later information as to amounts of sale, profit, and costs of operations will be made available later.

The manager suggests that we use worm composting due to smaller scale and less time/money investment. This, along with a modest facility and hard working recycling staff seems to be the best equivalent to this program for bay mills.

Supporting Statistics:

Shipping Revenue:

	Revenue	Cost	Income
Cardboard	$16,986.95	$10,621.60	$6,365.35 (+)
Magazines	$1,220.65	$325.00	$895.65 (+)
Old Newsprint	$1,274.84	N/A	$1,274.84 (+)
Glass	$554.87	$968.95	$414.08 (-)
			$8,121.76 (+)

Revenue- Amount taken in from buyer
Cost- Shepler's and A.M. Express Trucking Bills
Income- Subtract Revenue from Cost for Total Income

	2009	2010
Cardboard	$55 to $80 per ton	$125 per ton

Magazines and Old Newsprint are shipped to Manistique Paper, Inc. on the same load.

Figure 5: Inside the recycling facility. Large bins are organized for separation and storage

Figure 6: Stacked bails of valuable cardboard and plastics

Figure 7: One of six compost bays. This material is the final, sellable product

Figure 8: Community Members bringing in recyclables.

4.0 Description of the Funding and Sustainability/Long-Term Goals of the Solid Waste Program

Current funding for the daily operations of the waste transfer station come from tribal general funds and revenue generated by the dollar a bag policy in place. There have been numerous state and federal grants receivede for specific cleanup projects such as HHW, e-waste and other recycling infrastructure.

4.1 Financial Implementation

The long term management of the solid waste program is dependent on generating increased revenue. Possible long-term goals to increase revenue identified by the Solid Waste Comittee are as follow: diverting waste from the landfill, starting a profitable recycling center with personel to sort these wastes, opening the transfer station to non-tribal members in the surrounding area and charging these individuals a fee to fund the program.

4.1.1 Funding the Plan

The total funds needed to implement and maintain the SWMP is dependent on the chosen alternative(s) and yearly costs, (or the projected period of operation if the plan is temporarily approved). To calculate the projected capital and monthly costs for one of the presented alternatives, refer to the cost-effectice analysis section.
The two areas of funding the SWMP are capital/startup costs and sustained funding. It is extremely important to fund the SWMP's capitol/startup costs, partially or completely, using any and all grant and partnership opportunities. [12]

4.1.2 Revenue Generators

Current revenue generators on BMIC are the Casino and Resort, the King's Club Casino, and the Bay Mart store and gas station. Details on funds that can be realistically provided via current revenue generators must be placed in this section at a later date. Revenue is not generated from residential waste management service fees; nor do the current practices, as previously described, present a high cost to residents. The only monthly costs to residents are represented in the "dollar a bag" policy, the $28 optional curbside pick-up, and an average $11 inclusion in rental rates. A low fee structure is one of the reasons past waste issues, like illegal dumping, have been largely decreased. Increasing costs for the purpose of revenue may cause a reversion to illegal dumping, and is not

[12] See References and Resources, as well as Potential Partnerships

suggested as a source of future revenue. Revenue can be provided by future savings in waste management and sale of valuable recyclables and compost. Each of the alternatives presented, or modifications thereof, are capable of revenue generation and/or self sustainability.

4.1.3 Fee Structure

As described above, residents of the Tribal Housing areas pay waste fees as part of the overall rent. Curbside pickup costs are paid by opting residents. The BMIC's "dollar a bag" policy is an area of heavy cost to BMIC, but also prevents the above discussed waste problems.

The BMIC administration pays all other waste costs from Tribal General Funds.

4.1.4 Financial Sustainability

Financial sustainability of the SWMP is based cost savings and revenue provided by waste reduction, recycling and composting, as described in the Alternative Analysis section. A projection of internal funding must be discussed here at a later date.

External funding for short term sustainability may take the form of grants and partnerships, however, they cannot realistically provide long term sustainability though these can provide needed funding for capital improvements.

4.2 Long-Term Goals and Stategies

The highest priority of the SWMP is to maintain and enforce a safe, sanitary, environmentally healthy waste management program in the community. The current waste transfer station does not meet this priority and therefore should be addressed through seeking funding to support the building of a new waste transfer station.

Two other main goals of future waste management are the reduction of land filled waste produced and waste management costs. There are four strategies for the achievement of the main goals.

Any effective management requires an administrative structure. Authority must be delegated to monitor and direct the progress of the SWMP, its waste management/reduction programs. Proper authority must provide reviews and updates as necessary, as well as research opportunities for improved waste management.

The BMIC must research, implement and maintain waste reduction programs in direct support of the main goals. These programs can center on recycling and/or composting. See the Alternative Analysis section for descriptions of the proposed programs.

Community education and policy are necessary a components of any future waste reduction efforts.

To direct the SWMP accordingly, it is necessary to continuosly monitor the solid waste stream. Future policies are reliant on the current and future waste generators, waste types and amounts, and waste costs. Periodic waste stream assessments and records examinations can provide the base information for accurate waste stream characterization. A description of a timeline can be seen in the Implementation Section, but the immediate goals are as follows:

-Continue the meeting of the Solid Waste Committee
-Research and Implement waste reduction programs
-Implement policy that supports the chosen waste program(s)
-Continuously monitor the SWMP and the BMIC Waste Stream with waste assessments as necessary

4.2.2 Improvements Beyond Basic Compliance

While the majority of this plan concentrates on basic waste reduction, there are numerous improvements and services that can be included in the long term goals.

There are many more materials that are designated as recyclable than are commonly thought. Many classifications of plastics, papers, and styrofoam are present in BMIC's waste stream. Presently, these types are difficult to sort and have a low value on the recyclable materials market.

Tours and presentations are good educational and promotional tools. Such education can assist residents in independent waste reduction, such as home composting. A more in-depth community awareness program can be developed along with other, higher priority, programs.

A comprehensive composting program can, as previously described, contribute to community gardening and landscaping. A pertinent example is the Bay Mills Community College's traditional food growth program.

4.2.3 Strategies for Implementation and Maintenance

A critical strategy for the successful execution of this or any other SWMP, is the delegation of responsibility and authority of the plan's progress. The delegation of the SWMP to the Solid Waste Comitte will ensure that the Committee can oversee and direct the development of a SWMP and the goals associated with it.

Other goals and/or steps of implementation can be reviewed in the Long Term Goals and Strategies, and Implementation Sections.

5.0 Demonstration of Approval of Plan By Appropriate Governing Body

Insert executive council agreement adopting updated plan

5.1 By Whom

The governing body of BMIC is the Executive Council. The Executive Council meets for regular business meetings on the 2nd & 4th Monday of each month in the courtroom of the Tribal office.

Working sessions are also held on the 1st & 3rd Monday of each month in the conference room, located upstairs in the tribal office.

The Executive council shall delegate the day to day implementation of the SWMP to tribal administrative staff and the Solid Waste Committee which meets monthly.

5.2 Dating and Timeline

Dates designated for review and approval of a SWMP are to be determined, and are subject to the Executive Council's direction.

Appendix A - References and Resources

Bay Mills Indian Community Homepage
http://www.baymills.org/

Bay Mills Indian Community Tribal Action Plan, 2018

Dale Mutch. "Compost Marketing Study". Posted on April 06, 2009 14:20. Michigan State University Extension.
http://www.newag.msu.edu/Home/tabid/37/articleType/ArticleView/articleId/12/Compost-marketing-study.aspx
Accessed 8/03/10

Department of Planning and Evaluation, Environmental Protection Programs. "Hannahville Indian Community Solid Waste Management Plan." October 2008.

Dwight Sargent, Staff Geologist. "Waste Stream Assessment-Prepared for the Bay Mills Indian Community." Inter-Tribal Council of Michigan, Inc. 1995.

FreightCenter Full Service Freight Logistics Company.
http://www.freightcenter.com/QuickQuoteReview.aspx
Accessed 8/4/2010.

Greenhouse Gases and the Role of Composting: A Primer for Compost Producers
https://www.sanjoseca.gov/home/showpublisheddocument?id=198

Michigan Department of Natural Resources and Environment
-http://www.michigan.gov/deq/0,1607,7-135-3585_4130---,00.html

Recycled Materials Market Directory.
http://www.deq.state.mi.us/P2/rmmdpaper.asp

Michigan Department of Transportation
"Maximum Legal Truck Loadings and Dimensions"
http://www.michigan.gov/documents/Loads_dim_87014_7.pdf
Accessed 9/1/10

TruckPaper.com Trucking and Trailer Purchasing Publication.

http://www.truckpaper.com
Accessed 8/12/10

Tuthill Farm and Composting. Official Website
http://www.tuthillfarms.com/1/235/compost_benefits.asp
Accessed 8/03/10

U.S. Environmental Protection Agency Homepage.
http://www.epa.gov/reg5rcra/wptdiv/solidwaste/tribes.htm#techassist

Current Projects and Examples of Previous Projects and Grants Awarded by the EPA Region 5 Solid Waste Program.
http://www.epa.gov/reg5rcra/wptdiv/solidwaste/projects/msw_goals.htm#CCPs

"Integrated Waste Management Planning Method: To Incorporate the Five Elements Into A Tribal Integrated Waste Management Plan." (Final Regional Draft). April 17, 2007. Prepared by EPA Region 8, with input from other EPA Regions, IHS, USDA, BIA, and HUD.

"Measuring Recycling: A Guide for State and Local Governments: Standard Volume-to-Weight Conversion Factors" 03-27-2003. This table provided the conversion rates for BMIC waste amounts.

http://www.epa.gov/wastes/conserve/tools/recmeas/docs/guide_b.pdf (PDF
"Tribal Decision Maker's Guide to Solid Waste Management". Solid Waste and Emergency Response November 2003.
www.epa.gov/tribalmsw€

Appendix B - Additional Resources and Contacts

Environmental Protection Agency Region 5
(Serving Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin and 35 Tribes)
77 W. Jackson Boulevard (DW-8J)
Chicago, IL 60604
Homepage:
http://www.epa.gov/region5/

Contacts:
Dolly Tong
Tribal Solid Waste &
Pollution Prevention Coordinator
Telephone: (312) 886-1019
Fax: (312) 353-4788
E-mail: tong.dolly@epa.gov

Burdell Chapman
Tribal Solid Waste &
Pollution Prevention
Telephone: 312-353-9564
Cell: 630-605-0815
E-mail: chapman.burdell@epa.gov

Tribal Solid Waste Management Assistance Project
Homepage:
http://www.epa.gov/epawaste/wycd/tribal/finance.htm#ap
This is a workgroup whose members include representatives from the Environmental Protection Agency (EPA), Department of Agriculture, Rural Development (RD); Department of Defense (DoD); Department of Health and Human Services, Indian Health Service (IHS); Department of Housing and Urban Development; Department of the Interior, and Bureau of Indian Affairs (BIA).
Contacts:
Tonya Hawkins
Phone: (703) 308-8278
E-mail: Hawkins.tonya@epa.gov

Waste Management in Indian Country Homepage
Homepage:

http://www.epa.gov/epawaste/wycd/tribal/index.htm
This is a comprehensive listing of EPA Tribal Waste Management and Planning information and partnerships.

Michigan Department of Environment, Great Lakes, and Energy – Materials Management Division
Homepage:
https://www.michigan.gov/egle/0,9429,7-135-3306_63145---,00.html
Contact: Elizabeth Browne
5172846552
BrowneE@michigan.gov

DNRE Programs by Division page:
http://www.michigan.gov/deq/0,1607,7-135-3306_3329_21563-54665--,00.html

Bank of Recycling
628 West Spruce Street, Sault Ste. Marie, MI 49783
Office Phone: 906-259-0818
Richard Delimonte
Phone: 313-737-6858

Chippewa County Recycling Center
1423 West Easterday Avenue Sault Ste Marie, MI 49783
Office Phone: 906-635-5971

Appendix C - Bay Mills Indian Community and Surrounding Area Contacts

Tribal Office 906.248.3241

Child Development Center 906.248.5820

Emergency Connection (EMT) 906.248.2021

Armella Parker Senior Center 906.248.2108

Cultural Center 906.437.4372

Brimley Area Schools 906.248.3219

Bay Mills Commodity Foods 906.248.2527

Bay Mart 906.248.3675

Bay Mills Public Works 906.248.3356-Mike Carrik 906.248.8171

Enrollment Office 906.248.8342

Bay Mills Resort and Casino 906.248.3715

Ojibwe Charter School 906.248.2530

Bay Mills Community College 906.248.3354 -Research and Development 906.248.8454

Ellen Marshall Health Center 906.248.5527

Bay Mills Housing Authority 906.248.5524

Bay Mills Police Department 906.248.3244

Maintenance Department 906.248.8155 -Sam Hatfield 906.440.0104

Bay Mills Conservation Office 906.248.3251

BAY MILLS INDIAN COMMUNITY

Green Community Assessment and Recommendations

2022

Energy Efficiency
Waste Characterization
Procurement Policy
Green Building Recommendations
Stormwater Management Infrastructure

Bay Mills Indian Community
The Big Green Up Report
2022

Energy Efficiency
Waste Characterization
Single-Use Items Survey
Building Recycling Efforts
Procurement Policy
Green Building Recommendations
Stormwater Management Infrastructure

To assess current energy and waste trends across Bay Mills Indian Community's government, education, enterprise, and business holdings operations. Priorities include, identifying areas for improving energy efficiency, determining most feasible materials for landfill diversion through waste characterization studies, single-use item surveys, greener procurement policies and building recycling efforts, developing a green buildings checklist and assessing storm water management infrastructure to create sustainability standards for future development. This assessment was completed in an effort to create long-lasting, energy-conscious practices and positively affect the quality of the natural environment.

Prepared by: BMIC Green Infrastructure Committee

Brianna Gunka, Jennifer Parks, Aubrey Maccoux-LeDuc, Carmen Kincaid and assistance from the Superior Watershed Partnership

Table of Contents

Executive Summary

In December, 2021, President Gravelle directed the Green Infrastructure Committee to assess current energy and waste trends across government, enterprise, and business holdings operations. The Bay Mills Indian Community (BMIC) Energy and Waste Study was conducted over a 12-month period, beginning January, 2022. This final report was submitted to the Bay Mills Indian Community Executive Council on January 23, 2023. The project scope included conducting energy audits and reviewing two years of energy use bills of BMIC facilities, conducting a waste characterization study for the Bay Mills Resort & Casino, assessing current procurement and use of single-use goods, determining recycling efforts in BMIC facilities, developing a green buildings checklist and procedure policy for future development, and assessing storm water management across the reservation. The ultimate goal of the study is to better understand energy consumption and waste generation, and identify methods of increasing efficiency and sustainability across BMIC entities to create long lasting practices that consider changing climatic changes and weather patterns while positively affecting the quality of the natural and built environment.

In June, 2022, the Green Infrastructure Committee secured a Michigan Department of Environment, Great Lakes, and Energy Community Energy Management Program grant, allowing BMIC to contract with the Superior Watershed Partnership to complete the energy audits and waste characterization study. Over a period of six weeks, Superior Watershed Partnership staff conducted 24 energy audits using the Department of Energy's Building Energy Asset Score Tool, and sorted approximately 975 lbs of Bay Mills Resort and Casino waste using the EPA's waste characterization data collection log and standard operating procedures.

The energy audits and related power consumption analyses conducted for this study revealed numerous significant energy conservation and efficiency opportunities for all of the subject buildings. In addition, many of the energy conservation measures require no cost and serve to help balance other measures requiring capital investment. Reoccurring deficiencies relating to heating, cooling and thermostat inefficiencies, powering computers, lighting, items linked to weatherization and numerous other items were encountered that can be mitigated with the energy conservation measures developed in the following document.

The waste characterization study, single-use item survey and facility recycling survey brought to light many areas where improved recycling practices, greener procurement practices and use of reusable items can be implemented to divert materials from entering the landfill.

In 2021 alone, Bay Mills Indian Community as a whole, procured over $19.6 million in goods. Bay Mills Indian Community's existing Procurement Policy was designed to ensure that supplies, services, and construction are procured at the most favorable prices available to BMIC, not taking into consideration the environmental implications of such purchases. The Green Infrastructure Committee developed a draft Environmentally Preferable Products (EPP) policy to work in concert with the current procurement policy, to ensure that future procurement is assessed in terms of favorable pricing and environmental preferability.

In recent years, BMIC completed several new development projects; including, the Health Center, Elder's Housing, Boys and Girls Club, Maintenance, and Public Works. In addition, BMIC redeveloped old Maintenance into Boys and Girls Club offices, Great Lakes Composite Institute into Northern Lights Cannabis Company, and is in the process of redeveloping the old health center into a new Administration facility. In the next several years, BMIC will develop housing on Plantation Hill, additional Elders Housing, another Boys and Girls Club facility, a Waste Transfer Station, a long-term care facility, storage units, a fish ice shack, a dental clinic, Justice Center and Commodity Foods expansions, Child Development Center expansion, and a BMRC expansion. In addition, the Kings Club Casino, Chippewa Landing, Riverview Park, and properties in Brimley will be redeveloped. Extensive development and redevelopment presents the opportunity for Bay Mills Indian Community to take a proactive approach to development by prioritizing sustainability and a healthy built environment through thoughtful design. To facilitate this effort, the Green Infrastructure Committee compiled a Procedural Checklist for Development and Redevelopment, and Green Elements Building Checklist. Together, these documents will guide future infrastructure efforts by ensuring 1) due diligence steps are completed prior to development, and 2) infrastructure is designed to be more efficient, provide a healthier indoor environment, minimize harmful effects on human health and the environment, and ensure long-term resiliency of the structure.

A dozen road-stream-crossing culverts were surveyed on Bay Mills trust lands. Of the crossings surveyed two are high priority due to their eroding nature and impacts on fish passage in the stream. An additional four are ranked as medium priority for repair or replacement. Improvements at these locations will benefit stormwater management needs and create a more natural condition for fish in the stream.

Two supplemental reports on energy use at Bay Mills buildings were completed. Highlights of these reports, with details for each building, are included in Appendices B through C.

Chapter 1.0 Introduction

Bay Mills Indian Community is located in Michigan's Upper Peninsula and in a climate that is characterized by long cold winters that require heating homes and workplaces for much of the year. In addition to cold temperatures, exposure to strong north winds directly off Lake Superior and short winter daylight means additional energy use to offset these conditions. These conditions contribute to an intensive use of energy to overcome cold and darkness in buildings with design, heating, cooling, and lighting system inefficiencies. Increasing the energy efficiency of Bay Mills Indian Community buildings that are so dependent on energy for heating, lighting and numerous other uses is an important first step in reducing the use of carbon-based energy and costly energy expenditures. Energy efficiency measures are often called the "low hanging fruit" of an energy program because of the often-significant reductions for relatively low capital expenditures.

Waste characterization studies provide important data regarding solid waste generation and landfill diversion opportunities. Assessing the waste streams generated by BMIC informs recycling and procurement decisions by determining which material streams can be landfill diverted through improved recycling opportunities and green procurement policies. Determining recycling availability and use of disposable single-use items in facilities also provides data to assist with recommendations and support for improved recycling opportunities for various departments and buildings.

Future consequences and the practice of thinking forward seven generations are tied to strong family and environment values within the Bay Mills Indian Community. This project is integrated with these values because it plans for actions to positively affect the health and well-being of family, community and the environment. Reducing the amount of energy that originates from a source like that of coal fired electricity plants is very much in line with BMIC's values. Lowering electricity use lowers air emissions and leads to improved health especially for a population that consumes high amounts of fish. Mercury can be traced from coal fired electricity plants, deposited to the surface, ingested by living organisms, accumulated within living organisms and consumed by people. People that consume high amounts of fish, like Bay Mills Indian Community members, are at higher risk of consuming mercury in this way. Reductions in carbon dioxide and particulate matter similarly influence positive changes for current and future generations.

The benefits from the energy and waste reduction measures in this project include sustainable monetary savings, air emission and pollution reduction and strong integration with cultural values. Monetary savings from reduced energy bills and landfill expenditures would be a significant benefit from the implementation of this project's findings. These savings offer various future opportunities including reinvestment into expanding and continuing energy efficiency measures, weatherization, investment into renewable energy production systems and increased recycling.

This study and resulting recommendations create opportunities for reducing air emissions, pollution and environmental degradation that occurs with mining and drilling operations. Numerous environmental benefits would be associated with the implementation of this project's results with reductions of mercury, carbon dioxide reduction, nitrogen oxides reduction, carbon monoxide reduction, particulate matter reduction, erosion, sedimentation and others.

The anticipated cultural benefits of the proposed project would uphold the belief that stewardship of our environment and resources is vital. Continuously working towards care of the environment is a core value and would be part of the benefit of energy efficiency and energy reduction objectives of this project.

Chapter 1.1 Project Background and Description

In December, 2021, President Gravelle directed the Green Infrastructure Committee to assess current energy and waste trends across government, enterprise, and business holdings operations. Priorities included improving energy efficiency and use, and reducing waste entering the landfill.

Chapter 1.2 Project Scope

The Green Community Assessment and Recommendations report was conducted over a 12-month period, beginning January 2022, and ending December, 2022. The study focused on six key areas: conducting an energy audit, conducting a waste audit, determining single-use product use, determining recycling efforts in BMIC facilities, developing a green buildings checklist, developing procedures that promote sustainability and assessing storm water management.

Due to modified building usage during the COVID-19 pandemic, this assessment tried to use records less impacted by changes in building usage and staff behavior. Generally, researchers preferred to use records from 2018-2019 and 2020-2021. Some records were also chosen for analysis because buildings were newly acquired or renovated; in those cases, 2021 data was analyzed. Further explanation of record analysis is described in relevant sections below.

Chapter 2.0 Energy Assessment

2.1 Energy Assessment Methods

An energy assessment was first completed in 2011. Some of the buildings surveyed at the time have been significantly remodeled or repurposed since then. Some have also been renamed over the past decade. The table below highlights the old and new names for these buildings.

Table 2.1. Building Name Comparison

2011 Survey Building Name	2022 Survey Building Name
Tribal Administration Building	Tribal Administration Building
Ellen Marshall Health Center	Future Admin
BMIC Charter School	OCS
Waishkey Center Community Building	Waishkey Center
Bay Mills Community College Library	Library
Bay Mills Community College Admin.	Adikameg Hall
Bay Mills Community College Mikanuk	Mikanuk

2.1.i Billing and Historical Use Assessment Methods

The Bay Mills Indian Community Energy Efficiency Feasibility Study of 2011 was accomplished by collecting historical energy consumption data, analyses of historical energy use data, detailed energy audits including occupant and building manager interviews, thermography evaluation, itemized energy consumption calculations, energy conservation and energy efficiency alternatives research, energy conservation measure choice, energy conservation measure savings and cost calculations and community awareness throughout the project. These efforts were utilized with the objective of reducing each building's energy consumption by 30% or greater.

Before looking at each building's current energy use it was important to look at past energy use in the form of electricity and natural gas utility bills. Two years of previous utility bills were averaged together and formed the numbers representing existing energy use. This will serve as a baseline for comparison to energy conservation measures. In addition to yearly energy use, plotting historical monthly use was analyzed to determine increases associated with seasonal loads tied to heating and cooling.

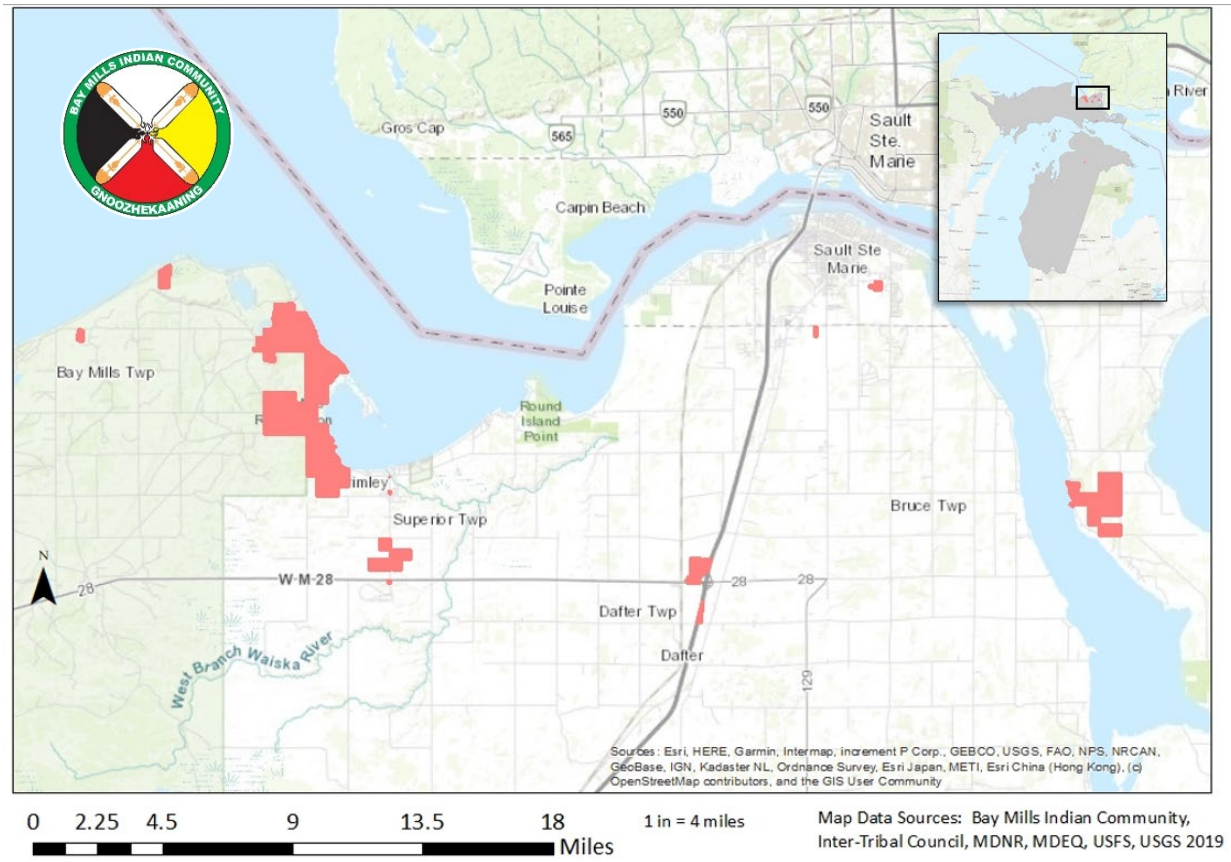


Figure 2.1.i Map of Bay Mills Indian Community Main Reservation

The study completed in 2022 followed a similar format. Records from 2021 and 2019 were used to determine current energy usage. Due to COVID-19, records from 2019 were used in place of 2020. This gives a more complete illustration of energy usage as many buildings were being used significantly less in 2020. For consistency, one year was the December of the previous year included with January-November bills of that year. For example, “2021” was December 2020 combined with January through November 2021. All buildings included in the billing assessment used records from 2021. While researchers hoped to assess the billed utility use of all Bay Mills buildings, that was not possible at the time. Numerous buildings, departments, programs have been in the midst of moves, reorganizations, and/ or renovations in the last three years. For this reason, major facilities such as the health center or Northern Lights were not included in this portion of the assessment. Additionally, data for some buildings was not in time to be included in analysis, such as the Housing Authority office. Still other buildings are combined in aspects of their utility billing and where therefore combined for simplicity in this assessment, such as the BMCC Main Campus buildings. The table below lists the primary buildings that were included in the assessment. They are grouped by primary manager for the facility and not necessarily by department(s) using the facility.

Table 2.1.i. Buildings Assessed for Energy Efficiency in 2022

GOVERNMENT OPERATIONS	EDUCATIONAL FACILITIES
Tribal Admin. Building / Kings Club	Ojibwe Charter School
Future Admin (12124 Lakeshore)	Waishkey Center
Elders/History Dept	BMCC Main Campus (Library + Mikanuk)
Culture Dept	BMCC West Campus: Trades
Justice Center	Mukwa Fitness Center
Head Start Child Center	Waishkey Bay Farm
AOT	BMCC Migizi Hall
Biological Services/Conservation Dept	ENTERPRISE AND BUSINESS HOLDINGS
Commodity Foods	Bay Mart gas station
Public Works (5463 Niibish)	Four Seasons Market & Deli
Maintenance (5414 Niibish)	Wild Bluff Golf Course
	Wild Bluff Mntn/ Cart Barn
	Laundry
	Bay Mills Resort and Casino

2.1.ii Energy Efficiency Assessment of 2022 by Superior Watershed Partnership—Methodology

In 2022, Bay Mills Indian Community contracted with Superior Watershed Partnership and the Great Lakes Climate Corps to perform an assessment on building energy usage and efficiency. The full report is available in Appendix B.

Table 2.1.ii.Building with DOE Score and Potential Cost Savings_

Building and Address	DOE Score	Potential Cost Savings
GOVERNMENT OPERATIONS		
Tribal Administration (12124 W. Lakeshore Dr)	10/10	1%
Biological Services/Conservation (11801 Plantation Rd)	9.0/10	11%
Public Works (5463 S Nbiish Rd)	6.5/10	2%
Advanced Office Technologies (12061 W. Lakeshore Dr)	10/10	14%
Waishkey Center/ Boys & Girls Club (11435 W. Lakeshore Dr)	7.5/10	4%
Tribal Justice Center (12449 W. Lakeshore Dr)	10/10	16%
Elder Center/ History (12485 W. Lakeshore Dr)	7.5/10	2%
Commodity Foods (12497 W. Lakeshore Dr)	8.0/10	1%
Housing Authority (3095 S. Towering Pines Rd)	8.0/5	11%

Culture Department (12498 W. Tower Rd)	10/10	12%
Maintenance Building (5414 S Nbiish Rd.)	0/0	5%
Ellen Marshall Health Center (new) (12455 W. Lakeshore Dr)	9.0/10	1%
EDUCATIONAL FACILITIES		
Head Start Child Care Center (12471 W. Lakeshore Dr)	9.0/10	14%
Ojibwe Charter School (11507 W. Industrial Dr)	6.0/10	>50%
BMCC Migizi Hall (Fire Crew building) (1895 S Iroquois Row)	9.5.10	3%
Bay Mills Community College (12214 W. Lakeshore Dr)	8.0/10	10%
Waishkey Bay Farm (10135 W. Mills Rd.)	5.0/10	10%
Mukwa Health/ Fitness Center (12400 W. Spectacle Lake Rd)	9.0/10	1%
ENTERPRISES		
Bay Mills Resort & Casino (11386 W. Lakeshore Dr)	9.0/10	11%
Wild Bluff Golf Course (11335 W. Lakeshore Dr)	10/10	14%
Bay Mart Gas Station (10001 W. Lakeshore Dr)	9.0/10	2%
Northern Light Cannabis Company (2735 W. M-28, Dafter)	9.5/10	2%
Four Seasons Market & Deli (9253 W. 6 Mile Rd)	10/10	13%

GLCC surveyors with energy efficiency scoring certifications from the Department of Energy (DOE), along with a contractor-partner, utilized a DOE's Building Energy Score Data Collection tool for building assessments. The Asset Score assesses the energy efficiency of these assets and identifies opportunities for improvement. Using building information input by the user, the tool runs a building energy simulation and generates a report. Throughout the process, the surveyors completed DOE data collection sheets for each building. The tool had the capability of assessing physical and structural energy efficiency. Measurements were taken of building envelope, orientation, and window area. Through the use of various sensors and detectors, the efficiency of windows and light fixtures was determined. Heating, ventilation, and air conditioning (HVAC) equipment was also inspected. The efficiencies for HVAC equipment was calculated using nameplate data and through data provided by manufacturers. BMIC Public Works Department and the History Department provided information about the age and features of buildings. Using the DOE's Online Asset Scoring System, each building was given a rating on a scale of one to ten. This system does not take into account occupant behavior or operations. This does allow for the comparison of buildings, but fails to consider the functions of buildings. The measures taken to decrease energy consumption should outweigh the cost both financially and environmentally of the proposed improvements, but it is not clear if that was taken into consideration.

The DOE tool is useful, but limited and should not be considered the *only* measure of efficiency building assessment. The DOE Asset Scoring Tool applies standard assumptions concerning miscellaneous loads (e.g., office equipment, vending machines) based on building type. Building-specific energy and operational costs are not included in the calculation of the building score. The Asset Score Report contains estimated annual building energy usage and estimated savings associated with identified energy efficiency measures. These estimates are based on average regional utility rates and standard assumptions about operational factors such as occupancy density, hours of operation, and miscellaneous loads (such as office equipment). Currently, the Asset Scoring Tool does not include on-site renewable energy generation in the calculation. This tool may be increasingly useful if more detailed information is inputted into the tool. But when only basic information is inputted, it may be challenging to compare buildings with great differences in design and operation, for example the Tribal Office compared to the Public Works building. Additionally in some buildings, limited recommendations for improvement may be offered by the tool if the building and appliances are fairly new, and/or if the building design would have to be significantly altered to improve efficiency (for example, large garage spaces).

2.2 Energy Assessment Results

2.2.i Energy Assessment Results of 2011

The results of the 2011 baseline energy assessment indicate that of the Ellen Marshall Health Center, Tribal Administration Building and the BMIC Charter School have ranking scores available within Energy Star's Portfolio Manager. The ranking of these three facilities show the Charter School is average in energy consumption, Ellen Marshall Health Center consumes more than average and the Tribal Administration Building consumes less energy than average buildings with similarly characterized use. While the remaining buildings don't have available ranking scores compared to their "peers" they do have Energy Intensity values. Energy Intensity and "peer" rankings (for buildings with available score) are shown in the following table that compares and summarizes each building's energy consumption. None of the BMIC facilities were eligible for an Energy Star EPR.

Based on each facility's energy use, estimates of greenhouse gas emissions were generated using Energy Star Portfolio Manager. The College consumed the most total site energy and also generating the greatest amount of GHG emissions at 411 MT CO2-e in 2011 and was close followed by the Ellen Marshall Health Center at 400 MT CO2-e. The total annual GHG emissions was 1,292 MT CO2-e, which to put in more tangible terms is equivalent to the annual emissions from 269 cars or the amount of carbon sequestered annually 1,059 acres of forest.[7] The following table and charts illustrate the current state of energy consumption in the subject buildings.

Table 2.2.i: 2011 Building Energy Performance

Building Energy Performance					
Building	**Energy Performance Rating (1-100)**	**Site Energy Intensity/National Median (kBtu/ft2/yr)**	**Source Energy Intensity/National Median (kBtu/ft2/yr)**	**Total Annual Site Energy (kBtu)**	**Total Annual GHG Emissions (MT CO_2-e)**
Tribal Admin Building (12140)	85	51/82	118/189 (-38%)	586,009	81
Ellen Marshall Health Center (12142)	44	111/104	227/213 (+7%)	3,329,503	400
Ojibwe Charter School	52	106/109	165/170 (-2%)	1,717,715	150
Waishkey Center Building	NA	88/39	145/100 (+45%)	2,589,427	242
BMCC Library	NA	65/104	139/244 (-43%)	429,411	55
BMCC (old) Admin Building	NA	70/104	186/244 (-24%)	926,286	148
BMCC Mikanuk	NA	157/104	308/244 (+26%)	1,880,608	216
Source: Energy Star Portfolio Manager					

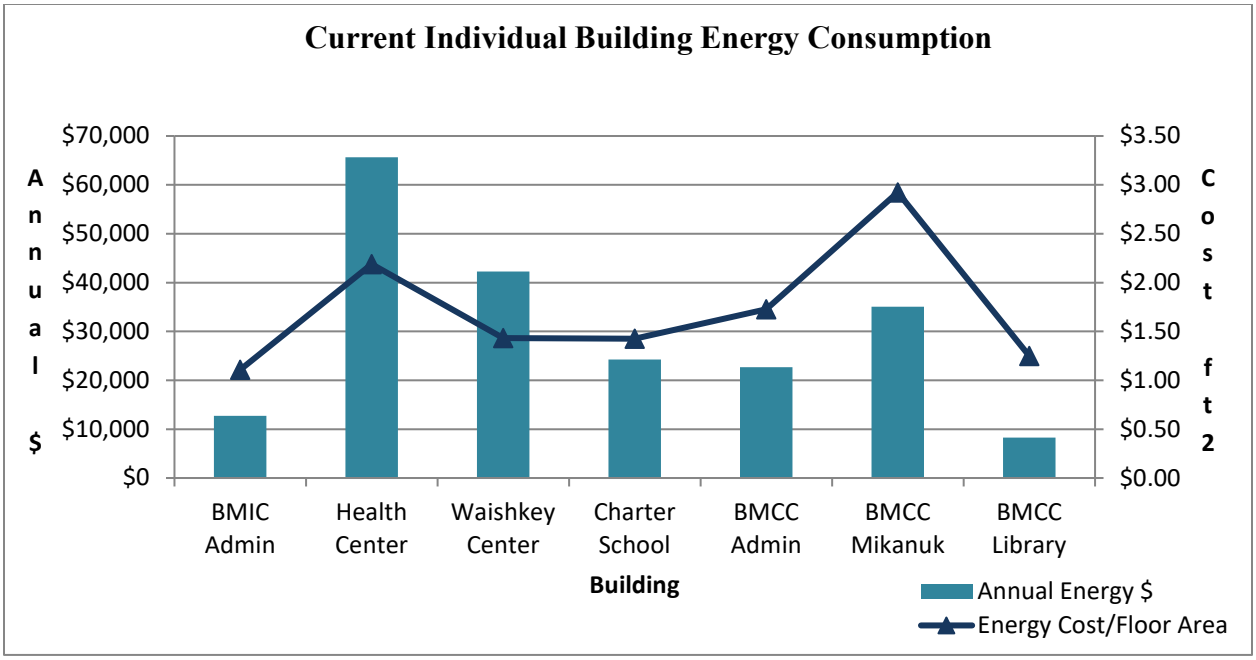


Figure 2.2.i.A. 2011 Individual Building Energy Consumption

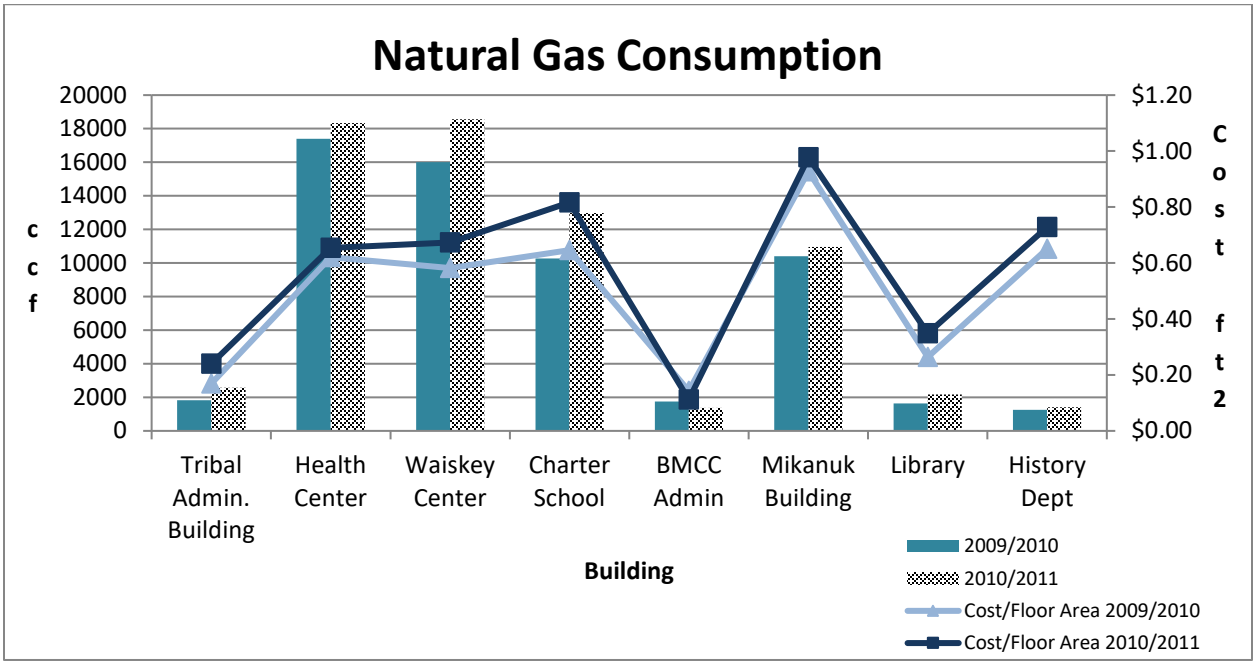


Figure 2.2.i.B: 2011 Natural Gas Consumption per Building

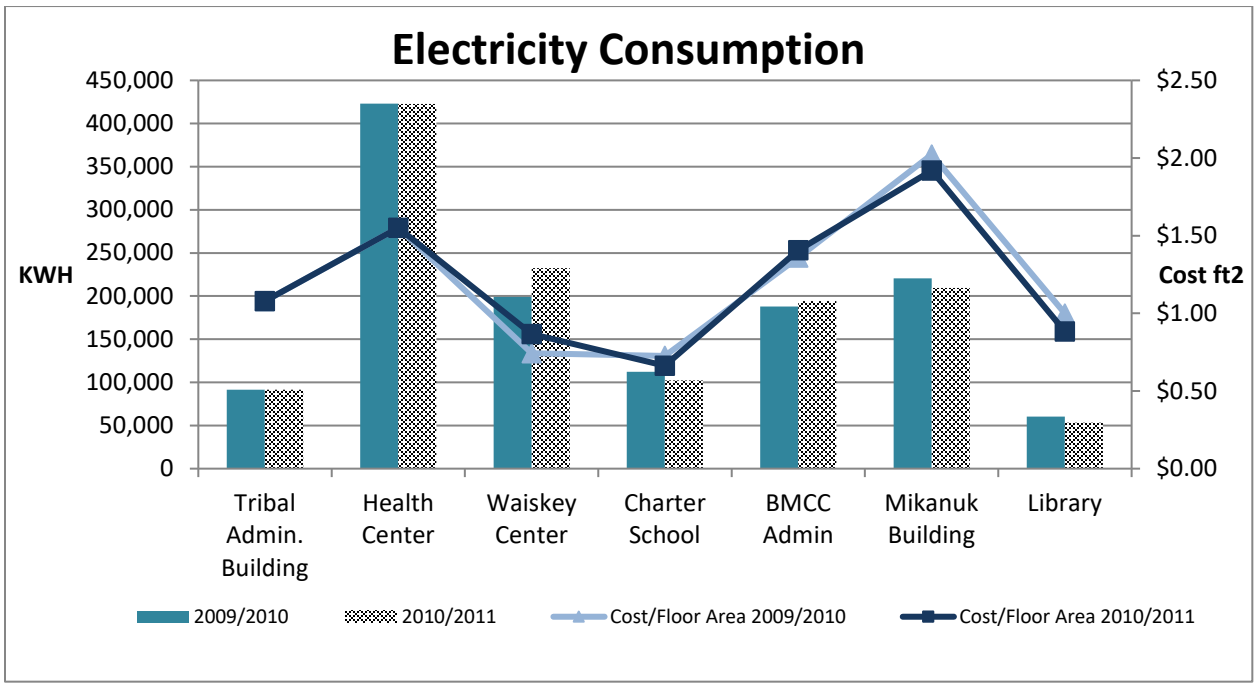


Figure 2.2.i.C: 2011 Electricity Consumption per Building

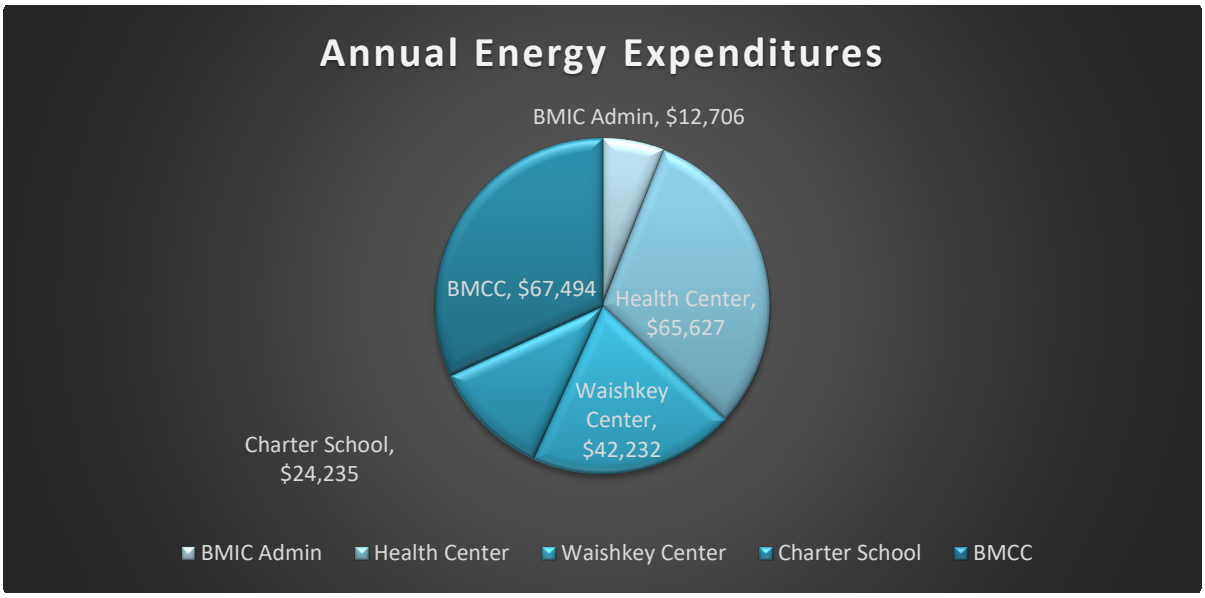


Figure 2.2.i.D: 2011 Annual Energy Expenditures per Building

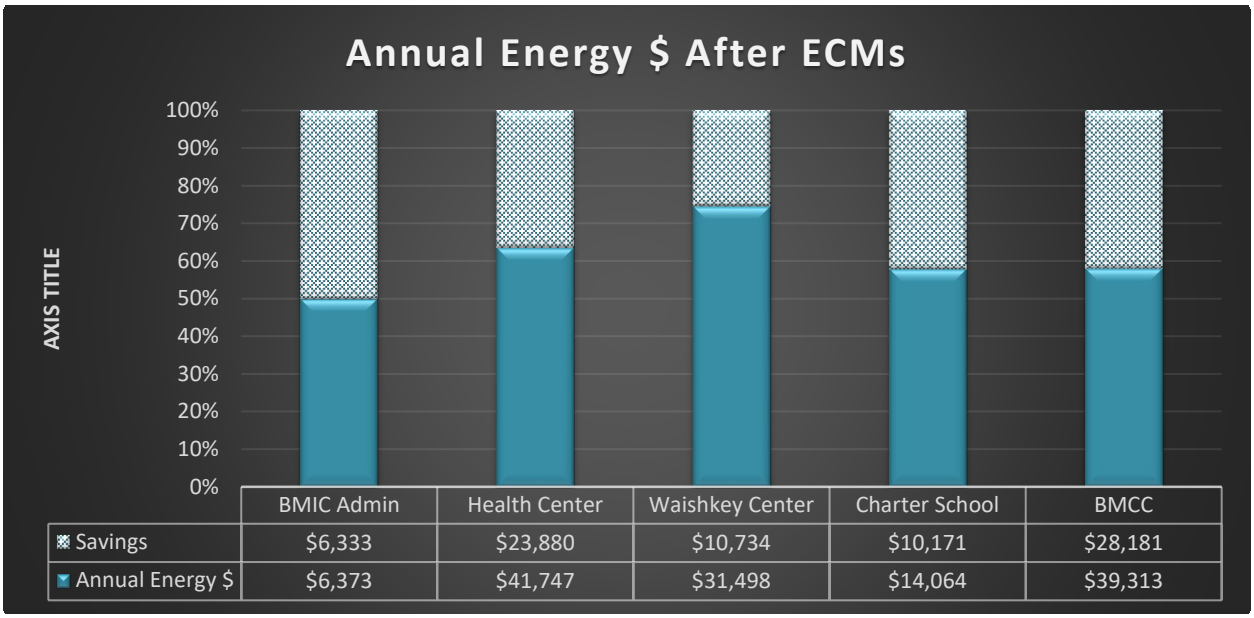


Figure 2.2.i.E: 2011 Annual Energy Savings after Energy Conservation Measures per Building

2.2.ii Energy Assessment Results of 2022

This assessment was performed for 26 total buildings. Due to this large number, results are grouped below by building type. Total building gas consumption, electrical consumption, combined energy costs and their relative square footage have been compared in the figures below.

Summary Results of Billing/ Use Assessment

Results in the graphs below reflect expected numbers. Numerous buildings are well-known to have high energy usage due to their building use, for example, BMRC. Others are known to have higher energy use and costs due to the age of the building and presumed poor insulation envelop. The graphs below also reflect anticipated energy use changes. For example, Kings Club casino (a combined energy bill with Tribal Admin) was open in 2019, but was closed in 2021; therefore the electrical use was significantly reduced. Other changes reflect building renovations such as new windows (AOT) or roofing (OCS). In a handful of cases, facility use increased in 2021 and as a result, energy use increased.

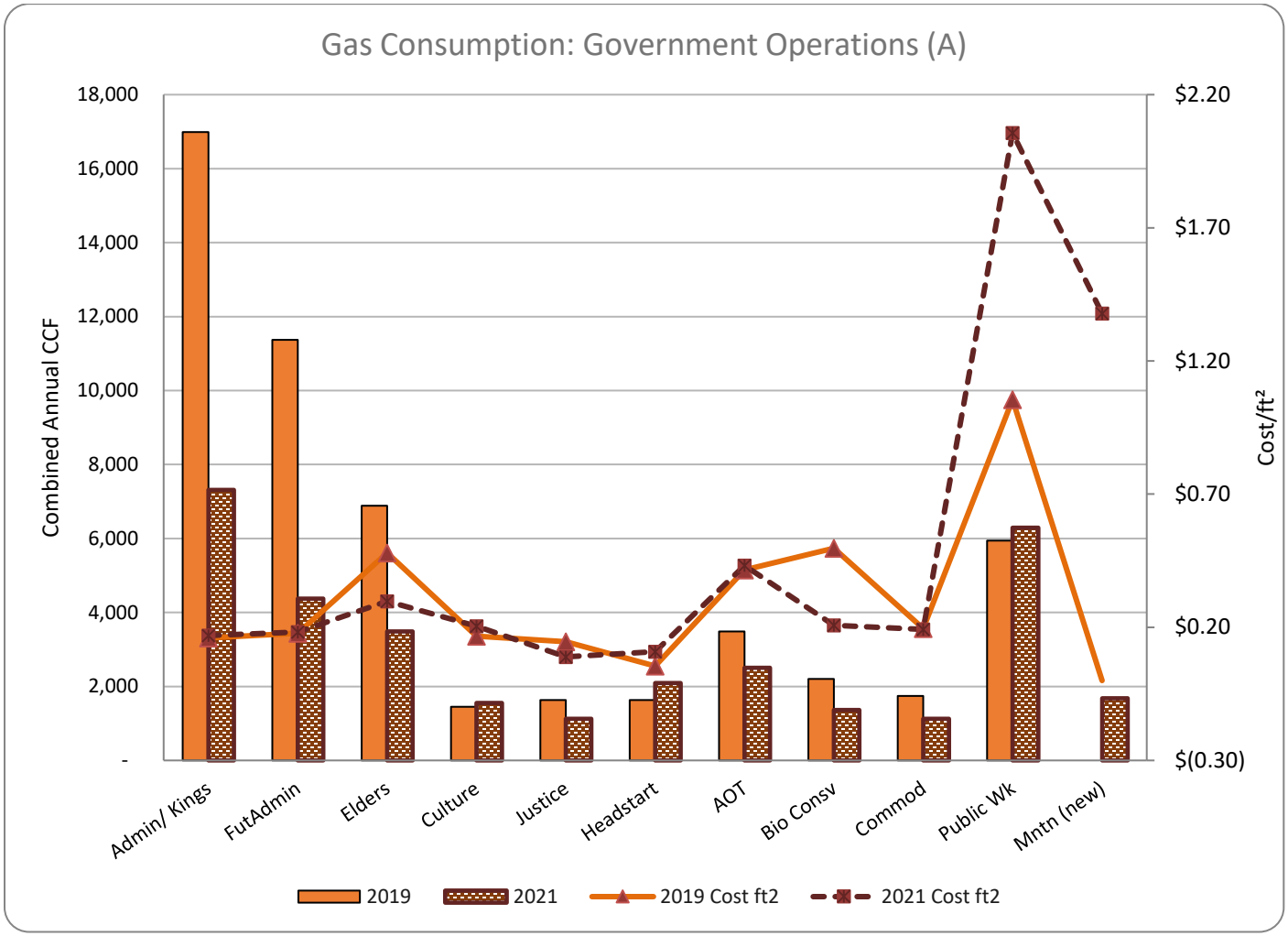


Figure 2.2.ii.A. 2022 Government Operations Gas Consumption (A).

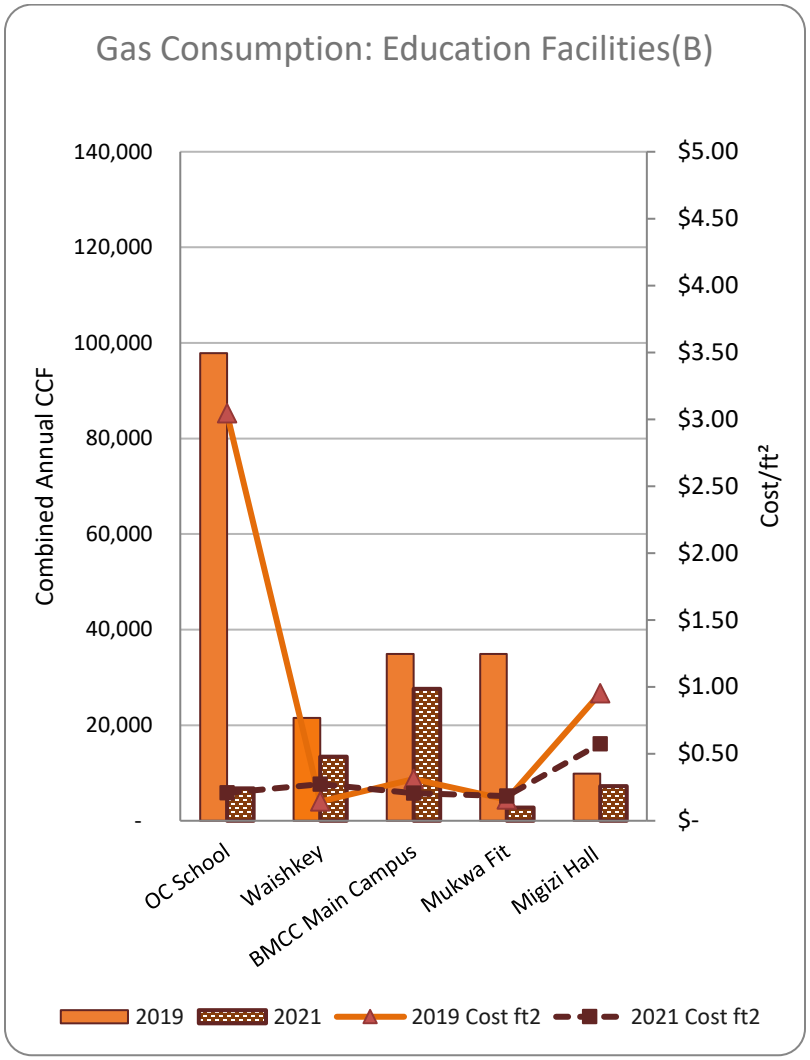


Figure 2.2.ii.B 2022 Educational Facilities Gas Consumption (B).

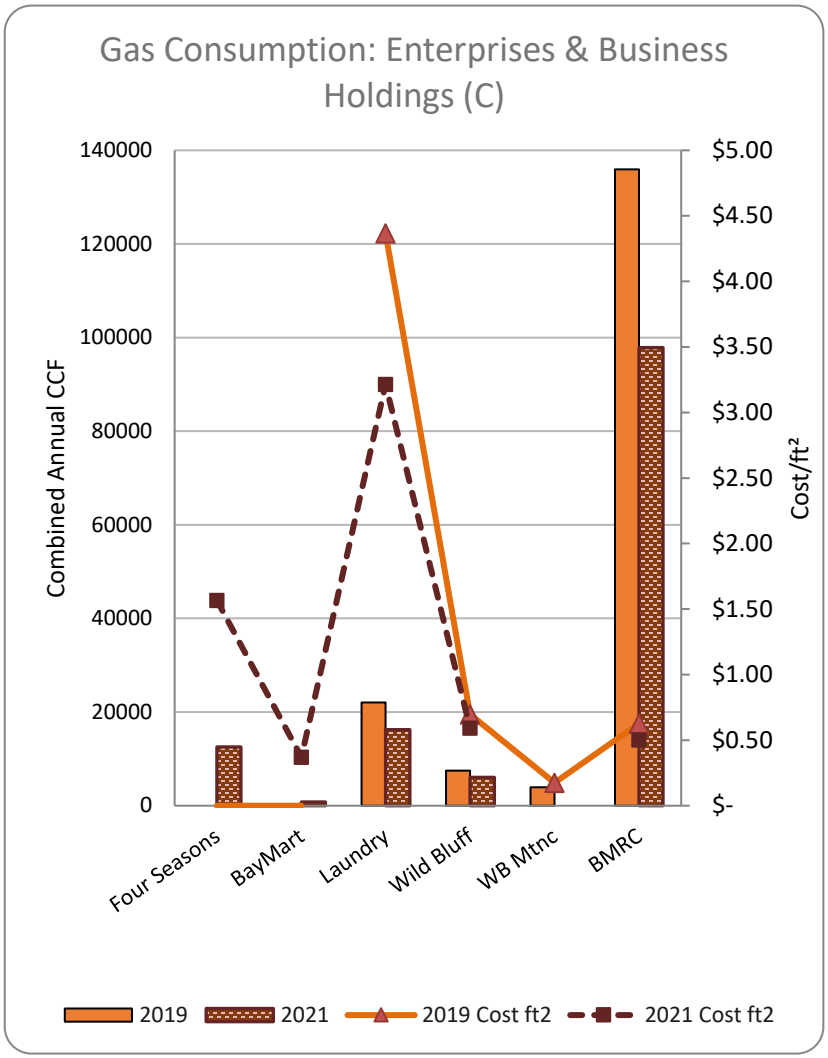


Figure 2.2.ii.C. 2022 Enterprises & Business Holdings Gas Consumption (C).

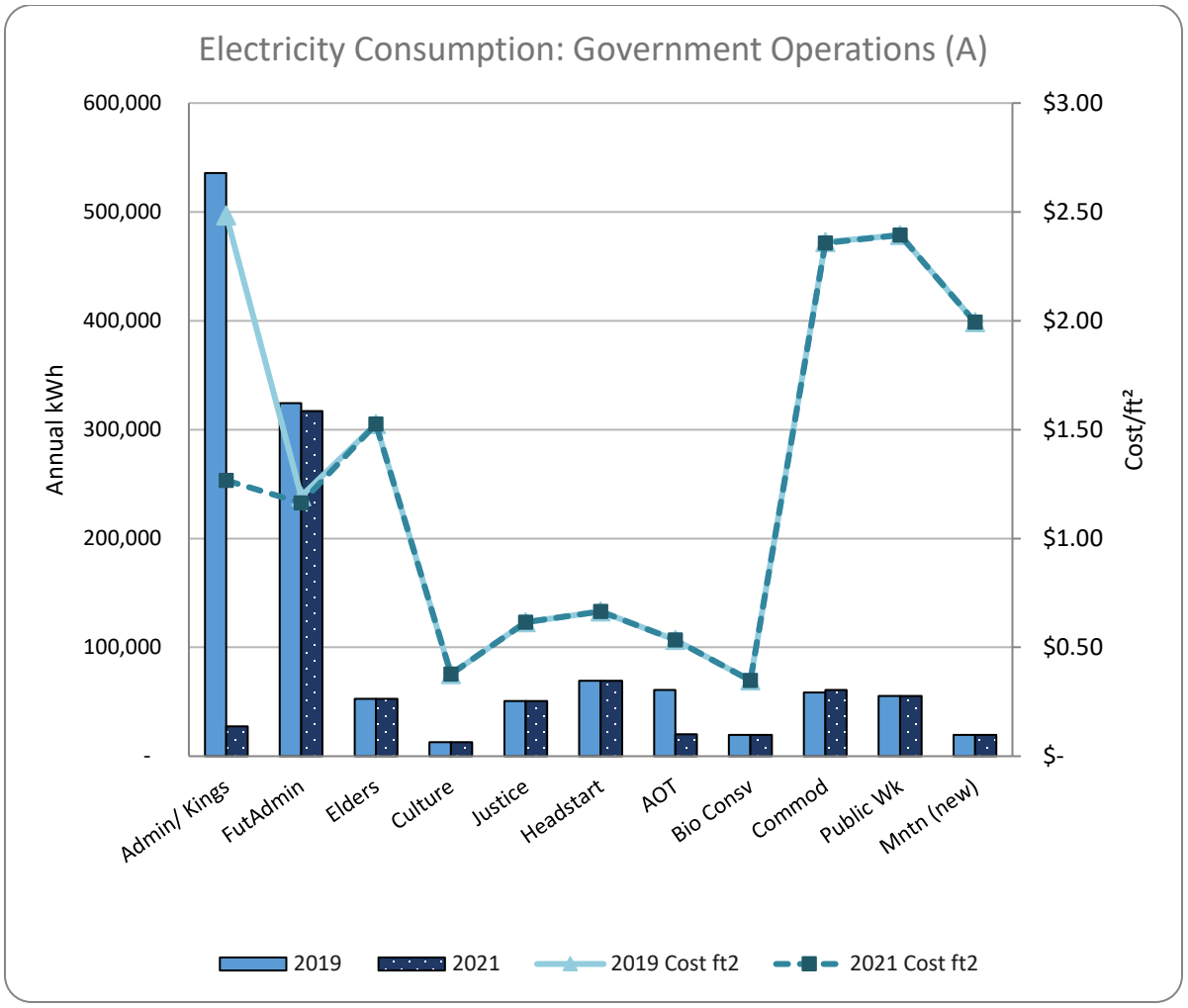


Figure 2.2.ii.D. 2022 Government Operations Electricity Consumption (A).

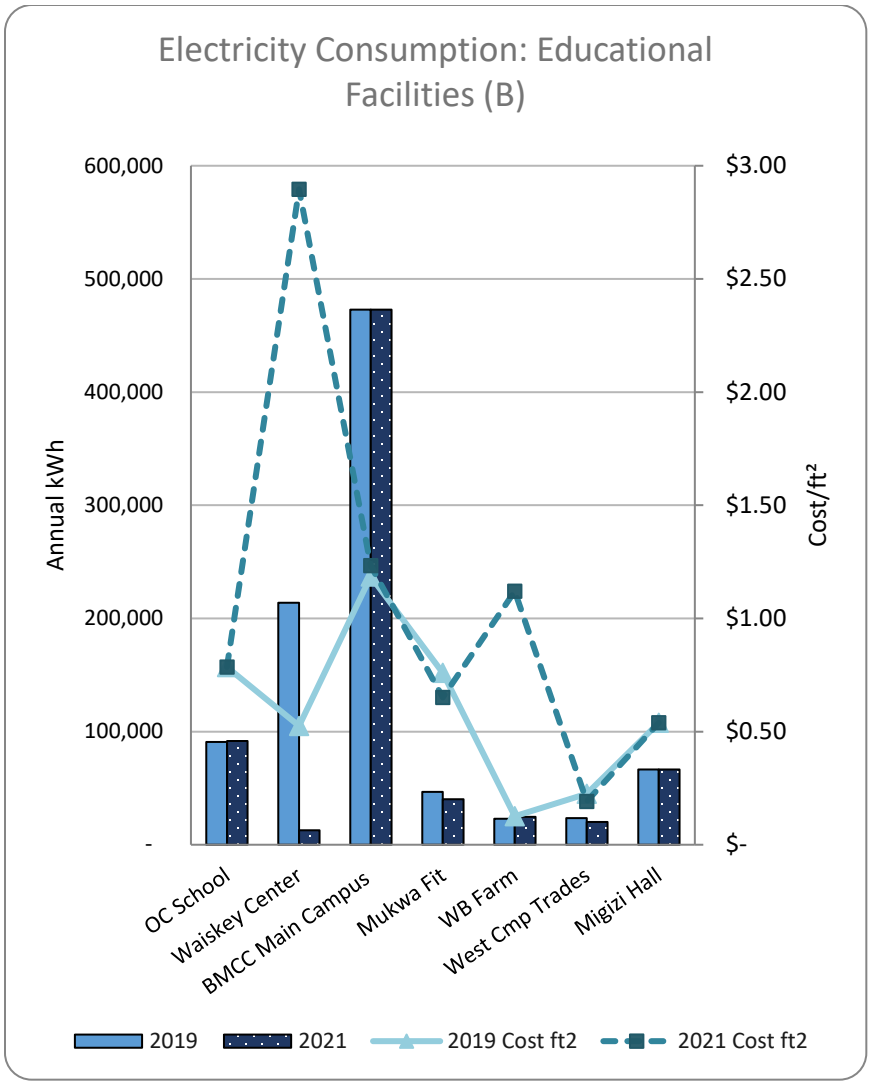


Figure 2.2.ii.E. 2022 Educational Facilities Electricity Consumption (B).

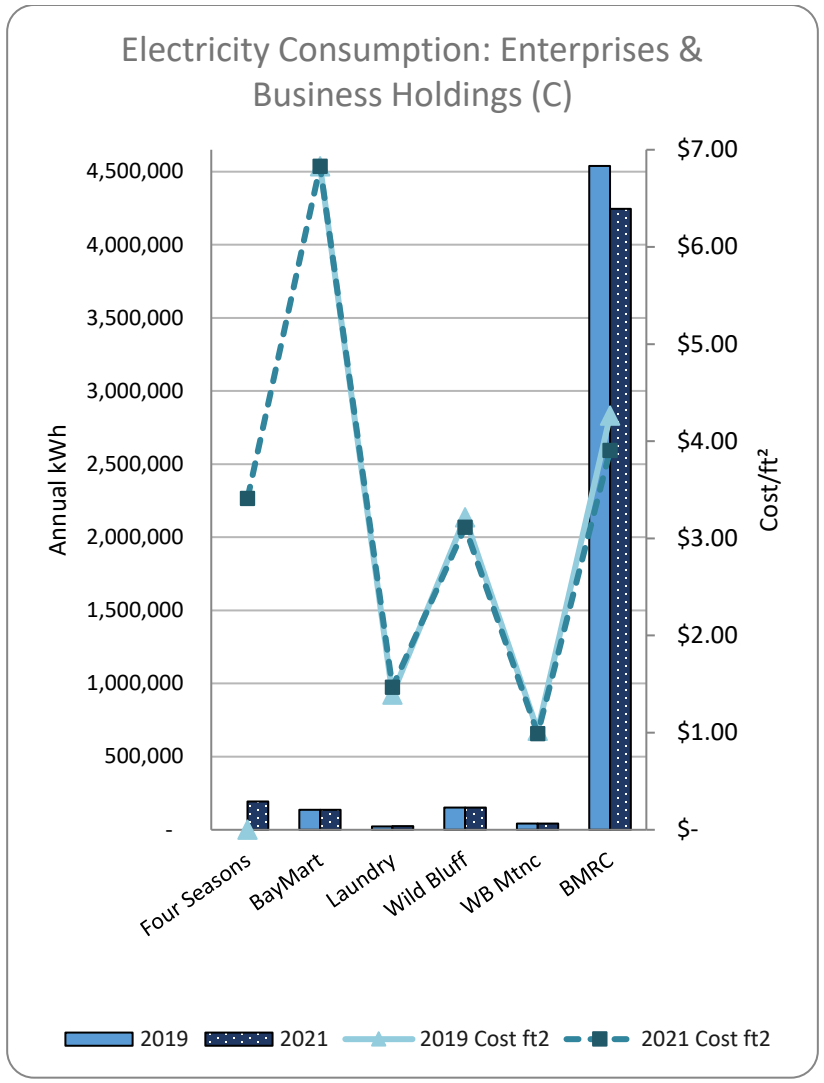


Figure 2.2.ii.F. 2022 Enterprises & Business Holdings Electricity Consumption (C).

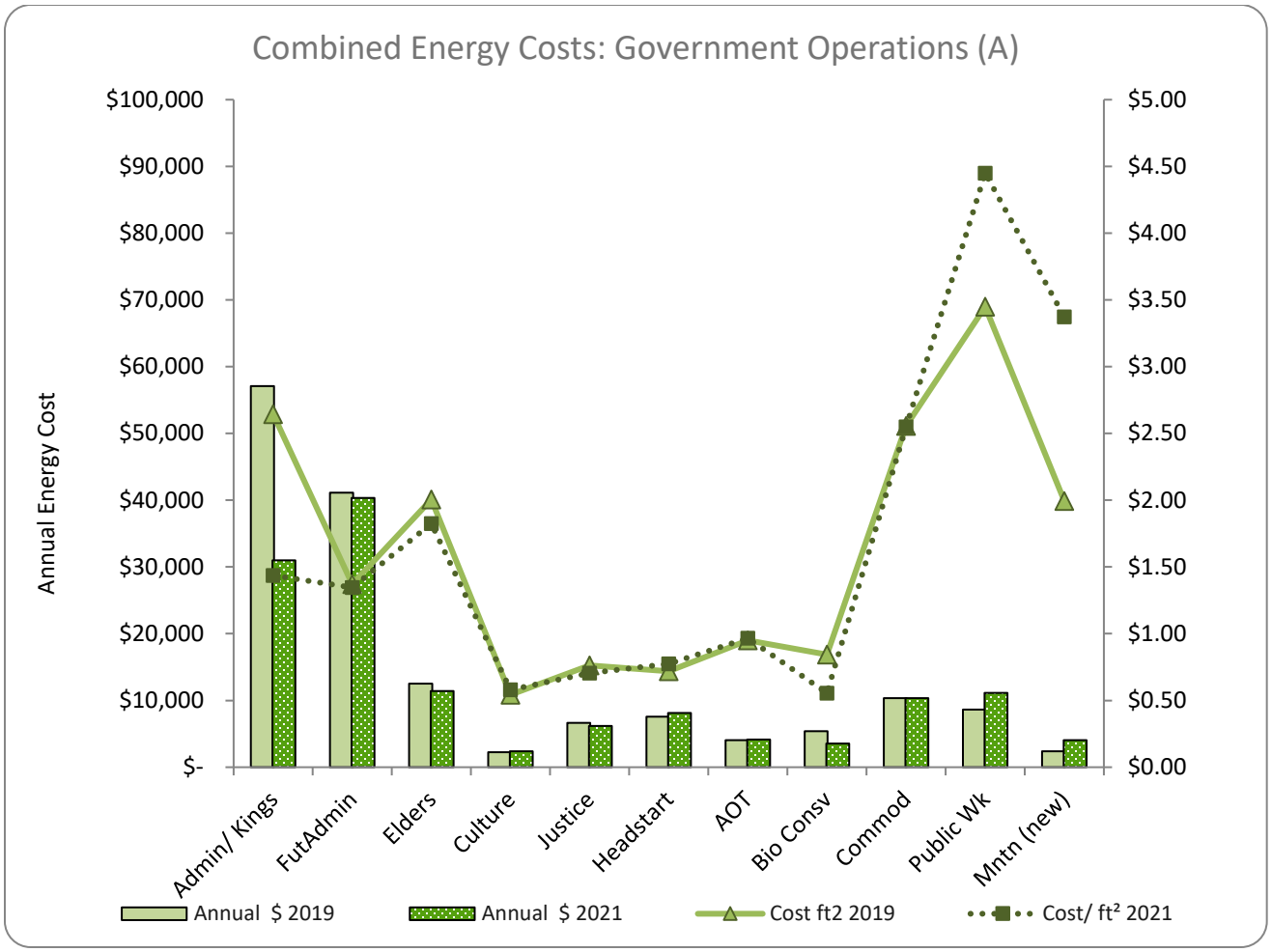


Figure 2.2.ii.G. 2022 Government Operations Individual Government Operations Energy Consumption (A).

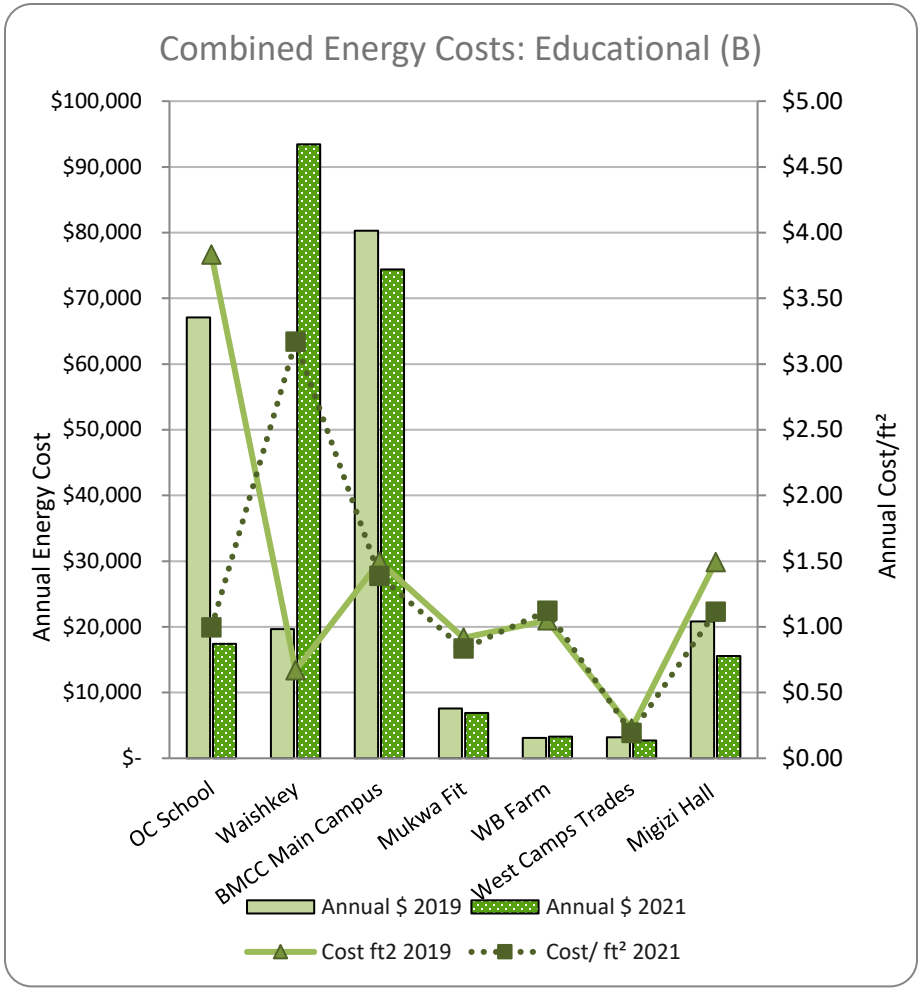


Figure 2.2.ii.H. 2022 Educational Facilities Individual Government Operations Energy Consumption (B).

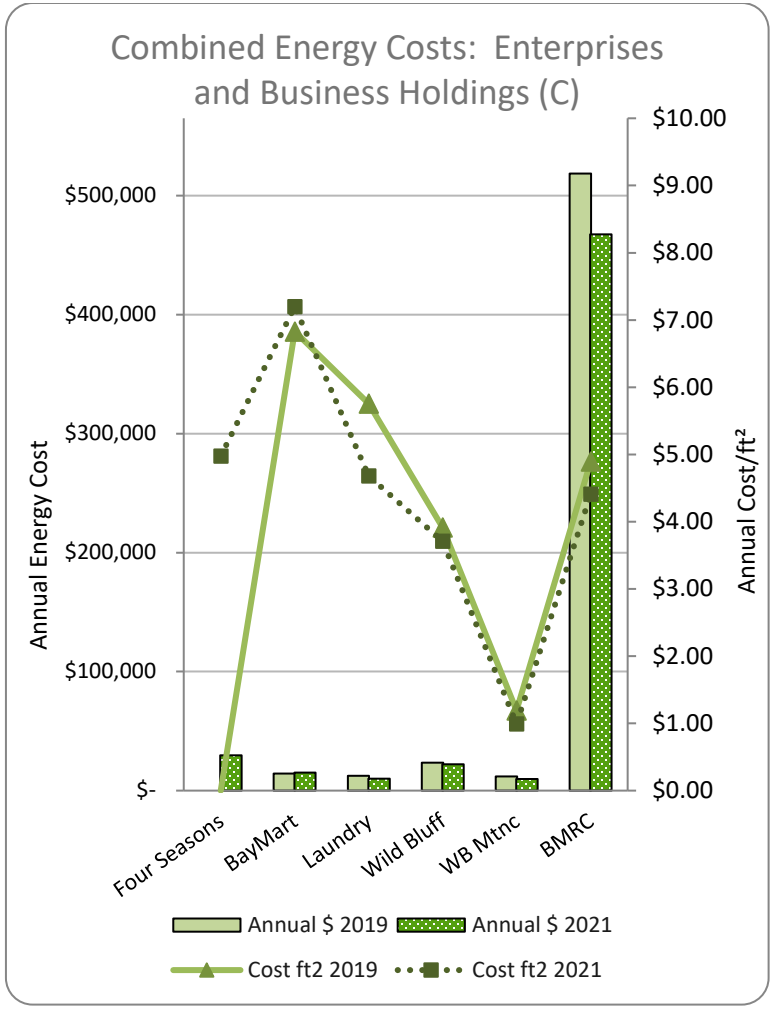


Figure 2.2.ii.I. 2022 Enterprises & Business Holdings Individual Government Operations Energy Consumption (C).

Summary Results of Energy Efficiency Assessment (by Superior Watershed Partnership)

All of the buildings audited utilize air conditioners, chillers, heat pumps, furnaces, and boilers for cooling and heating these properties. The efficiency and quality of technology used in newer available iterations of this equipment have improved dramatically over the past forty years. Most units currently in use at BMIC do not warrant replacement based on energy savings alone. However, the useful life of air conditioners is 12 to 15 years and over 20 for furnaces and boilers. Therefore, building managers should keep track of repair bills; once they become comparable to replacement rates, upgrading to the most efficient equipment available should be considered.

Many buildings are only occupied 40 to 50 hours per week. Programmable thermostats should be used to maintain lower temperatures during the unoccupied hours during the heating season. Air conditioners should be turned off. After a general upgrade to LED lighting, lighting fixtures should be linked to occupancy sensors to reduce waste. The new Ellen Marshall Medical Center does have a Building Management System which has the capability of saving energy through supply-demand alignment; this model should stand as an example to other buildings as they are upgraded.

Table 2.2.ii. Building with DOE Score and Potential Cost Savings

Building and Address	DOE Score	Potential Cost Savings
GOVERNMENT OPERATIONS		
Tribal Administration (12124 W. Lakeshore Dr)	10/10	1%
Biological Services/Conservation (11801 Plantation Rd)	9.0/10	11%
Public Works (5463 S Nbiish Rd)	6.5/10	2%
Advanced Office Technologies (12061 W. Lakeshore Dr)	10/10	14%
Boys & Girls Club/ Waishkey Center (11435 W. Lakeshore Dr)	7.5/10	4%
Tribal Justice Center (12449 W. Lakeshore Dr)	10/10	16%
Elder Center/ History (12485 W. Lakeshore Dr)	7.5/10	2%
Commodity Foods (12497 W. Lakeshore Dr)	8.0/10	1%
Housing Authority (3095 S. Towering Pines Rd)	8.0/5	11%
Culture Department (12498 W. Tower Rd)	10/10	12%
Maintenance Building (5414 S Nbiish Rd.)	0/0	5%
Ellen Marshall Health Center (12455 W. Lakeshore Dr)	9.0/10	1%
EDUCATIONAL FACILITIES		
Head Start Child Care Center (12471 W. Lakeshore Dr)	9.0/10	14%
Ojibwe Charter School (11507 W. Industrial Dr)	6.0/10	>50%
BMCC Migizi Hall (Fire Crew building) (1895 S Iroquois Row)	9.5.10	3%
Bay Mills Community College (12214 W. Lakeshore Dr.)	8.0/10	10%
Waishkey Bay Farm (10135 W. Mills Rd.)	5.0/10	10%
Mukwa Health/ Fitness Center (12400 W. Spectacle Lake Rd)	9.0/10	1%
ENTERPRISES		
Bay Mills Resort & Casino (11386 W. Lakeshore Dr)	9.0/10	11%
Wild Bluff Golf Course (11335 W. Lakeshore Dr)	10/10	14%
Bay Mart Gas Station (10001 W. Lakeshore Dr)	9.0/10	2%
Northern Light Cannabis Company (2736 M-28, Dafter)	9.5/10	2%
Four Seasons Market & Deli (9253 W. 6 Mile Rd)	10/10	13%

2.3 Recommendations of the Energy Assessment 2022

This energy efficiency audit elicited useful and actionable data for 23 BMIC-owned properties constructed between 1981 and 2022. While the body of this report contains building-specific assessments and recommendations, several emergent recommendations, which apply to all or most structures considered, are worth noting.

Recommendations from billing study:
The billing assessment showed that the Bay Mills Resort and Casino was by far the greatest energy user. Followed by the Waishkey Center, BMCC Main Campus, and OCS. However, when cost per square foot of building was analyzed Bay Mart, Bay Mills Laundry & Linen, and Four Seasons are the largest energy users. Of government operations Public Works, Commodity Foods, and Maintenance Departments were the highest energy users per square foot. Energy use total costs and cost per square foot was very high in OCS in 2019 but dropped dramatically in 2021 with the installation of the new roof. Additional assessments on insulation, appliance upgrades and other energy-reducing measures should be explored. However, some buildings will struggle due to their high energy consumption purely due to the nature of building use (for example, the Laundry will always, by its nature, be operating energy-intensive appliances.)

In general, a number of steps may be taken to reduce energy consumption. Additional assessment using more applicable methods could be done on the aforementioned buildings, prioritizing those with the highest usage/ square foot. Following the additional assessment, upgrades will be quantified. Upgrades will then be completed after being prioritized from most to least impactful or achievable. For some buildings, significant changes may not be realistic, such as those with larger work spaces that need to be heated/cooled to allow acceptable working conditions. For others, impactful changes may be as simple as adjusting the thermostat in areas with little use or improving insulation.

All of the buildings audited utilize air conditioners, chillers, heat pumps, furnaces, and/or boilers for cooling and heating these properties. The efficiency and quality of technology used in newer available iterations of this equipment have improved dramatically over the past forty years. Prior to 2000, the SEER (Season Energy Efficiency Ratio) rating for air conditioners and heat pumps when cooling was 10; in 2015, it increased to 14, a 40% increase in efficiency. Now, there are units available with a SEER as high as 22. HSPF (Heating Seasonal Performance Factor) is used to rate heat pumps during the heating season. Before 2000, the standard was 6.7. It was raised to eight in 2015. High-end units are now available with an HSPF of 13, almost double the old standard. Similarly, furnace and boiler efficiency standards have gone from 81% to 91%. There are many models available with 95+ % efficiency. Most units currently in use at BMIC do not warrant replacement based on energy savings alone. However, the useful life of air conditioners is 12 to 15 years and over 20 for furnaces and boilers. Therefore, building managers should keep track of repair bills; once they become comparable to replacement rates, upgrading to the most efficient equipment available should be considered.

Many buildings are only occupied 40 to 50 hours per week. Programmable thermostats should be used to maintain lower temperatures during the unoccupied hours during the heating season. Air conditioners should be turned off. After a general upgrade to LED lighting, lighting fixtures should be linked to occupancy sensors to reduce waste. The new Ellen Marshall Medical Center does have a Building Management System which has the capability of saving energy through supply-demand alignment; this model should stand as an example to other buildings as they are upgraded.

Building by building recommendations for each building are described in Appendix B.

Table 2.3. Upgrades Recommended in SWP Report

Recommended Upgrades to Make Now	**Recommended Upgrades to Make as Existing Appliances Fail**
Transition to LED lighting	Replace AC units and chillers
Install occupancy sensors for light fixtures	Replace heat pumps, furnaces, and boilers
Programmable thermostats programmed for business hours	
Improvements to building envelope (insulation)	

Chapter 3.0 Waste Assessment

3.1 Description of Current Waste Management Practices

Solid waste and recycling is managed in varied ways depending on the facility. BMIC Maintenance Department operates a waste transfer station which serves numerous government operations buildings as well as residents in the community. A complete description of these operations is available in the BMIC Solid Waste Management Plan (2022 BMIC).

- Solid Waste: The solid waste program in place consists of a manned transfer and compacting station located at the Maintenance grounds. This transfer station is manned 8 hours a day from Tuesday to Saturday. Maintenance staff performs curbside pickup at 8 locations including BMIC Administration offices and buildings. For all other residents, waste is disposed of using the "dollar a bag" policy. Once waste is collected at the transfer station and compacted, it is collected by GFL Environmental and taken to the Dafter Landfill.
- General Recycling: There is currently stationed at the BMIC Maintenance Transfer Station a self-sort recycling trailer. Residents can self-sort plastic, metal, glass and paper at this unit. Recycled materials are taken to Chippewa County Recycling in Sault Ste. Marie and recycled at no cost to the BMIC. There exists a second recycling trailer that is rotated into place while the first is being taken into Sault Ste. Marie to be emptied or undergoing maintenance.
- Cardboard Recycling: Starting in 2017 the BMIC initiated a corrugated cardboard recycling program. The maintenance department acquired a bailer and procured some space on the south end of the maintenance building for storage. The cardboard is bailed and stacked then ultimately loaded into a semi for transportation to a paper mill in Manistique. The frequency of pickup of this cardboard is variable and determined by several factors including how much storage room is present, weather conditions for storage, and pickup availability. This endeavor has and will continue to eliminate cardboard from entering into the waste stream.
- Electronic Waste: Electronic waste is collected throughout the year. This is a free service to Tribal Members. Other community members are encouraged to provide a donation at the time of drop off of their e-waste. This collection program is supported by the Michigan Department of Environmental, Great Lakes and Energy (EGLE). Through this program, BMIC is provided boxes and pallets for collection, shipping services and recycling of most materials free of charge. Disposal of some miscellaneous items do include a charge. The donation request is to cover the expense of disposal of these items.
- Special Collections: Currently there are several special collection events that happen at the BMIC on a recurring basis. There is a spring and fall cleanup available for residents where they can dispose of large or bulky items at no cost to themselves. These are large events which are widely participated in. Additionally, there is a regular Household Hazardous Waste collection event which is held in the spring and fall each year where residents can, at no charge, drop off these materials to the BMIC Biological staff for appropriate disposal. Drop-off for the recycling of tires is available to residents from spring to October 15 at the Maintenance Building.

Waste Generators

The following tribal buildings and residential areas have been identified as the main "waste generators" at BMIC. These generators utilize 13 waste disposal containers, including 4, 6, and 8 yard dumpsters, as well as 2 trash compactors and a cardboard recycling compactor. As mentioned in section 3.1 many of these generators are responsible for their own waste collection and do not currently utilize the facilities at the BMIC Waste Transfer Station.

Table 3.1.i. Waste Generator Locations and Fate of Waste Generated

BMIC GOVERNMENT OPERATIONS	
Advanced Office Technologies (AOT)	Maintenance Transfer Station Compactor
Maintenance Department	Maintenance Transfer Station Compactor
Ellen Marshall Health Center	Maintenance Transfer Station Compactor
Tribal Administration Building	Maintenance Transfer Station Compactor
Commodities Distribution Building	Maintenance Transfer Station Compactor
Elders Center/ History Dept	Maintenance Transfer Station Compactor
Head Start/ Child Development Center	GFL pickup
Cultural Center	GFL pickup
Emergency Medical Connection	GFL pickup
Housing Authority	GFL pickup
Public Works/Construction	GFL pickup
EDUCATION FACILITIES	
Bay Mills Community College (collectively)	GFL pickup
Ojibway Charter School	GFL pickup
Waishkey Center	Maintenance Transfer Station Compactor
ENTERPRISES & BUSINESS HOLDINGS	
Bay Mart Store	GFL pickup, Cardboard to Maintenance Transfer Station
Bay Mills Resort and Casino	BMRC Compactor, Cardboard to Maintenance Transfer Station
Laundry and Linen	BMRC Pickup
Wild Bluff Golf Course	GFL pickup
OTHER	
Residential Curbside Pickup	GFL pickup

The dumpsters and compactors are emptied by GFL Inc., (SS), on either a weekly or bi-weekly basis. Each container, after a conducting walk through examinations, averaged 70% capacities prior to pick up.

3.2 Waste Assessment Results

Below are figures showing a yearly total of the amount of waste generated by the key generators on the BMIC; those being the Bay Mills Resort and Casino Enterprises (BMRC) and the Municipal Waste Transfer Station located at the Bay Mills Maintenance Department. The records here comprise a 12 month period from December 2018 to December 2019.

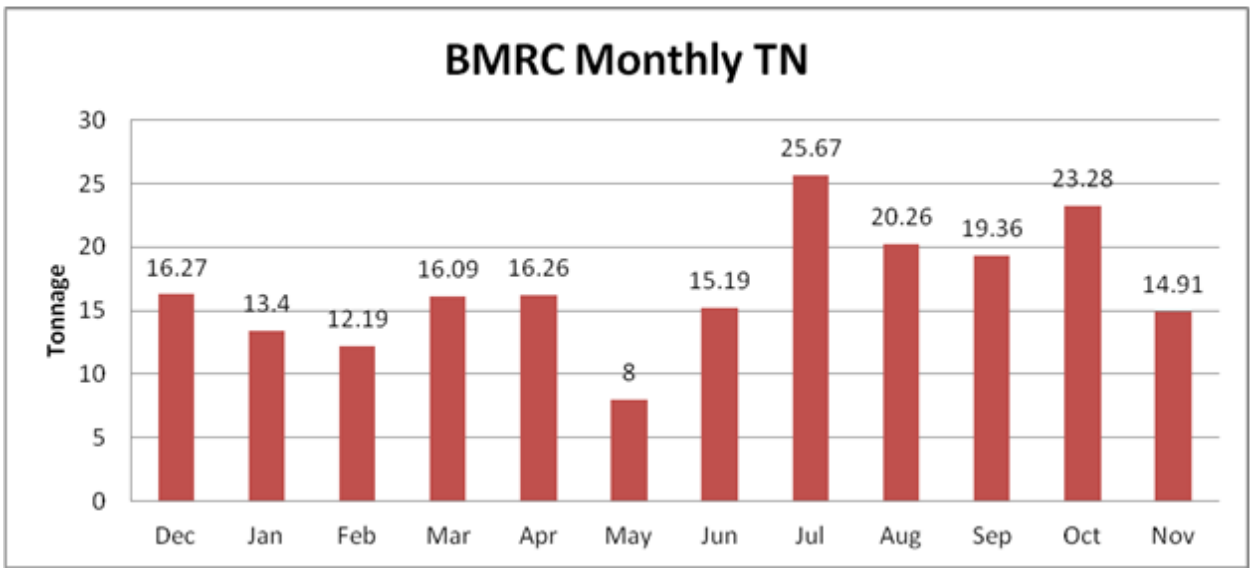


Figure 3.2.i.A: Bay Mills Resort and Casino Monthly Tonnages of Waste

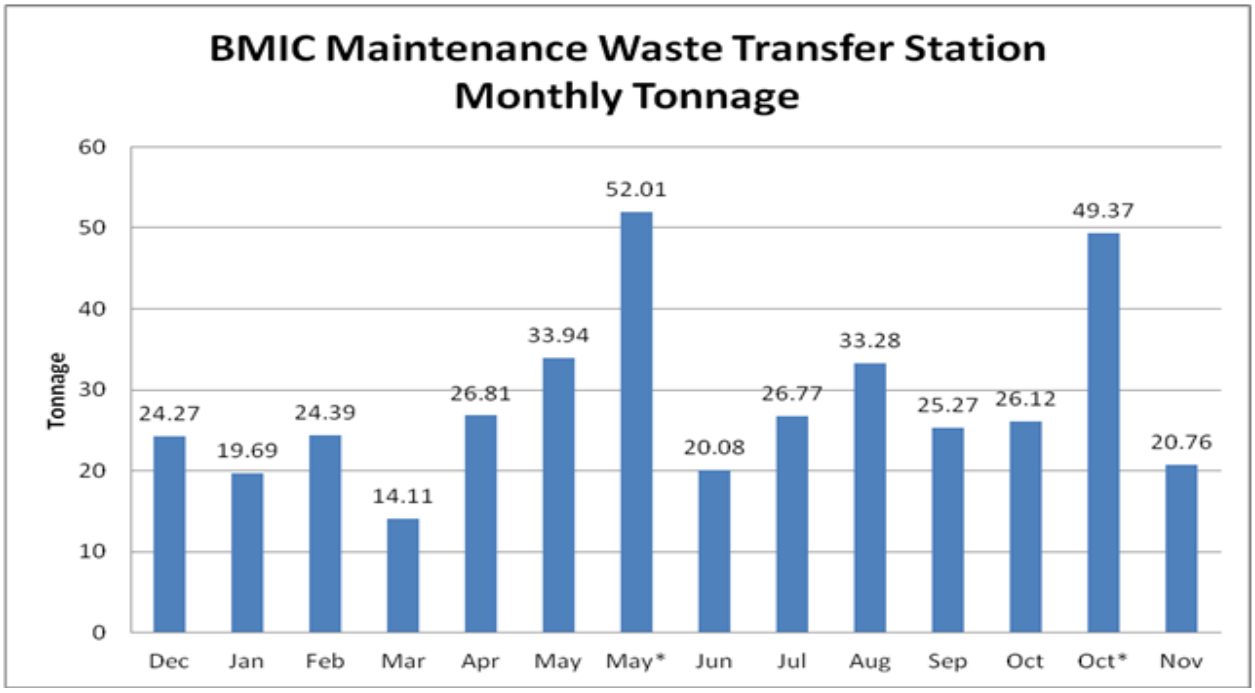


Figure 3.2.i.B: Monthly Tonnage of waste disposed of (* denotes a special cleanup event)

3.3 Waste Characterization Study of 2020—Community

In September of 2020 a waste audit was conducted with waste from the BMIC Maintenance Waste Transfer Station. The waste audit performed was intended to characterize the amount of waste being disposed of at the facility, and to determine if, and to what extent, recycling and other waste sorting practices were being utilized by BMIC residents.

There were plans to conduct a waste audit for the casino waste streams in order to determine if BMIC enterprises could be better incorporated into recycling efforts on the reservation. Due to complications from Covid-19 pandemic and how the casino tourism was affects by this event it was deemed that data collected from enterprise sources would not be representative of a typical season's business.

It should also be noted that the sort took place during the Covid-19 pandemic; it was determined that since the bulk of waste is from private residences, that the waste stream obtained from the Maintenance Waste Transfer station would be representative of typical use.

Waste was collected in a 16ft enclosed trailer for the week leading up to the sort. In all a total of 9 volunteers composed of BMIC, ITCMI, and EPA staff were able to sort through a total of 677 lbs of waste over the course of an 8 hour day. The waste was sorted into 26 categories. These categories were chosen to determine what waste could potential be removed from the waste stream and recycled with increased infrastructure, outreach, and/or education. The categories that were used as part of the study were chosen to identify recycling facilities that could be immediately available to the BMIC through outside contracts and to determine what types of alternative waste disposal could be feasible for the BMIC to implement directly.

Figures 3.3.i and 3.3.ii Staff sorting waste at 2020 characterization survey.

BMIC Waste Audit Results 2020

Results of characterization are listed below. Many pounds of recyclable items were found in the garbage. When these percentages are extrapolated across the costs of a year, the costs of recyclable items being sent to landfill is in the tens of thousands. If BMIC recycled all materials that are accepted throughout the local area (at the BMIC WTS and Chippewa County Recycling Center), approximately $24,000 could be saved per year in disposal costs. Additional money could be saved if recycling efforts were made during clean-up weeks as well.

- Other waste/ true garbage: Other waste comprised approximately 15% of the total waste at BMIC. This included items that could not be diverted from a landfill. Examples include diapers, trash bags, and other non-recyclable or non-compostable materials.
- Paper: The paper stream was almost completely free of corrugated cardboard. Newsprint/paper and recyclable paper/craft/paperboard was approximately 50lbs and 7.5% of the total waste stream. Non-recyclable paper was represented by plastic coated paper, mostly in the form of packaging of food/medicines. Even with these non-recyclable paper products over 50% of the total 97lbs of paper waste is considered to be recyclable.
- Plastic Waste: While plastics made up 19% of the total waste in the study there was a minimal amount of recyclable materials found. Only approximately 2% each of total waste was easily recyclable plastic (HDPE, PET, and #3-7 plastics). Most of the plastic in the general waste stream (54 of a total of 127lbs of plastic) was attributed to film and flexible packaging, which is not generally considered recyclable with typical facilities. Most of the EPS foam identified in the waste stream is attributed to foam food service containers which were identified to be from home meal delivery to school age children and elders during the Covid-19 pandemic; thus, this amount of EPS foam in the waste stream is not considered typical. Due to a lack of PET, HDPE and other plastic containers in the waste stream it seems that the recycling efforts at the BMIC are being utilized effectively by residents.
- Organic waste: As is shown in the totals from the waste audit conducted the largest category of waste that was represented was organic waste. At ~33% of the total waste stream the vast majority of waste is organic in nature. Two thirds of the organic waste are food scraps while approximately one third of all organic waste is compostable fibers (napkins, paper towels, etc.). While much of the organic waste was not of a composition that could be recycled by conventional means there was a large amount of food waste that could be reused through the use of a digester. There were many materials, such as paper-based materials, and coffee grounds that, if separated from the main waste stream, could potentially be part of a community recycling program.

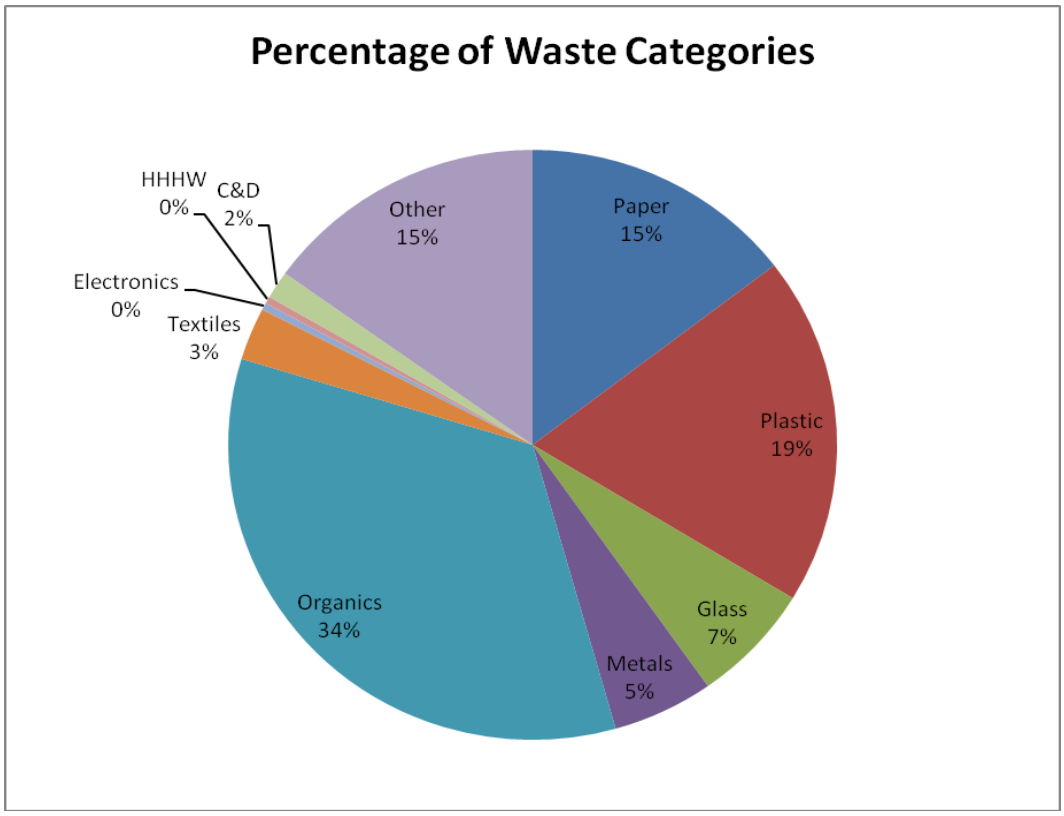


Figure 3.3.iii: 2020 BMIC Community Percentage of Major Waste Categories.

Table 3.3.i 2022 BMIC Waste Audit Totals

Waste Category	Percentage	Annual Cost
Other/ true garbage	15%	$ 5,625.00
Paper	15%	$ 5,625.00
Plastic	19%	$ 7,125.00
Glass	7%	$ 2,625.00
Organics	34%	$ 12,750.00
Metals	5%	$ 1,875.00
Textiles	3%	$ 1,125.00
HHW	0%	$ -
Construction	2%	$ 750.00
	Annual Garbage Tipping Fee	= $37,500.00

Table 3.3.ii 2022 BMIC Waste Audit Totals (detailed)

BMIC Maintenace Transfer Station Waste Audit
14 September 2020

Audit Locaiton and Date: Waishkey Bay Farm, 14 Sep 2020
Individuals in attendance: Anthony Rinna and Greg Schubel (ITCMI), Aubrey Maccoux-LeDuc, Angela Johnston, Britney Weaver, Ryan Sprague, Shannon Russel, Brian Wesolek (BMIC), Jennifer Manville (EPA)

Category	Material	Final Weight (lbs.)	Percent
Paper	Old Corrugated Cardboard (OCC)	4.1	0.61
	Old Newsprint (ONP), Paper, Magazines	25.6	3.78
	Other Mixed Recyclable Paper/Kraft/Paperboard	26.6	3.93
	Non-recyclable Paper Products	41.1	6.07
Plastic	PET Bottles and Containers	21.1	3.11
	HDPE (#2)	17.6	2.60
	Mixed Bottles/Containers (#3-#7)	13.1	1.93
	EPS Foam (#6)	11.1	1.64
	Film & Flexible Packaging	54.1	7.99
	Rigid Bulky	10.6	1.56
Glass	Recyclable Glass	36.1	5.33
	Non-Recyclable Glass	7.6	1.12
Metals	Ferrous Metal Containers	21.1	3.11
	Aluminum Cans (UBC)	6.1	0.90
	Other Metals/Scrap Metals	8.6	1.27
Organics	Food/Putrescible Waste	152.6	22.53
	Compostable Fibers (Napkins, Papertowels, Etc.)	73.6	10.87
	Other Organics	1.6	0.24
Textiles	Textiles	12.6	1.86
	Leather & Rubber	6.6	0.97
Electronics	All Electronics	2.6	0.38
HHHW	Household Hazardous Waste	2.6	0.38
C&D	C&D	10.1	1.49
Other	Fines/.Residual Refuse	101	14.91
	Other Bulky	N/A	N/A
	Composite Items	9.6	1.42
Total		677.4	100.00

3.4 Waste Characterization Study of 2022—BMRC

In June 2022 a waste audit was conducted with waste from the Bay Mills Resort and Casino (BMRC). The waste audit was intended to characterize the amount of waste being disposed of by the hotel, casino, kitchen/restaurants and offices at BMRC and to determine if, and to what extent, recycling and other waste sorting practices were being utilized by BMRC.

Garbage waste was collected in a 16ft enclosed trailer during the weekend leading up to the sort. Items already intended for recycling and/or bottle return were not included in this characterization. BMRC was at approximately 50% capacity during the weekend that the waste was collected for the audit. In all, a total of 9 volunteers comprised of BMIC staff and the Great Lakes Climate Corps members were able to sort through a total of 976.5 lbs of waste over the course of 6 hours. The waste was sorted into 26 categories. These categories were used to determine which waste streams could be diverted through increased recycling infrastructure, outreach, and education. These also help identify recycling facilities that could be immediately available to BMRC through outside contracts and to determine what types of alternative waste disposal could be feasible for the BMRC to implement directly.

BMRC Waste Audit Results 2022

Results of characterization are listed below. Many pounds of recyclable items were found in the garbage. When these percentages are extrapolated across the costs of a year, the costs of recyclable items being sent to landfill is in the tens of thousands. If BMRC recycled all materials that are accepted throughout the local area (at the BMIC WTS and Chippewa County Recycling Center), approximately $23,000 could be saved per year in disposal costs.

Other waste/ true garbage: Other waste comprised approximately 20% of the total waste at BMRC. This included items that could not be diverted from a landfill. Examples include diapers, trash bags, and other non-recyclable or non-compostable materials.

- Organic waste: As shown in the totals from the waste audit conducted at BMRC, the largest category of waste that was represented was organic at approximately 31% of the total waste stream. Approximately one half of the organic waste was food scraps while the other half was compostable fibers, mainly brown paper towels from the public restrooms. While much of the organic waste was not of a composition that could be recycled by conventional means there was a large amount of organic waste that could be diverted from the landfill through the use of a digester.
- Plastic Waste: Plastics made up 18% of the total waste in the study. The majority of plastics included materials that could be recycled at the Chippewa County Recycling Facility such as Plastics # 2-7 and PET. PET was mainly clear plastic bottles including water bottles. Much of the plastic by volume included film and flexible packaging, which is not generally considered recyclable with typical facilities. Most of the EPS foam identified in the waste stream was attributed to foam food service to-go containers.

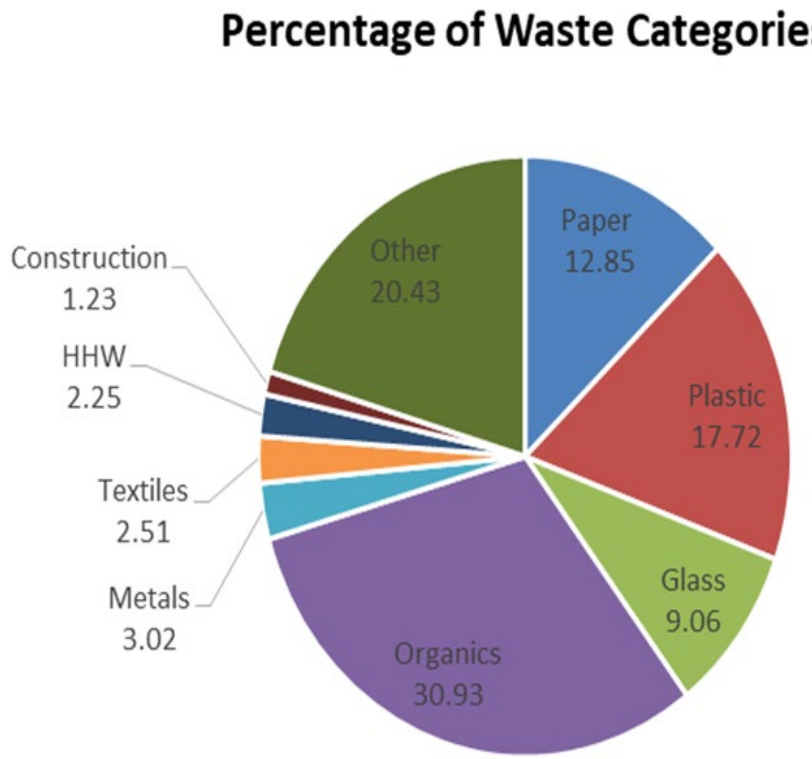


Figure 3.4.i 2022 BMRC Percentage of Major Waste Categories.

Table 3.4.i 2022 BMRC Waste Audit Totals

Waste Category	Percentage	Annual Cost
Other/ true garbage	20.43%	$ 6,741.90
Paper	12.85%	$ 4,240.50
Plastic	17.72%	$ 5,847.60
Glass	9.06%	$ 2,989.80
Organics	30.93%	$ 10,206.90
Metals	3.02%	$ 996.60
Textiles	2.51%	$ 828.30
HHW	2.25%	$ 742.50
Construction	1.23%	$ 405.90
	Annual Garbage Tipping Fee	= $33,000.00

Table 3.4.ii 2022 BMRC Waste Audit Totals (detailed)

BMRC Waste Audit June 20-21, 2022			
Audit Location and Date: Farmer's Market Pavilian June 20-21, 2022 Individuals in attendance: GLCC Crew: Luke, Ari, Kyle, Neveya; BMIC Technicians: James, Kyle, Charlotte, Cameron; BMIC Environmental Coordinator: Jen Parks			
Category	Material	**Final Weight**	**Percent**
Paper	Old Corrugated Cardboard (OCC)	10	1.02%
	Old Newsprint (ONP), Paper, Magazines	31	3.17%
	Other Mixed Recyclable Paper/Kraft/Paperboard	57	5.84%
	Non-recyclable Paper Products (greasy food containers)	27.5	2.82%
Plastic	PET Bottles and Containers (clear bottles/water bottles)	83.5	8.55%
	HDPE (#2)	11	1.13%
	Mixed Bottles/Containers (#3-#7)	41.5	4.25%
	EPS Foam (#6)	4.5	0.46%
	Film & Flexible Packaging (plastic wrap, food packaging)	32	3.28%
	Non-Recyclable Rigid Plastic/Mixed Rigid Bulky	0.5	0.05%
Glass	Recyclable Glass	88.5	9.06%
	Non-Recyclable Glass	0	0.00%
Metals	Ferrous Metal Containers (tin food cans)	2	0.20%
	Aluminum Cans (UBC)	24	2.46%
	Other Metals/Scrap Metals	3.5	0.36%
Organics	Food/Putrescible Waste	163.5	16.74%
	towels from restrooms)	120.5	12.34%
	Other Organics (coffee grounds)	18	1.84%
Textiles	Textiles	24.5	2.51%
	Leather & Rubber	0	0.00%
HHW	Household Hazardous Waste	22	2.25%
Electronics	All Electronics	0	0.00%
C&D	Construction & Demolition	12	1.23%
Other	Fines/Residual Refuse	199.5	20.43%
	Other Bulky	0	0
	Composite Items	0	0
Total		976.5	100.00%

3.5 Single-Use Item Survey

3.5.i Single-Use Item Survey Methods

In a survey separate, but similar to the waste characterization studies, an assessment of single-use items was made for each building. Due to the waste management method for each facility, these items may not have been captured in the characterization studies. Examples of single-use items range from napkins to small shampoo bottles to plastic to-go forks and many others. For each facility, the top ten items were listed. In specialized facilities, such as the Health Center, the survey was restricted to employee break room areas so medical supplies were excluded.

3.5.ii Single-Use Item Survey Results

The top ten single-use items listed by departments include: toilet paper, trash can bags, bathroom hand paper towels (brown, interfolding), kitchen paper towels (white, roll), facial tissue, food prep gloves, paper/plastic plates/bowls/cups, sanitizing wipes, plastic tableware and Ziplock-type bags. See Table 3.5.ii below for a complete list.

Table: 3.5.ii Single-Use Item Use per Building

Single-Use Item Consumption																				
Location	**Toilet Paper**	**Trash Can Bags**	**Bathroom Hand Paper Towels**	**Kitchen Paper Towels**	**Facial Tissue**	**Food Prep Gloves**	**Paper Plates/ Bowls/ Cups**	**Sanitizing Wipes**	**Plastic Tableware**	**Ziplock Bags**	**Hand Sanitizer - single use bottle**	**Napkins**	**Plastic Wrap**	**Bottled Water**	**Tin Foil**	**Hand soap - single use bottle**	**K-cups/Single Use Coffee**	**To Go Boxes**	**Aluminimun Baking Dishes**	**Souffle Cups with Lids**
AOT	x	x	x		x		x	x	x					x						
Biological Services	x	x	x		x	x				x										
Boys and Girls Club	x	x	x	x	x	x	x	x	x	x			x	x						x
Casino	x	x	x	x	x	x	x	x	x		x	x	x		x		x	x	x	
Charter School	x	x	x	x	x	x				x				x			x			
Child Development/Head Start	x	x	x	x	x	x	x	x	x	x	x	x			x					
Commodity Foods	x	x	x	x	x	x	x		x	x										
Community College	x	x		x																
Culture Department	x	x	x	x	x			x								x				
Ellen Marshall Building	x	x	x				x				x									
Health Center	x	x	x	x		x	x	x	x		x	x					x			
Four Seasons Market and Deli	x	x		x		x							x							
Gas Station	x	x		x																
Golf Course	x	x	x	x																
History Department/Elder Center	x	x	x	x	x	x	x	x	x	x	x	x	x		x			x	x	
Housing Authority	x	x	x	x	x		x	x		x	x		x		x	x				
Justice Center	x	x	x	x	x	x		x			x					x				
Maintenance Department	x	x	X													x				
Mukwa Fitness Center	x	x	x		x	x	x	x			x	x								
NLCC	x	x	x		x	x	x		x			x	x	x						
Public Works	x	x	x	x	x			x	x			x								
Tribal Administration	x	x	x				x		x	x					x					
Waishkey Bay Farm	x	x	x	x				x		x				x						
Count	**23**	**23**	**20**	**16**	**14**	**12**	**12**	**12**	**10**	**9**	**8**	**7**	**6**	**5**	**5**	**4**	**3**	**2**	**2**	**1**
Facilities Using Single-Use Items	100%	100%	87%	70%	61%	52%	52%	52%	43%	39%	35%	30%	26%	22%	22%	17%	13%	9%	9%	4%

3.5.iii Single-Use Item Recommendations

Many of the top ten single-use items are necessary health and sanitary items (toilet paper, trash bags, facial tissue, napkins and food prep gloves). Replacing these with reusable items is not recommended in a public or workplace setting. However, other single-use items could be replaced with reusable options that will reduce waste going into the landfill.

Table 3.5.iii. Replacement Items for Single Use Items

Single-Use Item	Reusable Item
Bathroom hand paper towel	Electric hand dryer
Kitchen paper towel	Dish cloth
Paper plates/bowls/cups	Ceramic dishes, glass/stainless steel cups
Sanitizing wipes	Large glass spray bottle with cloth
Plastic tableware	Stainless steel silverware
Ziplock bags	Glass storage containers
Hand sanitizer	Wall mounted refillable dispenser
Plastic wrap	Glass storage containers
Bottled water	Encourage reusable water bottles and refilling from tap
Tin foil	Glass storage containers
Hand soap	Wall mounted refillable dispenser
K-cups/single use coffee	Refillable K-cup coffee filter
To-go boxes	Stainless or glass dishes
Aluminum baking dishes	Ceramic baking dishes
Soufflé cups/lids	Glass storage containers

Another option for paper products is to elevate the importance of purchasing recycled products and those certified by the Forest Stewardship Council.

3.6 Building Recycling

3.6.i Building Recycling Survey Methods

Departments in each building were asked to self-report if they recycle materials including paper, cardboard, aluminum or metal, plastic or glass. These were recorded on the table below.

3.6.ii Building Recycling Survey Results

A surprising number of buildings practice little to no recycling. Four of the twenty-three buildings surveyed are reported to do no recycling. Cardboard is the most recycled item because the maintenance department provides pick-up service. Of the 23 buildings surveyed, 9 do not recycle paper, 12 do not recycle aluminum/metal, 10 do not recycling plastic and 12 do not recycle glass. Some of these buildings have had recycling sorting bins purchased for them by the Biological Services department in the past.

Table 3.6.ii: Recycling available in departmental buildings

	Recyclable Material				
Location	**Paper**	**Cardboard**	**Aluminum/metal**	**Plastic**	**Glass**
AOT	Yes	Yes	Yes	Yes	Yes
Biological Services	Yes	Yes	Yes	Yes	Yes
Boys and Girls Club	No	Yes	No	Yes	No
Casino (BMRC)	Yes	Yes	No	No	No
Charter School	Yes	Yes	Yes	Yes	Yes
Child Development/Head Start	No	Yes	No	No	No
Commodity Foods	No	Yes	No	Yes	No
Community College	Yes	Yes	Yes	Yes	Yes
Culture Department	Yes	Yes	Yes	Yes	Yes
Ellen Marshall Health Center	No	Yes	No	No	No
Future Admin (old Ellen Marshall) Building	Yes	Yes	Yes	Yes	Yes
Four Seasons Market and Deli	Yes	Yes	No	No	No
Gas Station	Yes	Yes	Yes	Yes	Yes
Golf Course	Yes	Yes	Yes	Yes	Yes
History Department/Elder Center	No	Yes	No	No	No
Housing Authority	Yes	Yes	Yes	No	No
Justice Center	No	No	No	No	No
Maintenance Department	Yes	Yes	No	Yes	Yes
Mukwa Fitness Center	No	No	No	No	No
NLCC	No	No	No	No	No
Public Works	No	No	No	No	No
Tribal Administration (current)	Yes	Yes	Yes	Yes	Yes
Waishkey Bay Farm	Yes	Yes	Yes	Yes	Yes
Yes	**14**	**19**	**11**	**13**	**11**
No	**9**	**4**	**12**	**10**	**12**
Facilities Recycling	**61%**	**83%**	**48%**	**57%**	**48%**

3.6. iii Building Recycling Recommendations

Recycling efforts in all buildings can be improved. Self-sort recycling containers could be made available in each building to promote recycling. These containers must be easily accessible. Internal efforts would need to ensure that janitorial and maintenance crews complete the recycling process by ensuring these recyclables are taken to the waste transfer station and placed in the appropriate recycling storage bins and locations. Lastly, a cultural shift must be made that prioritizes follow-through of all staff and renews trust in the whole waste stream system.

Chapter 4. Procurement

In 2021, Bay Mills Indian Community, including Governmental, Enterprise, and Business Holdings operations procured roughly $19.6 million of goods. See Table 4.1.i below for a full breakdown of procurement by entity. Note that, as a result of Coronavirus pandemic relief funding, namely PPP, CARES Act, and ARPA programs, BMIC experienced an influx of funding; therefore, total procurement figures may be atypical. Bay Mills Indian Community's Procurement Policy want not designed to consider or encourage the purchase of products that are environmentally preferable, but to assure that supplies, services, and construction are procured at the most favorable prices available to BMIC.

The goal of the Green Infrastructure Committee in relation to procurement; therefore, is to provide direction for procurement of environmentally preferable products, and to empower government, enterprise, and business holdings entities to factor sustainability into procurement decisions. Environmentally Preferable Products (EPP) are those that have a reduced negative impact on human health and the environment when compared to competing products that serve the same purpose. This comparison may consider raw material acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service.

Entity	Procurement of Goods
Enterprise	
Bay Mills Resort and Casino	$364,052.20
Business Holdings	
Bay Mart	$5,108,349.22
Four Seasons	$484,998.98
Northern Light Cannabis Company	$1,170,356.97
Government	
General Funds	$4,362,731.06
Grants and Contracts (*many departments*)	$8,118,645.18
TOTAL	**$19,609,133.61**

Table 4.1.i. 2021 Total Procurement of Goods by Entity

Factors to consider when determining EPP include, but are not limited to:

- Maximization of recycled products used in product lifecycle
- Environmental cost of entire product life cycle
- Reuse of existing products or materials in product life cycle
- Recyclability of product
- Cleanest mode of transportation used for distribution

- Biodegradability
- Feedstock analysis; what is used to manufacture the product and is the product bio-based or recycled
- Minimization of packaging; use of reusable/recycled packaging materials
- Reduction of energy/water consumption
- Use of renewable energy
- Manufactured from renewable materials
- Reduction of GHG emissions
- Toxicity reduction or elimination
- Elimination of uncertified hardwoods in product life cycle
- Durability and maintenance requirements
- Ultimate disposal of the product; minimize landfill disposal

When considering future procurement, the benefits of favorable pricing will have to be weighed against environmental preferability. In general terms, instituting an Environmental Preferable Procurement Policy would necessitate the following:

- Institute practices that reduce waste by increasing product efficiency and effectiveness;
- Make a good-faith effort to use environmentally preferable purchasing methods when purchasing products to minimize environmental impacts, toxics, pollution, and hazards to worker and community safety;
- Purchase products that reduce greenhouse gas emissions in their production, shipping, use and discard; and
- Purchase products that include recycled content, are durable and long-lasting, conserve energy and water, use agricultural fibers and residues, use unbleached or chlorine free manufacturing processes, are lead-free and mercury-free, and use wood from sustainably harvested forests.

4.1 Procurement Policy Recommendations

The BMIC Green Infrastructure Committee proposes the development of an Environmentally Preferable Procurement Policy that promotes the following tenets:

- Conserve natural resources for the next seven generations,
- Minimize environmental impacts such as pollution and use of water and energy,
- Eliminate or reduce toxins that create hazards to workers and our community,
- Support strong recycling markets,
- Reduce materials that are landfilled,

- Increase the use and availability of environmentally preferable products that protect the environment,
- Identify environmentally preferable products and distribution systems,
- Reward manufacturers and vendors that reduce environmental impacts in their production and distribution systems or services, and
- Create a model for successfully purchasing environmentally preferable products that encourages the use of agricultural fibers, chlorine-free manufacturing processes, wood from sustainably harvested forests, and other environmentally friendly practices, and that encourages other purchasers in our community to adopt similar goals.

Given that BMIC already has an established Procurement Policy, the Green Infrastructure Committee recommends that an EPP Policy be developed to act in concert with the current Procurement Policy, assuring that supplies, services, and construction are procured at the most favorable prices available to BMIC, as well as assuring BMIC is making a good-faith effort to make environmentally preferable purchases. As a matter of policy, the Green Infrastructure Committee looks to Executive Council to determine how stringent the EPP Policy should be in terms of application. This could merely be an exercise of good-faith effort to purchase environmentally-preferable products when economically feasible. Alternatively, Executive Council may choose to establish a firm rule whereby an intangible benefit percentage is allocated for green products. For example, if a green product costs $10,700, versus a comparable product costing $10,000 that isn't green, the green product should be given favor because it is less than 10% more than the non-green product.

4.2 Proposed Procurement Policy

In line with the aforementioned recommendations, the BMIC Green Infrastructure Committee proposes the following Environmentally Preferable Procurement Policy. Note that an intangible benefit percentage has not been provided in this proposed policy draft. The proposed draft language was developed to provide a launching point for future EPP Policy discussions, and will require finetuning based on Executive Council and Executive Management feedback:

BAY MILLS INDIAN COMMUNITY
ENVIRONMENTALLY PREFERABLE PROCUREMENT POLICY

1.0 STATEMENT OF POLICY

It is the policy of Bay Mills Indian Community to:

- Institute practices that reduce waste by increasing product efficiency and effectiveness;
- Make a good-faith effort to use environmentally preferable purchasing methods when purchasing products to minimize environmental impacts, toxics, pollution, and hazards to worker and community safety;

- Purchase products that reduce greenhouse gas emissions in their production, shipping, use and discard; and

- Purchase products that include recycled content, are durable and long-lasting, conserve energy and water, use agricultural fibers and residues, use unbleached or chlorine free manufacturing processes, are lead-free and mercury-free, and use wood from sustainably harvested forests.

2.0 PURPOSE

This Policy is adopted in order to:

- Conserve natural resources for the next seven generations,
- Minimize environmental impacts such as pollution and use of water and energy,
- Eliminate or reduce toxins that create hazards to workers and our community,
- Support strong recycling markets,
- Reduce materials that are landfilled,
- Increase the use and availability of environmentally preferable products that protect the environment,
- Identify environmentally preferable products and distribution systems,
- Reward manufacturers and vendors that reduce environmental impacts in their production and distribution systems or services, and
- Create a model for successfully purchasing environmentally preferable products that encourages the use of agricultural fibers, chlorine-free manufacturing processes, wood from sustainably harvested forests, and other environmentally friendly practices, and that encourages other purchasers in our community to adopt similar goals.

3.0 DEFINITIONS

3.1 "Bio-Based Products" means commercial or industrial products (other than food or feed) that utilize agricultural crops or residues but does not include products made from forestry materials.

3.2 "Biodegradable plastic" means the degradation of the plastic must occur as a result of the action of naturally occurring microorganisms.

3.3 "Buyer" means anyone authorized to purchase or contract for purchases on behalf of this jurisdiction or its subdivisions.

3.4 "The Carpet and Rug Institute" (CRI) is the national trade association representing the carpet and rug industry. CRI has developed and administered the "Green Label" indoor air quality testing and labeling program for carpet, adhesives, cushion materials and vacuum cleaners. The "Green Label Plus" testing program incorporates additional requirements to meet California's Collaborative for High Performance Schools low-emitting materials criteria.

3.5 "Compostable plastic" means plastic that is biodegradable during composting to yield carbon dioxide, water and inorganic compounds and biomass, at a rate consistent with other known compostable materials and leaves no visually distinguishable or toxic residues.

3.6 "Contractor" means any person, group of persons, business, consultant, designing architect, association, partnership, corporation, supplier, vendor or other entity that has a contract with Bay Mills Indian Community or serves in a subcontracting capacity with an entity having a contract with Bay Mills Indian Community for the provision of goods or services.

3.7 "Degradable plastic" means plastic that undergoes significant changes in its chemical structure under specific environmental conditions.

3.8 "EcoLogo" is a third-party, multi-attribute eco-labeling program founded by the Canadian government in 1988 and part of UL Environment since 2010. The Program compares products / services with others in the same category, develops rigorous and scientifically relevant criteria, and awards the EcoLogo to those that are environmentally preferable throughout their entire lifecycle.

3.9 "Electronic Product Environmental Assessment Tool" (EPEAT) is a procurement tool to help institutional purchasers in the public and private sectors evaluate, compare and select personal computers, displays, imaging equipment and televisions based on their environmental attributes.

3.10 "Energy Star" means the U.S. EPA's energy efficiency product labeling program.

3.11 "Energy-Efficient Product" means a product that is in the upper 25% of energy efficiency for all similar products, or that is at least 10% more efficient than the minimum level that meets Federal standards.

3.12 "Environmentally Preferable Products (EPP)" means products that have a reduced negative effect on human health and the environment when compared to competing products that serve the same purpose. This comparison may consider raw material acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service.

3.13 "Federal Energy Management Program" is a program of the Department of Energy that issues a series of *Product Energy Efficiency Recommendations* that identify recommended efficiency levels for energy-using products.

3.14 "Forest Stewardship Council" is a global organization that certifies responsible, on-the-ground forest management according to rigorous standards developed by a broad variety of stakeholder groups.

3.15 "Green Seal" is an independent, non-profit environmental labeling organization. Green Seal standards for products and services meet the U.S. EPA's criteria for third-party certifiers. The Green Seal is a registered certification mark that may appear only on certified products.

3.16 "Integrated Pest Management" is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

3.17 "LEED Rating System" means the most recent version of the Leadership in Energy and Environmental Design (LEED) Rating System, approved by the U.S. Green Building Council, and designed for rating new and existing commercial, institutional, and residential buildings.

3.18 "NSF/ANSI" means NSF International follows the American National Standards Institute (ANSI) standards development process. Standards are developed by joint committees (balanced stakeholder groups of public health, industry and user representatives).

3.19 “Organic Pest Management” prohibits the use and application of toxic chemical pesticides and strives to prevent pest problems through the application of natural, organic horticultural and maintenance practices. All pest control products shall be in keeping with, but not limited to, those products on the approved list of California Certified Organic Farmers (CCOF).

3.20 "Post-consumer Material" means a finished material which would normally be disposed of as a solid waste, having reached its intended end-use and completed its life cycle as a consumer item, and does not include manufacturing or converting wastes.

3.21 “Pre-consumer Material” means material or by-products generated after manufacture of a product is completed but before the product reaches the end-use consumer. Pre-consumer material does not include mill and manufacturing trim, scrap, or broke which is generated at a manufacturing site and commonly reused on-site in the same or another manufacturing process.

3.22 “Recovered Material” means fragments of products or finished products of a manufacturing process, which has converted a resource into a commodity of real economic value, and includes pre-consumer and post-consumer material but does not include excess resources of the manufacturing process.

3.23 “Recycled Content” means the percentage of recovered material, including pre-consumer and post-consumer materials, in a product.

3.24 “Recycled Content Standard” means the minimum level of recovered material and/or post-consumer material necessary for products to qualify as “recycled products.”

3.25 “Recycled Product” means a product that meets [the Organization’s] recycled content policy objectives for post-consumer and recovered material.

3.26 “Remanufactured Product” means any product diverted from the supply of discarded materials by refurbishing and marketing said product without substantial change to its original form.

3.27 “Reused Product” means any product designed to be used many times for the same or other purposes without additional processing except for specific requirements such as cleaning, painting or minor repairs.

3.28 “Source Reduction” refers to products that result in a net reduction in the generation of waste compared to their previous or alternate version and includes durable, reusable and remanufactured products; products with no, or reduced, toxic constituents; and products marketed with no, or reduced, packaging.

3.29 “U.S. EPA Guidelines” means the Comprehensive Procurement Guidelines established by the U.S. Environmental Protection Agency for federal agency purchases as of October 2007 and any subsequent versions adopted.

3.30 “Water-Saving Products” are those that are in the upper 25% of water conservation for all similar products, or at least 10% more water-conserving than the minimum level that meets the Federal standards.

3.31 “WaterSense” means a partnership program by the U.S. Environmental Protection Agency. Independent, third-party licensed certifying bodies certify that products meet EPA criteria for water efficiency and performance by following testing and certification protocols specific to each product category. Products that are certified to meet EPA specifications are allowed to bear the WaterSense label.

4.0 STRATEGIES FOR IMPLEMENTATION

4.1 Source Reduction

4.1.1 Institute practices that reduce waste, encourage reuse, and result in the purchase of fewer products.

4.1.2 Purchase remanufactured products such as toner cartridges, tires, furniture, equipment and automotive parts.

4.1.3 Consider short-term and long-term costs in comparing product alternatives. This includes evaluation of total costs expected during the time a product is owned, including, but not limited to, acquisition, extended warranties, operation, supplies, maintenance and replacement parts, disposal costs and expected lifetime compared to other alternatives.

4.1.4 Purchase products that are durable, long lasting, reusable or refillable and avoid purchasing one-time use or disposable products.

4.1.5 Request vendors eliminate packaging or use the minimum amount necessary for product protection. Vendors shall be encouraged to take back packaging for reuse. A vendor's willingness to take back packaging will be used as part of the consideration in the bid process.

4.1.6 Specify a preference for packaging that is reusable, recyclable or compostable, when suitable uses and programs exist.

4.1.7 Encourage vendors to take back and reuse pallets and other shipping materials, unless these can be used by departments.

4.1.8 Encourage suppliers of electronic equipment, including but not limited to computers, monitors, printers, and copiers, to take back equipment for reuse or environmentally sound recycling when Bay Mills Indian Community discards or replaces such equipment, whenever possible. Suppliers will be required to state their take back, reuse or recycling programs during the bidding process. If this is not feasible, departments can utilize the BMIC E-waste recycling facility and will be expected to follow the disposal fee schedule.

4.1.9 Consider provisions in contracts with suppliers of non-electronic equipment that require suppliers to take back equipment for reuse or environmentally sound recycling when Bay Mills Indian Community discards or replaces such equipment, whenever possible. Suppliers will be required to state their take back, reuse or recycling programs during the bidding process.

4.1.10 Promote electronic distribution of documents rather than printing or copying.

4.1.11 When producing paper documents, print and copy all documents on both sides to reduce the use and purchase of paper. Printers and copiers shall be set to default to duplex.

4.1.12 Reduce the number and type of equipment needed to perform office functions to save energy and reduce purchasing and maintenance costs. Eliminate desktop printers, redundant network printers and reduce the number of fax machines leased or owned by Bay Mills Indian Community]. Consider lease or purchase of multi-function devices.

4.1.13 Ensure all imaging equipment is installed with energy and resource-efficient settings set as default.

4.2 Recycled Content Products

4.2.1 Purchase products for which the United States Environmental Protection Agency (U.S. EPA) has established minimum recycled content standard guidelines, such as those for printing paper, office paper, janitorial paper, construction, landscaping, parks and recreation, transportation, vehicles, miscellaneous, and non-paper office products, that contain the highest post-consumer content available, but no less than the minimum recycled content standards established by the U.S. EPA Comprehensive Procurement Guidelines.

4.2.2 Purchase multi-function devices, copiers and printers compatible with the use of recycled content and remanufactured products.

4.2.3 When specifying asphalt, concrete, aggregate base or Portland cement concrete for road construction projects, use recycled, reusable or reground materials.

4.2.4 Specify and purchase recycled content traffic control products, including signs, cones, parking stops, delineators, channelizers and barricades.

4.2.5 Ensure pre-printed recycled content papers intended for distribution that are purchased or produced contain a statement that the paper is recycled content and indicate the percentage of post-consumer recycled content.

4.3 Energy Efficient and Water Saving Products

4.3.1 Purchase energy-efficient equipment with the most up-to-date energy efficiency functions. This includes, but is not limited to, high efficiency space heating systems and high efficiency space cooling equipment.

4.3.2 Replace inefficient interior lighting with energy-efficient equipment.

4.3.3 Replace inefficient exterior lighting, street lighting and traffic signal lights with energy-efficient equipment. Minimize exterior lighting where possible to avoid unnecessary lighting of architectural and landscape features while providing adequate illumination for safety and accessibility. Refer to the BMIC Green Building Checklist, if needed.

4.3.4 Purchase U. S. EPA Energy Star certified products when available. When Energy Star labels are not available, choose energy-efficient products that are in the upper 25% of energy efficiency as designated by the Federal Energy Management Program.

4.3.5 Purchase U.S. EPA WaterSense labeled water-saving products when available. This includes, but is not limited to, high-performance fixtures like toilets, low-flow faucets and aerators, and upgraded irrigation systems.

4.4 Green Building Products and Practices

4.4.1 Consider Green Building practices for design, construction, and operation as described in the LEED Rating Systems for all building and renovations undertaken by Bay Mills Indian Community. Refer to the BMIC Green Building Checklist.

4.5 Landscaping Products and Practices

4.5.1 Employ sustainable landscape management techniques for all landscape renovations, construction and maintenance performed by Bay Mills Indian Community including workers and contractors providing landscaping services for Bay Mills Indian Community, including, but not limited to, integrated pest management, grasscycling, drip irrigation, computerized central irrigation linked with the local weather station, composting, and procurement and use of mulch and compost that give preference to those produced from regionally generated plant debris and/or food scrap programs.

4.5.2 Choose Landscape Professionals for landscape design and maintenance services. Training and qualifications shall include landscaping locally, landscaping for native and climate adapted species, landscaping for less to the landfill, nurturing the soil, conserving water, conserving energy, protecting water and air quality, and creating wildlife habitat.

4.5.3 Select plants to minimize waste by choosing species for purchase that are appropriate to the microclimate, species that can grow to their natural size in the space allotted to them, and perennials rather than annuals for color. Native and climate adapted plants that require no or minimal watering once established are preferred.

4.5.4 Hardscapes and landscape structures constructed of recycled content materials are encouraged. Limit the amount of impervious surfaces in the landscape. Permeable substitutes, such as permeable asphalt or pavers, are encouraged for walkways, patios and driveways.

4.5.5 Create bioswales and rain gardens in all landscape renovations and construction performed by Bay Mills Indian Community to assist in water run-off management. Develop outreach programs to instruct the public in the proper maintenance of bioswales and rain gardens.

4.6 Toxics and Pollution Prevention Products and Practices

4.6.1 Manage pest problems through prevention and physical, mechanical and biological controls when Bay Mills Indian Community and its contractors maintain buildings and landscapes. Bay Mills Indian Community may either adopt and implement an Organic Pest Management (OPM) policy and practices or adopt and implement an Integrated Pest Management (IPM) policy and practices using the least toxic pest control as a last resort.

4.6.2 Use products with the lowest amount of volatile organic compounds (VOCs), highest recycled content, low or no formaldehyde and no halogenated organic flame retardants when purchasing building maintenance materials such as paint, carpeting, adhesives, furniture and casework.

4.6.3 Purchase or require janitorial contractors to supply, industrial and institutional cleaning products that meet Green Seal or UL/EcoLogo certification standards for environmental preferability and performance.

4.6.4 Purchase, or require janitorial contractors to supply, vacuum cleaners that meet the requirements of the Carpet and Rug Institute Green Label/Seal of Approval Program for soil removal, dust containment and carpet fiber retention for indoor air quality protection and performance cleaning standards. Other janitorial cleaning equipment should be capable of capturing fine particulates, removing sufficient moisture so as to dry within 24 hours, operate with a sound level less than 70dBA, and use high-efficiency, low-emissions engines.

4.6.5 Purchase paper, paper products, and janitorial paper products that are unbleached or are processed without chlorine or chlorine derivatives.

4.6.6 Prohibit the purchase of products that use polyvinyl chloride (PVC) such as, but not limited to, furniture and flooring.

4.6.7 Purchase products and equipment with no lead or mercury whenever possible. For products that contain lead or mercury, Bay Mills Indian Community should give preference to those products with lower quantities of these metals and to vendors with established lead and mercury recovery programs. In addition, whenever lead- or mercury-containing products require disposal, Bay Mills Indian Community will dispose of those products in the most environmentally safe manner possible. All fluorescent lamps and batteries will be recycled or disposed of using the BMIC Maintenance Department Bulb Crusher

4.6.8 Purchase or specify personal computers, displays, imaging equipment and televisions that meet, at a minimum, all Electronic Product Environmental Assessment Tool (EPEAT) environmental criteria designated as "required" as contained in the IEEE 1680 family of Environmental Assessment Standards.

4.6.9 Purchase or specify commercial carpeting that meets NSF/ANSI 140 Standard for Sustainable Carpet Assessment and require old carpet that is removed be recycled.

4.6.10 Purchase or specify non-carpet floor coverings that meet NSF/ANSI 332 Standard for Resilient Flooring including vinyl, linoleum and rubber flooring.

4.6.11 When replacing vehicles, consider less-polluting alternatives to diesel such as compressed natural gas, bio-based fuels, hybrids, electric batteries, and fuel cells, as available.

4.7 Bio-Based Products

4.7.1 Purchase paper, paper products and construction products made from non-wood, plant-based contents such as agricultural crops and residues.

4.7.2 Purchase bio-based plastic products that are biodegradable and compostable, such as bags, film, food and beverage containers, and cutlery.

4.8 Forest Conservation Products

4.8.1 To the greatest extent practicable, do not procure wood products such as lumber and paper that originate from forests harvested in an environmentally unsustainable manner. When possible, give preference to wood products that are certified to be sustainably harvested by a comprehensive, performance-based certification system. The certification system shall include independent third-party audits, with standards equivalent to, or stricter than, those of the Forest Stewardship Council certification.

4.8.2 Encourage the purchase or use of previously used or salvaged wood and wood products whenever practicable.

5.0 RESPONSIBILITIES

5.1 The health and safety of workers and citizens is of utmost importance and takes precedence over all other practices. Nevertheless, Bay Mills Indian Community recognizes its duty to act in a fiscally responsible as well as a timely manner.

5.2 Nothing contained in this policy shall be construed as requiring a department, purchaser or contractor to procure products that do not perform adequately for their intended use, exclude adequate competition, risk the health or safety of workers and citizens, or are not available at a reasonable price in a reasonable period of time.

5.3 Nothing contained in this policy shall be construed as requiring Bay Mills Indian Community, departments, purchasers, or contractors to take any action that conflicts with local, state or federal requirements.

5.4 Bay Mills Indian Community has made significant investments in developing a successful recycling system and recognizes that recycled content products are essential to the continuing viability of that recycling system and for the foundation of an environmentally sound production system. Therefore, to the greatest extent practicable, recycled content shall be included in products that also meet other specifications, such as chlorine free or bio-based.

6.0 IMPLEMENTATION

6.1 The Chief Financial Officer shall implement this policy in coordination with other appropriate Bay Mills Indian Community personnel.

6.2 Require successful bidders to certify in writing that the environmental attributes claimed in competitive bids are accurate. Vendors shall be required to specify the minimum or actual percentage of recovered and post-consumer material in their products, even when such percentages are zero.

6.3 Upon request, buyers making the selection from competitive bids shall be able to provide justification for product choices that do not meet the environmentally preferable purchasing criteria in this policy.

6.4 Encourage vendors, contractors and grantees to comply with applicable sections of this policy for products and services provided to Bay Mills Indian Community.

7.0 PROGRAM EVALUATION

7.1 The Chief Financial Officer shall periodically evaluate the success of this policy's implementation and report to the Executive Council.

8.0 EFFECTIVE DATES

The above Policy was adopted at a meeting of the Executive Council held on the ____day of _____, 2023, by a vote of ____ in favor, ___ opposed, ___ absent, and ___ abstaining. As per the provisions of the Bay Mills Constitutions, the President must abstain except in the event of a tie.

_____
Beverly A. Carrick
Secretary
Executive Council

Chapter 5. Green Buildings and Grounds

Humans interact with the built environment constantly, from our homes, to the roads we drive on, to the stores we shop in, to the offices where we work. The built environment; therefore, literally shapes our everyday lives. Studies show that the design of infrastructure significantly impacts the mental, emotional, and physical health of humans.

Partners with Biological Services and Inter-tribal Council of Michigan compiled a study in 2016 of expected weather impacts to the Bay Mills region. The region has observed noticeable changes in weather in recent years. These changes have been measured in mean season temperatures, percentage of ice cover, frequency of severe storms and many other parameters. Since 1950 the mean temperatures in winter and spring have increased more in the northern Great Lakes than in other areas. The Eastern Upper Peninsula has witnessed warmer winters and warmer springs.

The frequency and intensity of storms in the Great Lakes region has also changed in the last fifty years. GLISA reported that precipitation from 1981-2010 is 5.1% more intense and frequency has increased 23.6% when compared to 1951-1980 (GLISA, Extreme Precipitation, 2015). Severe or intense precipitation has numerous consequences that are cause for concern. Flooding and storm water runoff are priority concerns, as rain from extreme participation events has inadequate time to infiltrate the soil. Instead, it erodes land surfaces, infiltrates and damages infrastructure, and carries soils, nutrients, and/or contaminants directly to surface waters (ITCMI, 2016). Stormwater runoff has the potential to impact natural and manmade systems and structures (ITCMI, 2016).

Climate change is predicted to increase the number of extreme weather events and also decrease our air quality which will impact human health and disease in many ways. With the projected increases in temperature and frequency of extreme weather events, data suggests ground level ozone and particulate matter will increase which causes many problems including decreased lung function, increase in asthma attacks and increase in premature deaths. Also, with the increase in frost-free days and warmer seasonal temperatures, allergenic plants are projected to have longer pollen seasons and affect people with allergies. Buildings may also have increases in mold growth due to the warmer temperatures and increased precipitation. Doctors may have a harder time aiding people with allergies and asthma in the future (Luber et al. 2014). In addition, with these health risks, the projected increase in temperature may increase heat-related illness including heat exhaustion, heat stroke and death. Human health impacts from insect-borne diseases are projected to become more prevalent as well.

Armed with this knowledge, Bay Mills Indian Community can make a conscious decision to thoughtfully design future infrastructure in such a way as to maximize Mino Bimaadiziwin "Good Life" of our citizens, employees, and visitors. Green buildings are one avenue through which BMIC can achieve this goal.

5.1 Definitions

Sustainable Design: an architectural approach that seeks to reduce negative environmental impact that promotes improved health outcomes.

Green infrastructure: planned natural and engineered features designed to deliver ecosystem services for the benefit of human and environmental health.

Net Zero: a target of negating the amount of greenhouse gases produced by human activity by reducing emissions and removing greenhouse gases from the atmosphere.

Stormwater Management: the process of controlling stormwater runoff, primarily from impervious surfaces.

Biophilic Design: an architectural approach that promotes the use of natural materials, natural light, and landscape features to increase connectivity of building occupants to the natural environment, and create a more productive, healthy built environment.

5.2 Background

Green buildings and grounds are those that exemplify biophilic and sustainable design. Essentially, this means that infrastructure is designed in such a way as to reduce harmful impact to the natural environment, while also promoting human health. This can be achieved through use of natural materials, maximizing natural light, incorporating green infrastructure in landscaping, and much more.

When thinking about sustainability in the context of Bay Mills Indian Community, there are several aspects that we can contemplate. The first aspect is how infrastructure can impact different components of a community, whether it be the built environment, social atmosphere, cultural traditions, or human health. Human health is typically thought of as a cross-section of physical, mental, emotional, and spiritual well-being. These ideas can be melded together to create a model of sustainability catered specifically to BMIC. While the word sustainability typically focuses on the cross-section of community well-being, economic prosperity, and environmental stewardship, the Green Infrastructure Committee felt it important to add a long-term resilience component to the mix. All of these concepts together form the basis of sustainability, and the underlying goals for Green buildings in Bay Mills Indian Community (see Figure 5.2. BMIC Sustainability Model).

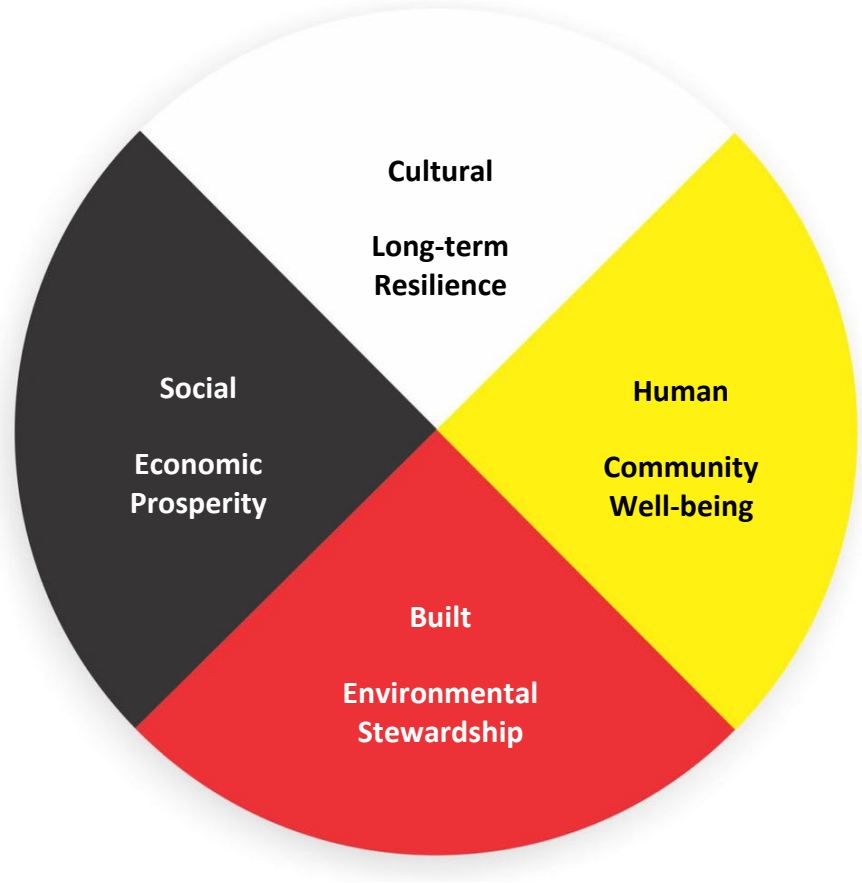


Figure 5.2. BMIC Sustainability Model

"Green" development can be expressed/measured in terms of green building certifications or standards. These certifications create, and hold buildings to specific environmental, energy, human health, etc. standards related to the design, construction, and performance of the building. This may include reduced water and energy consumption, maximizing natural light, proving green space, contemplating physical, mental and emotional wellbeing in the design of a building, meeting air quality standards, reducing light pollution, and much more. Dozens of green building certifications exist for new development and redevelopment. Some of the most popular new development certifications include Leadership in Energy and Environmental Design (LEED), WELL, Energy Start, and the Living Building Challenge. Common redevelopment certifications include EnerPhit and Passive House Certificate. Organizations generally choose a green building certification that aligns most closely with the specific project, organizational goals and objectives. While these certifications/standards are great tools in assisting communities or entities in reducing their ecological footprint, it is important to note that meeting the stringent standards set by these certifications come at a cost, both in terms of time it takes to receive the certification, and the amount of money it can cost to meet the standards.

Given the extensive nature, time and monetary requirements associated with these certifications, the Green Infrastructure Committee is proposing a BMIC Green Building checklist, defined by the Tribe, to include elements of popular green building standards with the additional consideration of culture, values, and traditions as set forth in the BMIC Sustainability Model.

5.3 Green Building Recommendations and Checklist

To ensure future infrastructure, whether new development or redevelopment of existing structures, incorporates sustainable and biophilic design, the Green Infrastructure Committee developed a Procedural Checklist for Development and Redevelopment, and a Green Elements Building Checklist.

The Procedural Checklist for Development and Redevelopment is a tool for departments or entities to thoroughly review a proposed project while in its infancy. This procedural checklist allows BMIC to take a proactive approach to development and redevelopment, instead of a reactive approach, by thoughtfully assessing the proposed project and site on which it will be placed. The procedural checklist includes the following steps:

1. Tribal Manager Review
2. Land Office Review
3. Biological Services GIS Desktop Review
4. THPO Review
5. Construction Manager Review
6. Team Review
7. Additional Committee/Departmental Review
8. Other Considerations, if warranted, including Phase 1 Archaeology Studies or BIA Forestry Timber Cruise and/or Timber Sale
9. Additional Steps, including a presentation of the proposed project to Executive Council, coordinating with the Grants Department to identify and secure funding, and posting a Request for Quotes for Architecture and Engineering services

The full Procedural Checklist for Development and Redevelopment can be found on page 49-50 of this report.

Working through this procedural checklist will ensure any concerns regarding the project and/or proposed location are identified right away. Findings during this initial process may warrant additional reviews, such as a Phase 1 Archeology Study or contacting the BIA Forestry Department. Should grant funding be required for a proposed project, this procedure will provide much of the information for an Environmental Narrative, should that be required by the funding agency/organization. Additionally, this comprehensive review ensures all aspects of a development or redevelopment are considered prior to procurement of architecture and engineering plans. This will safeguard against significant changes late in the development process due to poor initial planning, thereby saving time and money.

In addition to the Procedural CheckList, the Green Infrastructure Committee also developed a Green Elements Building Checklist for extreme weather resilience. This Checklist is designed to complement the Procedure Checklist, specifically when it is time to secure an Architect and Engineering firm. The Green Elements Building Checklist is a Bay Mills Indian Community-specific set of standards for future development or redevelopment that encourages facilities to be designed and constructed to be more efficient, provide a healthier indoor environment, minimize harmful effects on human health and the environment, and ensure long-term resiliency of the structure.

The checklist includes sections focusing on the following:

10. Seven Generations
11. Stormwater Management
12. Disaster and Extreme Weather Mitigation
13. Net Zero Construction and Green Energy
14. Indoor Human Use and Biophilic Design
15. Outdoor Human Use and Biophilic Design
16. Human Health Impacts
17. Solid Waste and Materials
18. Considerations During Construction, including what to do if historic properties, archeological resources, human remains, or other cultural items are discovered; a site blessing in conjunction with the Cultural Department; and how to mitigate environmental challenges in conjunction with the Biological Services Department.

Each of these categories puts forth general items that should be incorporated in the development of Architect/Engineering plans and designs. Specific outcomes will be project-specific, and should rely on proper planning. This checklist may be provided during the Request-for-Proposal process to ensure standards and expectations are fully understood prior to onboarding a A/E firm.

The full and Green Elements Building Checklist can be found on page 51-53 of this report.

In line with the aforementioned recommendations, the BMIC Green Infrastructure Committee proposes the following Procedural Checklist for Development and Redevelopment, and Green Elements Building Checklist:

PROCEDURAL CHECKLIST FOR DEVELOPMENT AND REDEVELOPMENT

DRAFTED BY THE GREEN INFRASTRUCTURE COMMITTEE: 2022

THIS CHECKLIST IS INTENDED TO GUIDE BAY MILLS INDIAN COMMUNITY TO TAKE A PROACTIVE APPROACH TO DEVELOPMENT AND REDEVELOPMENT PLANNING. THIS CHECKLIST IS A TOOL FOR DEPARTMENTS, COMMITTEES, AND LEADERSHIP TO REVIEW A PROPOSED PROJECT WHILE IN IT'S INFANCY.

1 TRIBAL MANAGER REVIEW

- [ ] Present proposed development/redevelopment to Tribal Manager
- [ ] Determine if there are competing proposals for the same site

2 LAND OFFICE REVIEW

Please allow 5 business days for the request to be processed

- [ ] Review maps with BMIC Land Office.
- [ ] Review ownership/leases
- [ ] Review in correlation with Comprehensive Plan/Land Use Plan

3 BIOLOGICAL SERVICES GIS DESKTOP REVIEW

Please allow 30 business days for the request to be processed

- [ ] Map Township/Range/Section/Quarter Section of Proposed Area
- [ ] Map Soils and Drainage
- [ ] Map Topography and Surface Water Hydrology- both Ephemeral and Permanent Streams, including 100' buffer
- [ ] Map Vegetation Cover Type/Wetland Classification (This will determine if a Wetland Delineation Survey is needed)
- [ ] Map 100-year Floodplain, including 100' buffer
- [ ] Map Threatened and Endangered Species; determine if a Threatened and Endangered Species clearance letter
- [ ] Request a Phase 1 ESA report if known historical contamination/current contamination of proposed site and surrounding area

4 THPO REVIEW

Please allow 30 business days for the request to be processed

- [ ] Review Map of Township/Range/Section/Quarter Section
- [ ] 50' buffers from identified sites
- [ ] Provide THPO Review Letter

5 CONSTRUCTION MANAGER REVIEW

Please allow 5 business days for the request to be processed

- [ ] Review map of soils and drainage
- [ ] Review map of topography, hydrology, and 100-year floodplain
- [ ] Review utility hook-up potential
- [ ] Review road access potential and zoning requirements
- [ ] 100' setback from Lake for septic systems, etc.
- [ ] Assess need for permits

6 TEAM REVIEW

- [ ] Team review with Tribal Manager, Land Office, THPO, Biological Services, Construction Manager, and Legal

7 ADDITIONAL COMMITTEE/DEPARTMENTAL REVIEW

- [ ] Review proposal with Solid Waste Committee
- [ ] Review proposal with Green Infrastructure Committee
- [ ] Review proposal with Transportation Planner- road access, trails, and walkability

8 OTHER CONSIDERATIONS, IF WARRANTED

- [ ] BIA Phase 1 Archeological Study
- [ ] BIA Forestry Department Timber Cruise/ Timber Sale

9 ADDITIONAL STEPS

- [ ] Present project to Executive Council
- [ ] Introduce project to BMIC Grants Department- follow Grants Policy and Procedures, and prepare the neccessary documents; such as, clearance surveys, environmental narratives, and NEPA
- [ ] Request for Quotes for Architecture and Engineering Services; attach Green Buildings Checklist to RFQ

GREEN ELEMENTS BUILDING CHECKLIST FOR EXTREME WEATHER RESILIENCY

DRAFTED BY THE GREEN INFRASTRUCTURE COMMITTEE: 2022

FIRST COMPLETE THE PROCEDURAL CHECK LIST FOR DEVELOPMENT AND REDEVELOPMENT

1 SEVEN GENERATIONS

- [ ] Appropriately size the facility to ensure there is room to grow. Will users of this building have room to:
  - [ ] Grow staffing for the next seven generations?
  - [ ] Grow storage for the next seven generations?
- [ ] Durability of the Materials: choose durable, sustainability sourced materials that will not need frequent replacement
- [ ] Plan for vertical development if site conditions allow (two stories +, always build a full basement on suitable soil sites)

2 STORMWATER MANAGEMENT

- [ ] Install road ditches where suitable
- [ ] Stormwater catchment basins on parking lots (equivalent to 20% of parking lot square footage)
- [ ] Culverts sized for 100-year flood

3 DISASTER AND EXTREME WEATHER MITIGATION

- [ ] Dual energy and heating sources (on the grid electric with backup generator, wood-burning heat source, etc.)
- [ ] Siting on higher ground to avoid flood waters
- [ ] Roof pitch and capacity to handle 100-year ice storm/rain storm/wet snow, etc.
- [ ] Durability of materials (i.e. triple-paned, bird-safe glass, resilient exterior cladding, etc.)

4 NET ZERO CONSTRUCTION AND GREEN ENERGY

- [ ] First orient the building for passive solar design (additional passive lighting from well-placed windows, sky tunnels, and sky lights)
- [ ] Create efficient exterior envelope (thick insulation, high R-value insulation, triple-paned, bird-proof glass)
- [ ] Install efficient appliances and electric systems (LED lights, EnergyStar appliances, recirculating fans, heat pumps, etc.
- [ ] Water efficiency (e.g. high and low flush toilets) and/or recapture system (e.g. rain water to flush toilets)

- [ ] Electricity generation on-site
  - [ ] Solar panel siting/green energy considerations (At a minimum, facilities should be engineered PV-ready)
  - [ ] Electric vehicle charging station (At a minimum, facilities should be engineered EV charger-ready)

5 INDOOR HUMAN USE AND BIOPHILIC DESIGN

- [ ] Allow for incorporation of "biophilic" design. This goal often supports occupant mental health (including passive lighting, plants, water, natural materials such as wood and stone, etc.)
- [ ] Allow for incorporation of Anishinaabe principle in the design
- [ ] Allow for diverse accessibility
  - [ ] ADA hallways, doorways, elevators, bathrooms, etc.
  - [ ] Breastfeeding/pumping rooms for employees
  - [ ] Employee mental health rooms

6 OUTDOOR HUMAN USE AND BIOPHILIC DESIGN

- [ ] Allow for incorporation of Anishinaabe principle in the design
- [ ] Consider views and access to outdoor spaces and walkability to and from the facility
- [ ] Allow for diverse accessibility
  - [ ] ADA sidewalks, parking, ramps, etc.
- [ ] Consider large vehicle access for maintenance and deliveries

7 HUMAN HEALTH IMPACTS

- [ ] Radon, air and vapor mitigation systems
  - [ ] Regular mold inspections
  - [ ] Chemical storage
- [ ] Biohazard bins

8 SOLID WASTE AND MATERIALS

- [ ] Allow adequate space for waste stream sorting. If the facility contains a kitchen or breakroom, allow space for indoor composting
  - [ ] Consider bear-proof or nuisance animal mitigation if outdoor waste streams
  - [ ] Consider if facility will be part of Maintenance pick-up or independent contractor route
- [ ] Construction waste reduction
  - [ ] Utilize material-efficient framing and ordering techniques
  - [ ] Implement construction waste management practices to reduce waste going to landfill
  - [ ] Utilize construction materials with recycled content or reused construction materials

9 CONSIDERATIONS DURING CONSTRUCTION

- [ ] **NATIONAL HISTORIC PRESERVATION ACT AND NATIVEAMERICAN GRAVE PREPATRIATION ACT. If historic properties, archeological resources, human remains, or other cultural items not previously reported are encountered during the course of any activity associated with this lease, all activity in the immediate vicinity of the properties, resources, remains, or items will cease and the Lessee will contact the Bureau of Indian Affairs and the Bay Mills Indian Community to determine how to proceed and appropriate disposition.**
- [ ] **Invite Cultural Department for a site blessing.**
- [ ] **Engage early and often with Biological Services for technical expertise to mitigate environmental challenges that may arise during construction.**
- [ ] **Report all fuel/chemical spills within 24 hours to Biological Services Department while the responsible party applies containment of spill. Refer to BMIC Spill Prevention Plan.**

3

Chapter 6. Stormwater Management Infrastructure and Roads Network

Like many communities, the network of roads, ditches, and stormwater management at Bay Mills has changed and evolved as the community has grown. Main roads, such as Lakeshore Drive, W Spectacle Lake Rd, Tower Rd, and Plantation Rd, are maintained by Chippewa County Road Commission and so match their typical design parameters. Neighborhood roads, such as Red Pine Lane, Crane Road, South Towering Pines Rd, and others are developed and maintained by BMIC. Some areas have ditching for stormwater management while others do not.
BMIC ordinances for businesses and government building development date back to 1960s. These ordinances do not include design specifications on parking lot green space or ditching requirements. Snow plowing is also completed at the discretion of the operator, so piles frequently concentrate along riparian and shoreline areas. Consequently, many BMIC government, enterprise, business holdings, and residential facilities experience ponding or flooding during rain events and spring melt.

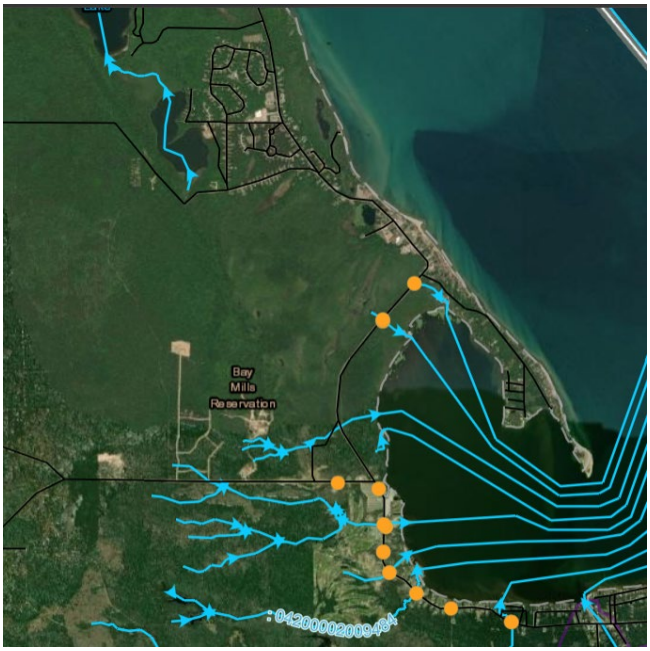
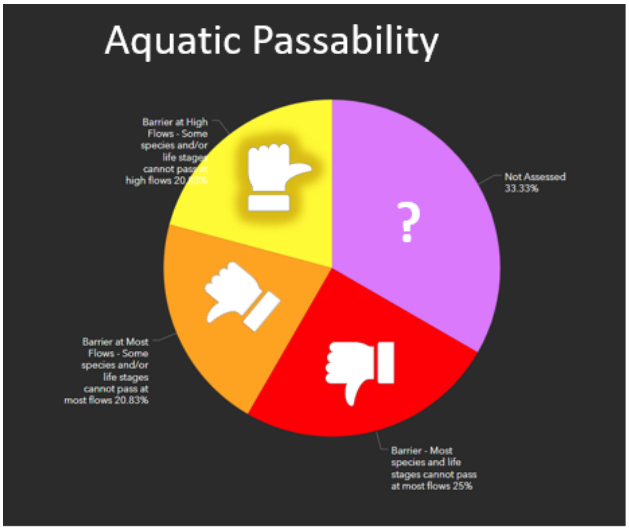
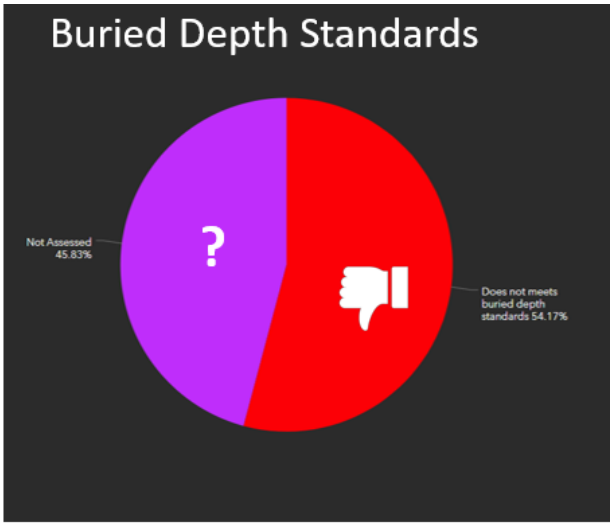


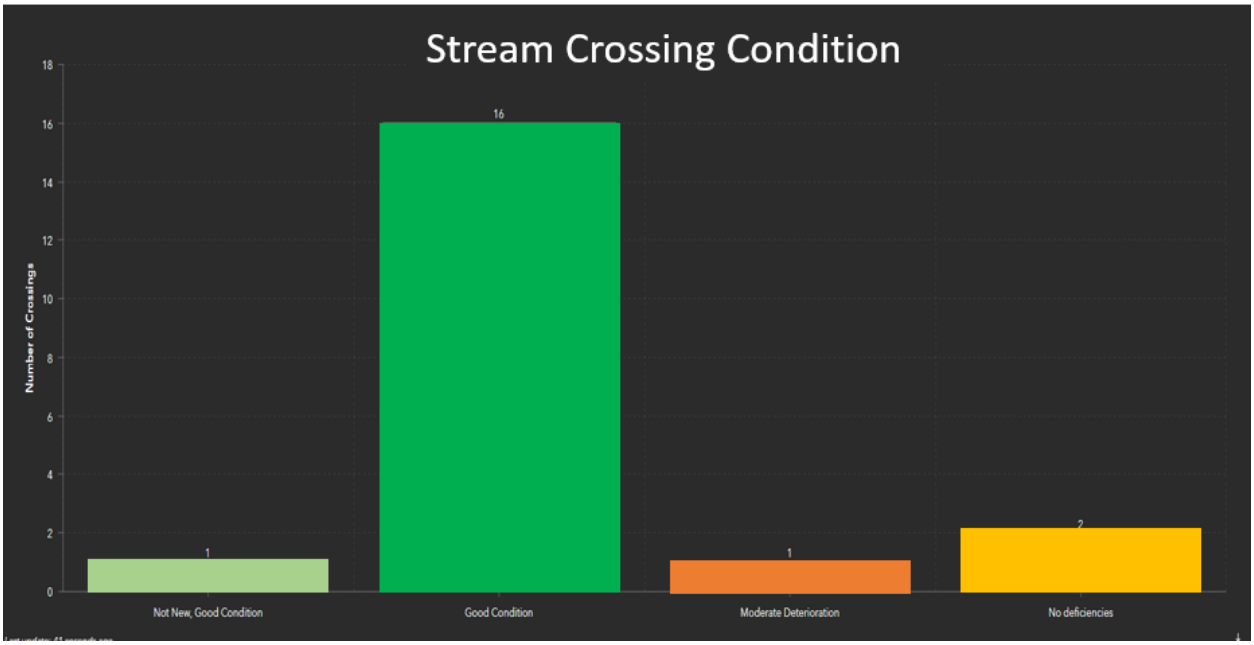
Figure 6a. Road-stream-crossing locations around Waishkey Bay. Many more driveway and ditch culverts exist, but were not assessed. Figure 6b. High priority crossing 281/282 at BMRC.

The Waishkey River Watershed Management Plan of 2020 included extensive surveys of area road stream crossings (whether they are culverts or bridges). Many, many more culverts exist in this area, allowing for ditch drainage, etc; in this survey, only crossings of permanent streams were surveyed. Information was collected at a dozen specific crossings on Bay Mills trust land within the Waishkey watershed (see Figure 6a). Data collected from the stream-crossings surveys revealed point- and nonpoint sources of contamination. Many of the culverts in the watershed and Bay Mills are undersized and should be considered for replacement. Additionally, their style may be ill-suited for the flashy, clay streams they are placed in. The metal or concrete of these structures may be in largely good condition, but due to alignment, sizing, embedded depth, etc, these structures are less than ideal for the environment and human infrastructure (see figures

and table below). Potential negative outcomes from improper RSC range from environmental degradation, to additional road maintenance, to catastrophic failure of the crossing. Of the RSC surveys completed at Bay Mills, most are undersized. Two RSCs (located at BMRC parking lot) are deemed high priority due to their alignment.







Figures 6c, 6d, 6e. Data summary from Great Lakes Road Stream Crossing data dashboard (DNR).

Table 6.1. Road Stream Crossings recently surveyed with Great Lakes Road Stream Crossing Inventory. These priority levels have been determined by BMIC Biological Services staff.

ID	Priority Level	Road	Stream/ Landmark	Erosion Extent	Fish Passage	Perch Culvert	Undersized	Misalignment	Ownership
RSX 276	Medium	Lakeshore Dr	Deep Creek	Entrenched	Barrier at high flows	No	Yes	Ok	County
RSX 281	High	BMRC Driveway	Parrish Creek	Moderate	Plugged	No	Yes	Severe	BMIC
RSX 282	High	Lakeshore Dr, BMRC	Parrish Creek	Moderate	Barrier at high flows	No	Yes	Ok	County
RSX 287	Low	Lakeshore Dr	Unnamed, Ash Preserve	Moderately entrenched	Plugged. Barrier to Fish	Perched	Yes	Ok	County
RSX 291	Low	Lakeshore Dr	Club Creek	Minor	No	Slightly	No	Minor	County
RSX 292	Low	Lakeshore Dr	Lil Waiska	Minor	No	No	Yes	Ok	County
RSX 314		Lakeshore Dr	Unnamed, RV Park	no	no	no	Somewhat	Ok	County
RSX 315	Medium	Plantation	Unnamed, ditch	Moderate	No	No	Yes	Ok	County
RSX 316	Low	Lakeshore Dr	Ponty's Creek	Entrenched. Moderate	Yes	Yes. Not Buried	No	Ok	County
RSX 317	Medium	Lakeshore Dr	Unnamed, Chippewa Landing	Minor	No	No	Yes	Ok	County
RSX 318	Medium	Lakeshore Dr	Unnamed, Gma Turtle	Moderate	Barrier to Fish	Yes	Yes	Poor	County
RSX 319	Unranked	Lakeshore Dr	Unnamed, College Pond	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	County

6.1 Stormwater Management Recommendations

General strategies have been developed by local land managers and partner organizations. These strategies are outlined and further described in the Waishkey River Watershed Management Plan (accepted in 2020 by Bay Mills Executive Council). These recommendations should be employed around Bay Mills when opportunity arises.

Excerpts from Table 22. Nonpoint source pollution goals and proposed implementation strategies for all Waishkey River subwatersheds.

SUBJECT	STRATEGY	PARTNER
Ordinances and Policies (business development & parking lots)	a. Promote water infiltration on site (percolation through soil and plant uptake and transpiration). Use soil and vegetation in a constructed technique, such as rain gardens. b. Build snow retention areas / bioswales DISCONNECTED from waterbodies. c. Protect adjacent lands from direct stormwater discharge off of BMIC gov and enterprise developments. d. Build rain gardens or green roofs, to mimic natural hydrologic processes and water infiltration. e. Effectively minimize or disconnect impervious surfaces (for example, continuous parking lots).	BMIC
Ordinances and Policies (BMIC neighborhood roads network)	f. Reduce floodplain development and preserve small streams. Preserve natural features, such as floodplains with a natural vegetation buffer along streams, that can slow, filter, and store storm runoff. g. Plan new neighborhoods with stormwater in mind. h. Ensure long-term operation and maintenance of stormwater facilities.	BMIC
Reduce streambank erosion (due to culverts & other anthropogenic causes)	i. Stabilize slopes j. Reseed areas with native plants k. Replace undersized culverts l. Encourage the use of bottomless culverts and bridges	BMIC, CCRC, CLMCD, MITC, Townships

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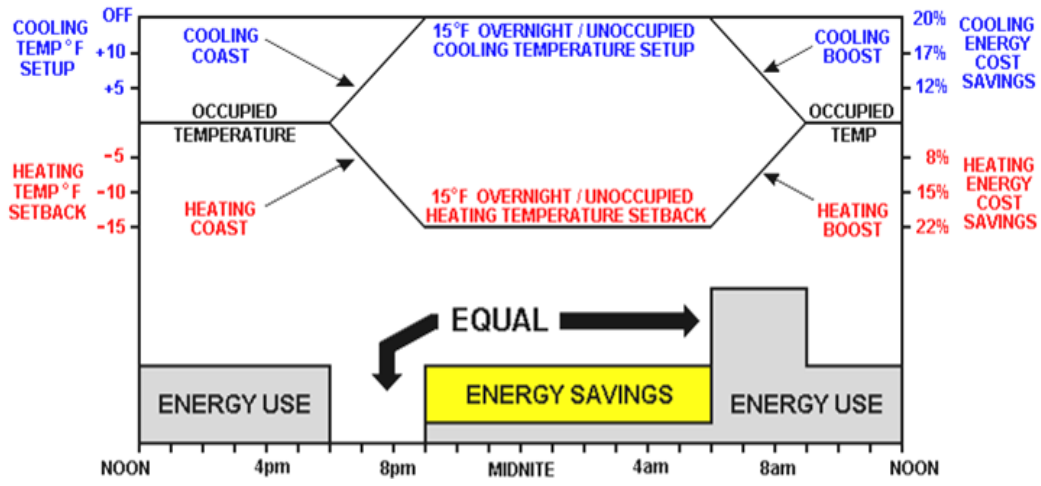
Superior Watershed Partnership. 2022. Bay Mills Indian Community Energy Efficiency Assess

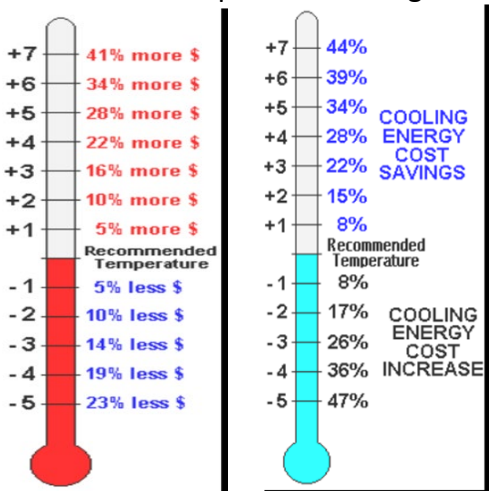
Appendix A: Energy Conservation Measures

Thermostat Optimization

Setback & Setup Savings



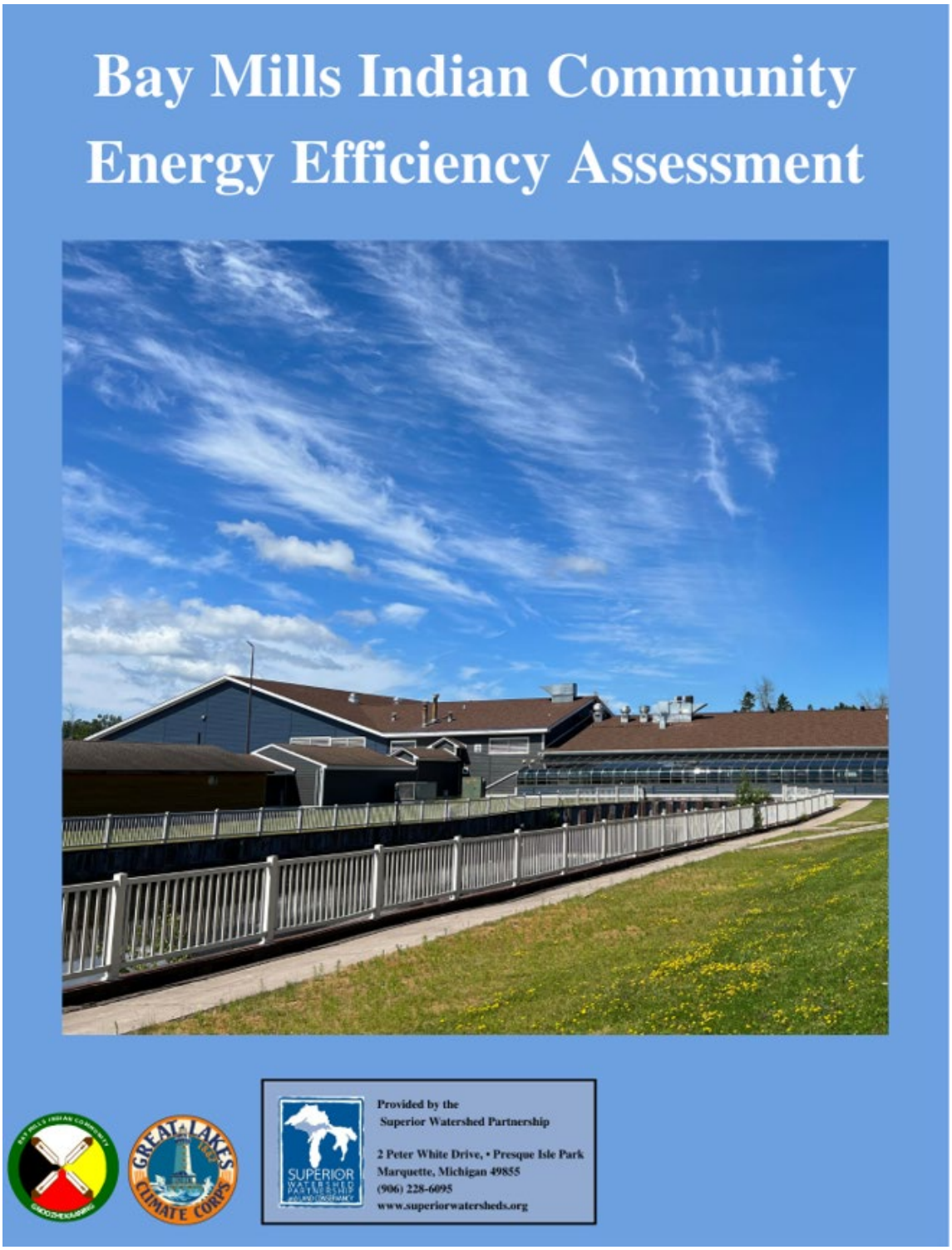
Thermostat Temperature Savings



Lighting

Leviton Ultrasonic/Infrared Dual-Relay Multi-Technology Occupancy Sensor
Model # : 041-OSSMT-MDI

Appendix B: Energy Efficiency Assessment of 2022



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All Assisting Building Managers and Staff

The Citizens and Administrators of Bay Mills Indian Community

Executive Summary

Project Profile

This report contains the results of a community-wide, collaborative energy audit/assessment undertaken by the Superior Watershed Michigan Energy Assistance Program (SWP MEAP) at the Bay Mills Indian Community (BMIC) in Chippewa County. Over eight weeks, surveyors from the Great Lakes Climate Corps (GLCC) worked with an expert contractor to conduct audits on 24 buildings of importance to the BMIC population. The GLCC's primary goal is to educate UP communities regarding renewable energy and energy waste reduction to assist low-income families in conserving energy and lowering their energy costs. UP communities pay some of the highest electricity rates in the country. The GLCC addresses this issue throughout all 15 counties in the Upper Peninsula by conducting basic home energy assessments in low-income households and installing weatherization measures to improve self-sufficiency and lower heating and electric costs. Their work with BMIC produced useful energy-asset characterizations and identified opportunities for tangible efficiency improvements. This report includes a building-by-building narrative description of assessment outcomes as well as figures and data pulled from DOE Assessment Summaries. The original summaries are included in the report's appendices.

Methodology

At the BMIC, two GLCC Surveyors holding Department of Energy (DOE) energy efficiency scoring certifications and a contractor-partner deployed the DOE's Building Energy Score Data Collection tool, a nationally standardized tool for assessing buildings' physical and structural energy efficiency. Surveyors took measurements of each building's envelope, orientation, and window area. They used an ETEKT+ Low-E Coating Detector to determine whether glass had a Low-E coating. Light fixtures were counted and listed by type, mounting, number of lamps per fixture, and wattage. Occupancy sensors were noted. Heating, ventilation, and air conditioning (HVAC) equipment was inspected. Equipment nameplate data was used to calculate efficiencies available for air conditioners, chillers, boilers, and furnaces. Surveyors did this for hot water heaters as well. Manufacturers were contacted to gather further details. Interviews were held with building managers, maintenance personnel, and the BMIC Construction Department to glean additional information about building age and features. When available, blueprints and specifications were reviewed, and a discussion was held with the architect for the recently completed Ellen Marshall Health Center. Finally, the History Department provided additional information to fill knowledge gaps.

Throughout this process, surveyors filled out department of Energy data collection sheets for each building. These were digitized, reviewed, and entered into the DOE's Online Asset Scoring System. The system scored buildings' energy efficiency based on asset characteristics; the score does not consider occupant behavior or operations, making inter-building score comparisons possible. Each building's score falls along a one to ten energy efficiency scale. The system generates a series of energy conservation measures (ECMs) and shows how much a property score could increase through the ECMs' adoption. Therefore, this report shares DOE system-generated property asset scores, property-specific ECMs, and expert recommendations offered by the project's contractor after investigating each site with GLCC surveyors.

Assessments by Building

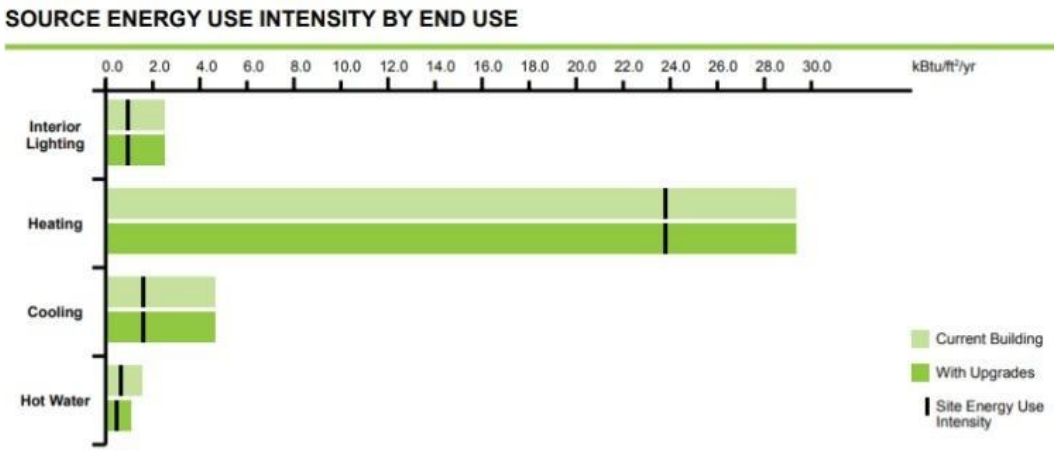
BMIC Tribal Administration

The BMIC Tribal Administration Building, built in 1981, received a ten-out-of-ten DOE asset score. Occupant sensor assessments showed 248 average occupants and average usage at 48.6 hours a week.

Recommendations

The DOE building score summary identifies an upgrade opportunity in the Administration building's Hot Water System; installing low flow faucets in Block 2 would slightly increase hot water efficiency for moderate investment cost. Building envelopes, Lighting Systems, and HVAC Systems generated no recommendations.

If the recommended improvements are adopted, the building's score would improve by one percent and remain at a score of ten. It is worth noting that while the Administration Building's score reflects modern systems, only roughly a quarter of the building's gross floor space is regularly used. This may affect the DOE system's calculation and warrants further operations assessment. Regardless, the improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 1 DOE)

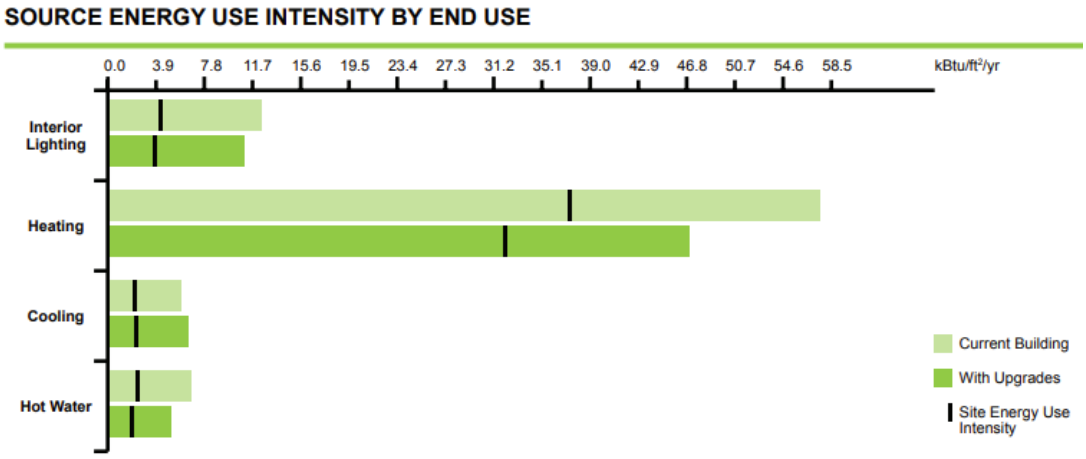
BMIC Biological Services & Conservation

The BMIC Biological Services & Conservation Building, built in 2006, received a nine-out-of-ten DOE asset score. The building hosts an average of 31 people with an average usage of 48.6 hours per week.

Recommendations

DOE systems recommended several improvement measures. Firstly, the building envelope can be made more efficient through air barrier renovations; a building's air barrier is composed of physical assemblies designed to prevent outside air infiltration. In most cases, unconditioned attics and large conditioned spaces account for most envelope leakage. Insulation and other improvements in such areas would help to reduce building air leakage resulting in a relatively low increase in efficiency for a moderate cost. For lighting systems, shifting Fixture 1 to LED would result in a moderate increase in efficiency at a low cost. Also, installing occupancy sensors would further increase efficiency for a medium-high investment. In hot water systems, installing low-flow faucets would slightly increase efficiency for moderate cost. The system did not identify ECMs for HVAC.

Implementing the above ECMs would increase the Biological Services and Conservation Building's score from nine to ten and capture an estimated 11% in energy savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 2 DOE)

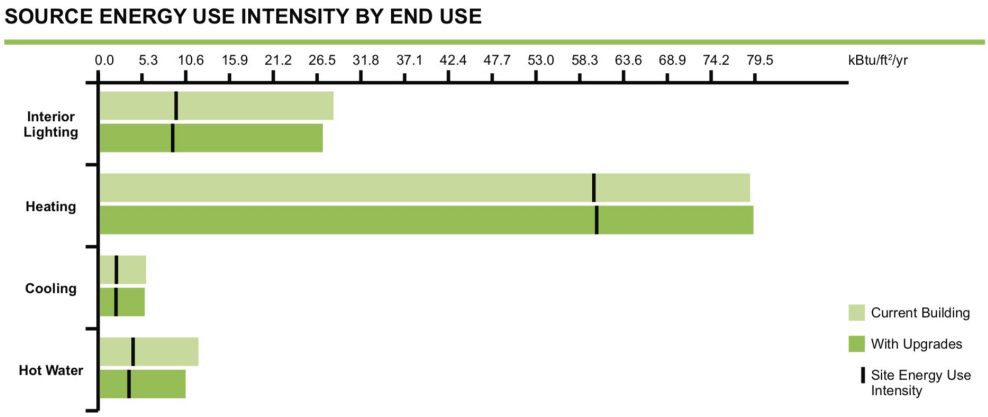
BMIC Public Works

The BMIC Public Works Building, constructed in 2016, scored a 6.5 on the DOE asset assessment. Occupancy was assumed at 12 persons, and hours of operation per week were found to be 48.6.

Recommendations

DOE recommendations for lighting systems improvement include the installation of occupancy sensors to better coordinate energy supply with demand for a low to medium-sized investment cost. Upgrading to low-flow faucets will also help decrease hot water heating waste for a medium-cost investment.

With these improvements, the Public Works Building's score will remain a 6.5 and provide an estimated 2% energy cost savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 3 DOE)

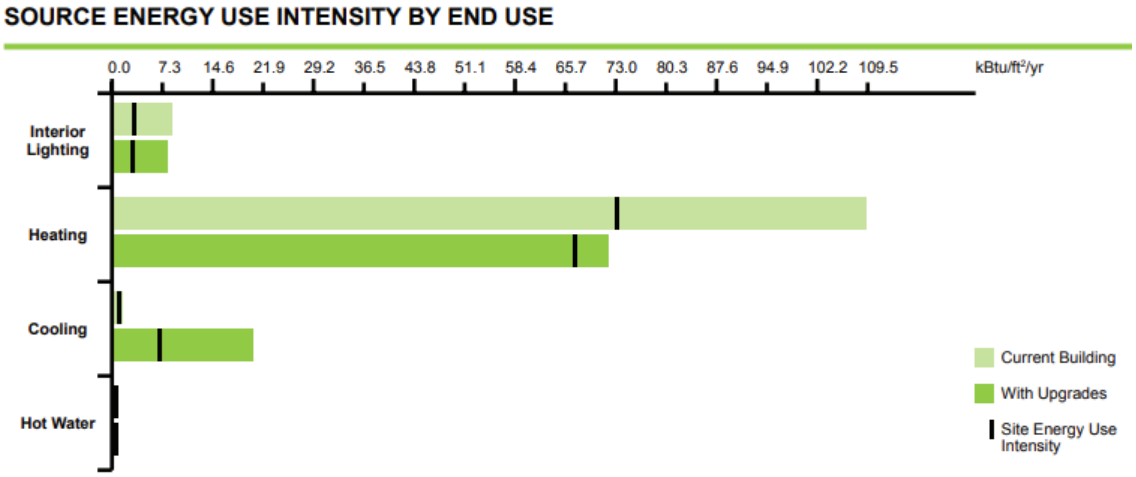
Advanced Office Technologies

The Advanced Office Technologies building, built in 2006, received a ten-out-of-ten DOE asset score. Occupancy is noted at 63 people with an average usage of 46.3 hours per week.

Recommendations

The DOE recommended several improvements. First, for lighting systems, the summary suggests shifting lighting to LED, resulting in a low cost, moderate efficiency improvement. In HVAC systems, data shows that installing an air-side economizer would moderately improve efficiency for a medium-high investment. Economizers help reduce air-conditioning costs by sensing outside air temperature in coordination with thermostat settings; the device draws in outside air for free cooling when feasible. HVAC can be further made efficient with the installation of a variable frequency drive for fan control. These devices allow the system to match output with demand rather than overusing energy during low-demand periods. Neither building envelope nor hot water service systems warranted improvement recommendations.

With these improvements, the building's score will remain a 10; however, energy savings are estimated at 14%. The improvement's effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 4 DOE)

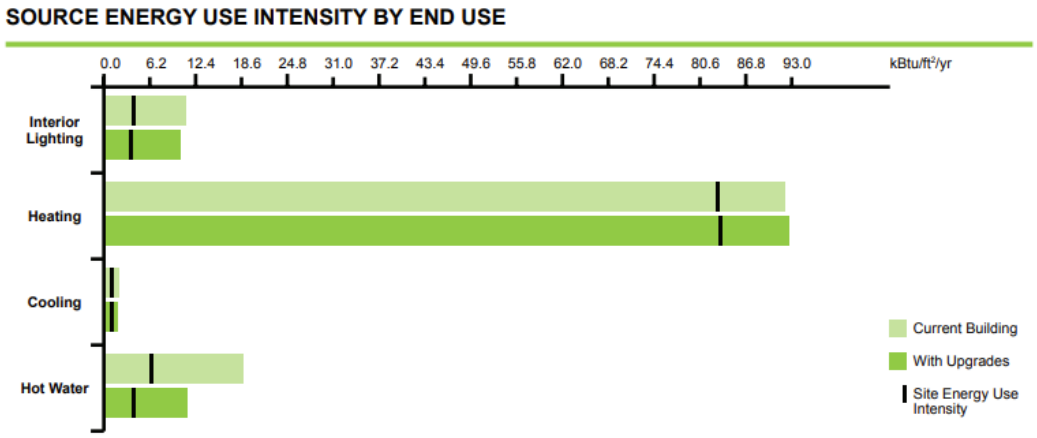
Boys & Girls Club of Bay Mills

The Boys & Girls Club of Bay Mills, built in 2022, scored seven out of ten on the DOE asset summary. The building sees an occupancy of 64 and 40.75 operation hours a week.

Recommendations

Occupancy sensors would help regulate lighting system waste by better coordinating fixture use with demand. This would slightly increase efficiency for a medium-high investment. Low flow faucets would improve hot water efficiency; slight efficiency improvements will occur for medium investment. There are no DOE recommendations for the Club's envelope or HVAC systems.

Implementing the changes listed above will increase the Club's score to 7.5 with a 4% energy cost reduction. The improvement's effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 5 DOE)

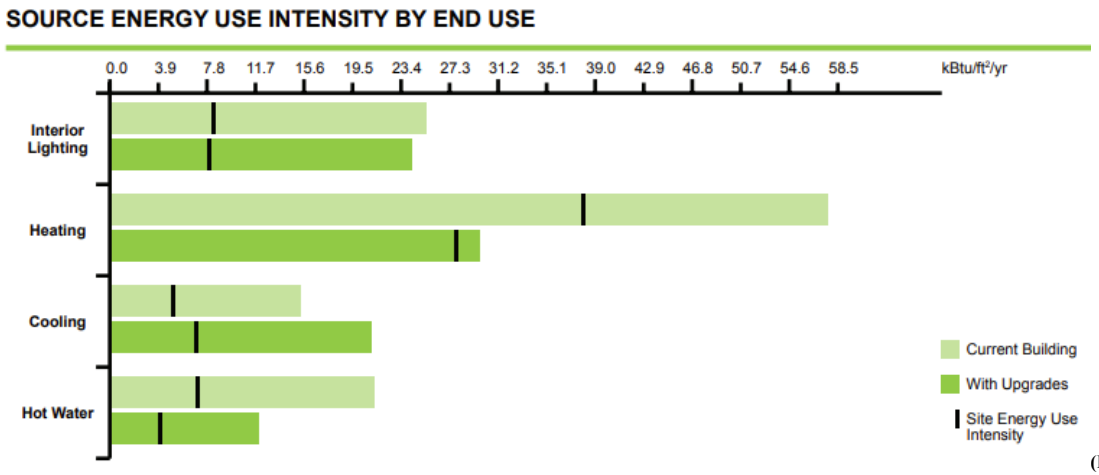
BMIC Justice Center

The BMIC Justice Center, completed in 2014, scored a ten on the DOE asset summary. Occupancy was assumed at 265 and hours of operation per week at 90.5.

Recommendations

In relation to the property's long hours and high occupancy, the DOE recommends the adoption of occupancy sensing interior lighting control to better align light supply with occupant demand. This lighting systems improvement would generate a relatively low increase for a moderate cost. Next, the DOE system recommends several improvements for the Justice Center's HVAC systems. An air-side economizer would improve efficiency by capturing free cooling by circulating outside air when appropriate. The investment would be low to medium with a moderate efficiency increase. In tandem, implementing demand-controlled ventilation (DCV) will further improve the economizer's ability to respond to changes in demand. DCV would require a medium-sized investment with moderate gains in efficiency. Upgrading fans with variable frequency drives would improve ventilation even further. Again, this final HVAC investment requires medium investment for moderate efficiency improvement. Finally, the installation of low-cost low-flow faucets would slightly improve hot water efficiency.

While these improvements would keep the Justice Center at a ten score, energy savings come in at an estimated 16 percent. The improvement's effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 6 DOE)

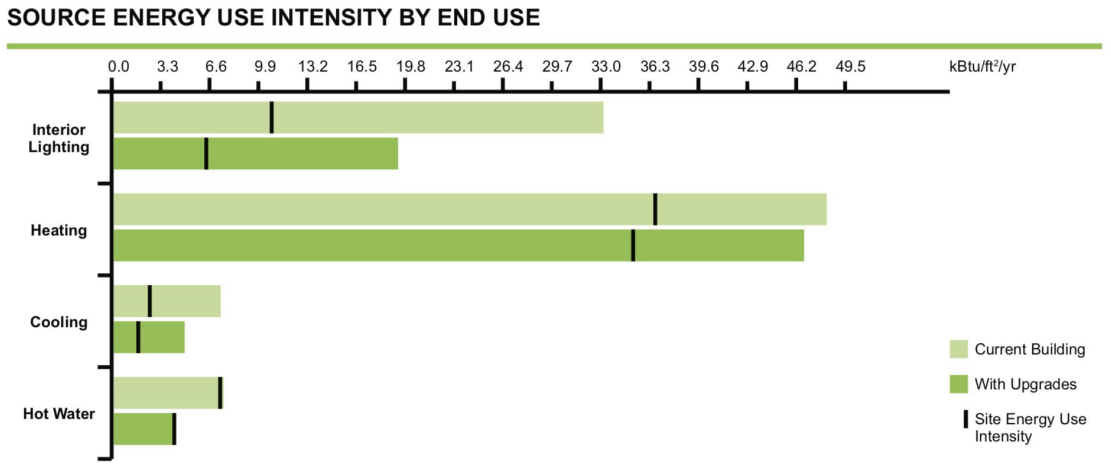
Bay Mills Head Start Child Development Building

The Bay Mills Head Start Child Development Building, built in 2008, was rated at seven out of ten by the DOE asset system. Occupancy was noted at 105, with weekly use at an average of 40.75 hours.

Recommendations

In lighting systems, transitioning lighting in fixture 1 to LED would moderately increase energy efficiency for low investment costs. Combining these more-efficient light sources with occupancy sensors would further increase efficiency for a low to medium investment cost. Shifting HVAC systems with the addition of demand-controlled ventilation will align ventilation expenditure with occupancy demand, moderately increasing conditioning efficiency for medium-cost investment. Further increasing demand alignment, installing variable frequency fans would allow for more efficiency with another medium-cost investment. Finally, low-flow faucets will provide relatively lower efficiency increases for a medium investment cost. The DOE system found no improvement opportunities in the building's envelope system.

Adopting the above recommendations will increase the Child Development Building's score to a 9, with energy cost savings calculated at 14%. The improvement's effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 7 DOE)

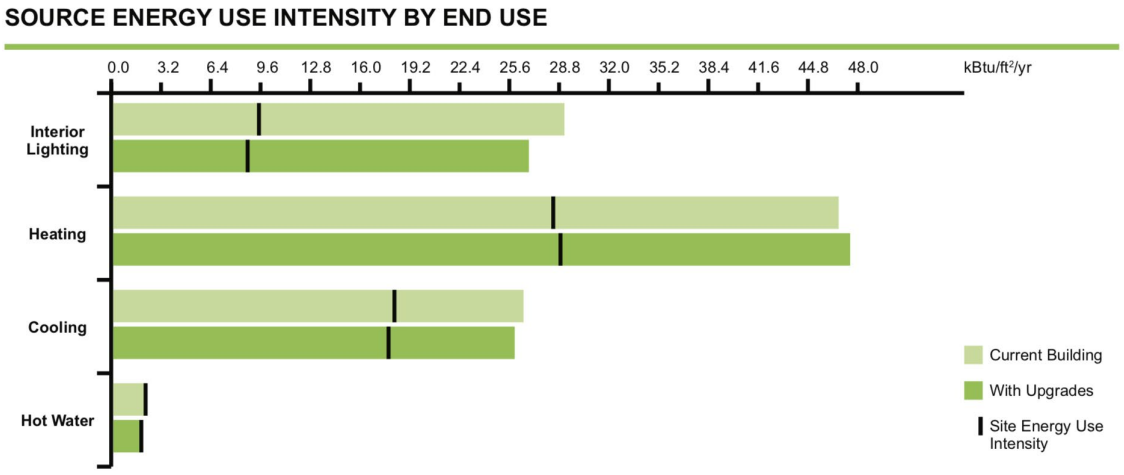
Armelia B. Parket Elder Center & History Department

The Armelia B. Parket Elder Center & History Department Building, constructed in 2001, scored a 7.5 on the DOE system. Occupancy was noted to be 65, and the building sees an average use of 46 hours a week.

Recommendations

Again, the property's lighting system can be improved by replacing older lighting with LED light fixtures. For a low investment, efficiency can be moderately increased. Variable frequency drive fans will moderately increase HVAC efficiency through supply-demand alignment for a medium cost. Low flow faucets can slightly increase heating efficiency for a medium investment cost. The building envelope elicited no recommendations.

With these improvements, the Center would remain at a score of 7.5; energy cost savings is calculated at 2%. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 8 DOE)

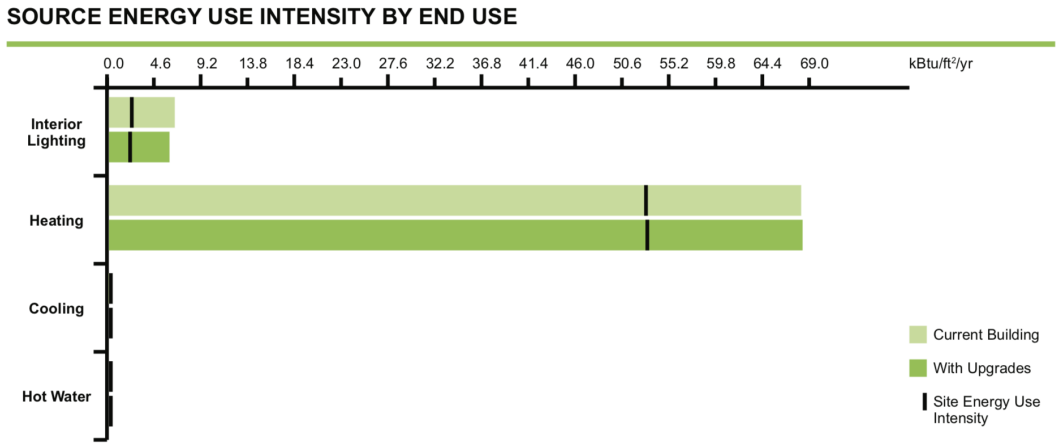
Commodity Foods

The Commodity Foods Building, constructed in 2005, scored a 7.5 on the DOE asset score.

Recommendations

The DOE assessment recommends a building-wide upgrade to LED lighting; this low-cost improvement would offer moderate energy efficiency gains.

The LED installation will improve the building's asset score to an eight as well as provide 1% in energy cost savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 9 DOE)

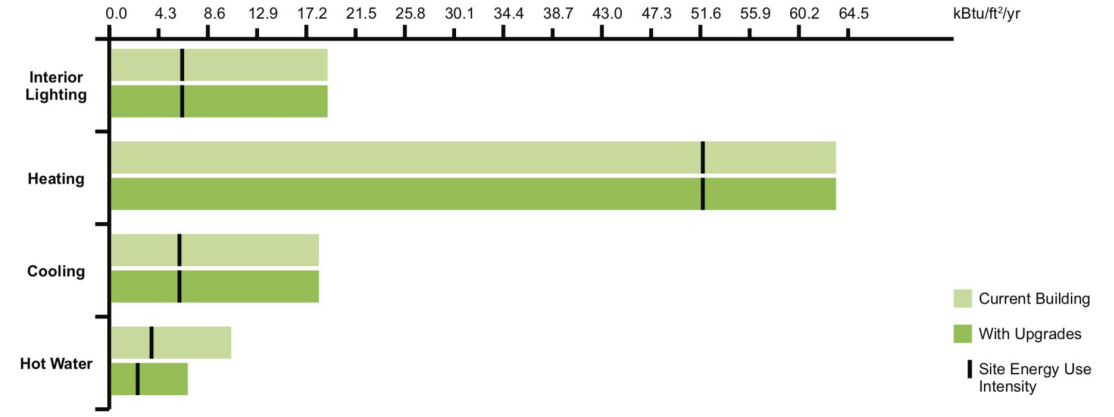
Mukwa Health & Fitness Center

The new Mukwa Health & Fitness Center, built in 2022, scored an 8.5 out of ten on the DOE asset assessment. Occupancy was estimated at 36 and weekly hours of use at 48.6.

Recommendations

The DOE system recommended the installation of low-flow faucets to improve hot water efficiency for a medium investment cost. The DOE tool made no other recommendations were made.

The low-flow faucet upgrade would increase the Health & Fitness Center's score to an even 9 with a 1% savings in energy costs. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 10 DOE)

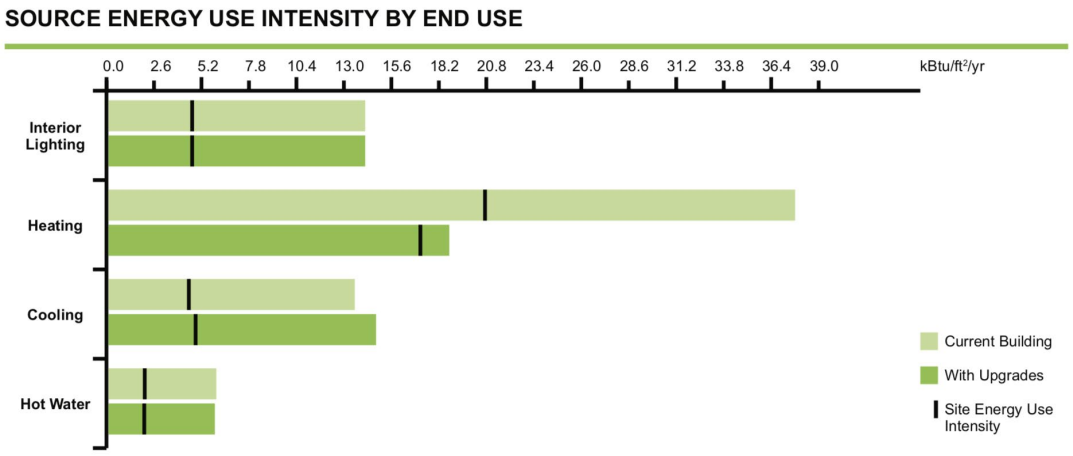
Culture Department

The BMIC Culture Department, finished in 2016, was rated ten out of ten on the DOE asset assessment. Occupancy was assumed at 41, and average weekly hours of use were set at 46.

Recommendations

Most improvements were identified in the building's HVAC system. First, the DOE assessment recommends the installation of an air-side economizer to capture amenable outside air for free cooling. For low to medium investment, the economizer offers a moderate increase in energy efficiency. In tandem with the economizer, adding variable fan drives will help adjust ventilation for closer alignment with occupant demand. This improvement would require another low to medium investment and offer moderate energy efficiency improvements. Finally, the assessment recommends installing low-flow faucets to moderately improve hot water efficiency for a medium investment cost. No opportunities were identified in the building envelope and lighting systems.

Should these recommendations be adopted, the Culture Department's score will remain a ten; however, there will be a 12% energy cost savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 12 DOE)

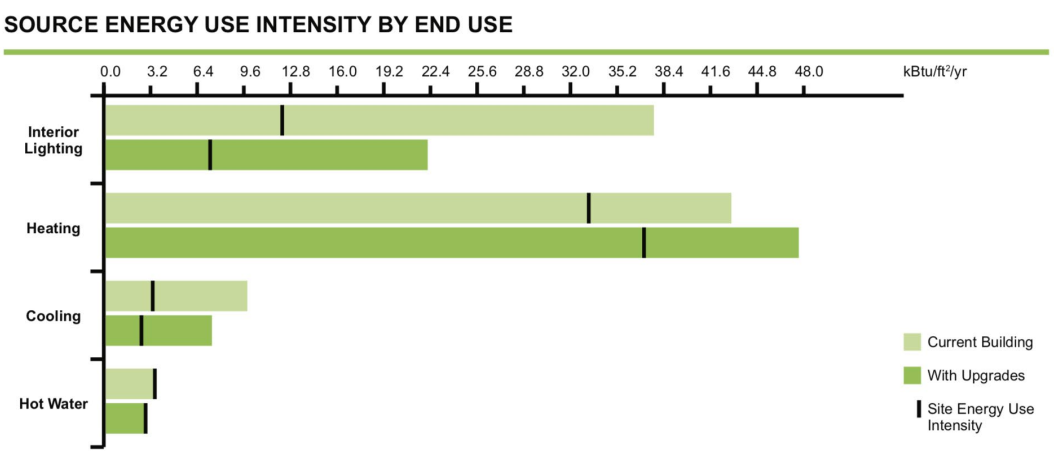
Bay Mills Housing Authority

The Bay Mills Housing Authority Building, completed in 2001, received a seven out of ten DOE asset score. Occupancy was estimated at 22 and weekly hours of use at 48.6.

Recommendations

Lighting systems improvement recommendations included light fixture replacements with LED lighting. This low-cost improvement would provide a moderate increase in energy efficiency. Again, adding occupancy sensors will augment LED replacement benefits by better coordinating lighting demand and energy supply for a low to medium-cost investment. Finally, low-flow faucet installation will improve hot water efficiency. HVAC and Lighting systems warranted no improvement recommendations.

These changes will increase the property's DOE asset score to 8.5 while providing an 11% energy costs savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 13 DOE)

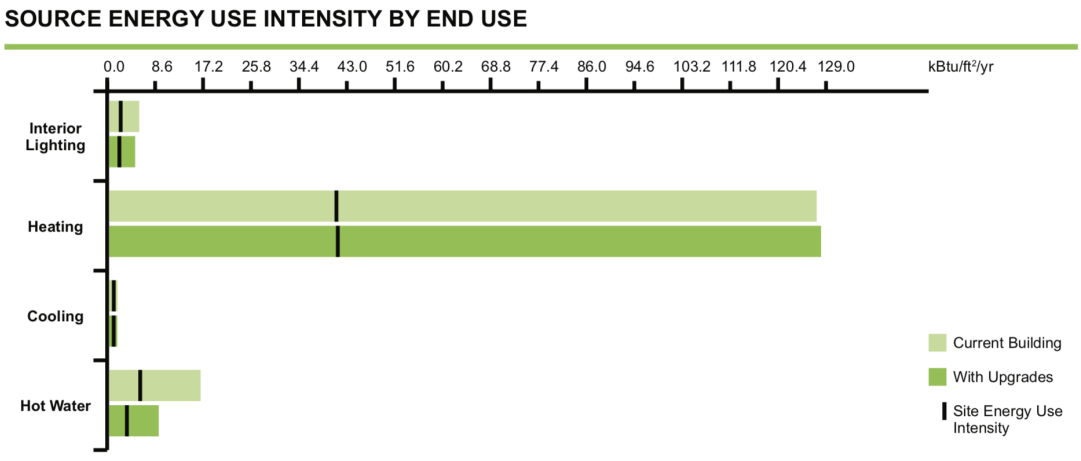
Ojibwe Charter School

The Ojibwe Charter School, constructed in 2002, received a six out of ten DOE asset score. Occupancy was estimated at 161 persons, and hours of operation per week averaged 40.75.

Recommendations

In lighting systems, the DOE assessment recommends upgrading to LED lighting, a low-cost investment for a moderate efficiency increase. Secondly, interior lighting systems efficiency can be improved with the addition of occupancy sensors to better align usage with demand. These sensors would require a medium-sized investment. Low-flow faucet upgrades would increase water heating efficiency for a medium-sized investment cost. For HVAC, the School relies on seven wall-mounted heat pumps for heating and cooling; these were installed during construction in 2002. Heat pump technology and heating capabilities have since improved dramatically. In fact, the use of older heat pumps adds high costs to the building's HVAC usage, especially when outside air temperatures approach freezing. Newer units available for northern climates can now provide heat to -13 degrees F. Upgrading to these newer models would decrease Electrical consumption by 15% for cooling and at least 50% for heating. Purchasing heat pumps with Variable Refrigerant Flow (VRF) can provide even more savings by only running compressors at speeds to match the loads.

The Charter School has one of the highest potential improvement rates through recommendation upgrades. Adopting non-HVAC improvements would improve its score to a 7; however, the heat pump upgrades alone will improve overall efficiency by over 50%. The figure below represents the improvements' effect in terms of fuel end use change is illustrated in the figure below. Heat pump upgrades are not included in the figure as these recommendations were made by the project's contractor, not the DOE system.



(Fig. 15 DOE)

Bay Mills Resort & Casino

Overall, the Bay Mills Resort & Casino, built in 1995, scored a 7.5 out of 10 on the DOE assessment. Because of the structure's size, the DOE assessment output sheet contains several section-specific ratings for the retail and lodging portions of the structure; this report will focus on overall recommendations from the project expert contractor and include the original scoring sheet in the appendix.

Recommendations

In the lodging section, 163 Wall-Mounted Packaged Terminal Air Conditioners (PTAC) are used to heat and cool individual hotel rooms. These units rely on inefficient electric resistance for heating. Heat pump PTACs are now available, which move heat out of the rooms to the outside air in the summer and extract heat from the air in the winter to warm the room. The existing PTACs were installed in the 1990s and had a coefficient of performance (COP) of 3.2 for cooling but only 1.0 for heating. A modern heat pump will approach a COP of 4.0 for both heating and cooling. Thus cooling electrical consumption may decline by 25%, while heating will go down by 75%. Furthermore, smart heat pump units are available that use occupancy sensors to reduce energy expenditure when the room is unoccupied, generating further savings.

In lighting systems, an overall conversion to LED lighting will greatly reduce costs. Also, upgrading to advanced lighting controls (ALC) fixtures will allow for programming, dimming, and adjusting to daylight to further reduce unnecessary energy use. The recommended order for improvement is the Casino, Lobby, Back Bay Bar & Casino, hotel rooms, Conference Center, and Sacy's restaurant.

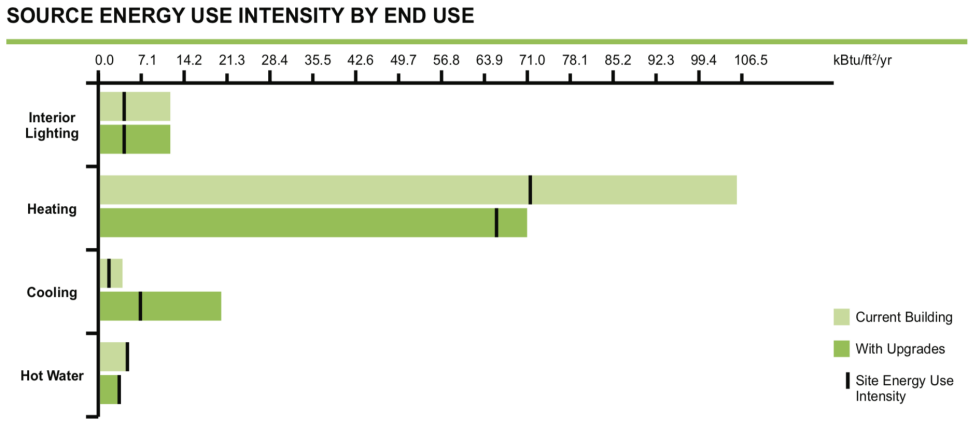
Wild Bluff Golf Course

The Wild Bluff Golf Course Building, constructed in 1999, was rated at 9.5 on the DOE assessment score. Occupancy was estimated at 89 persons and hours of use per week at 46.3.

Recommendations

The DOE system recommended the improvement of HVAC systems via air-side economizer instillation. This would allow HVAC systems to make use of free conditioning opportunities presented by amenable outside weather. The upgrade would provide a moderate efficiency increase at a low to medium-cost investment. In addition, upgrading the HVAC with variable drive fans will further reduce energy waste through increased customizability. For a medium cost, this improvement offers moderate efficiency gains. Finally, low-flow faucets will decrease water-heating waste at a medium cost.

The above improvements would improve the Gulf Course's DOE score to a ten and provide an estimated 14% energy cost savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 16 DOE)

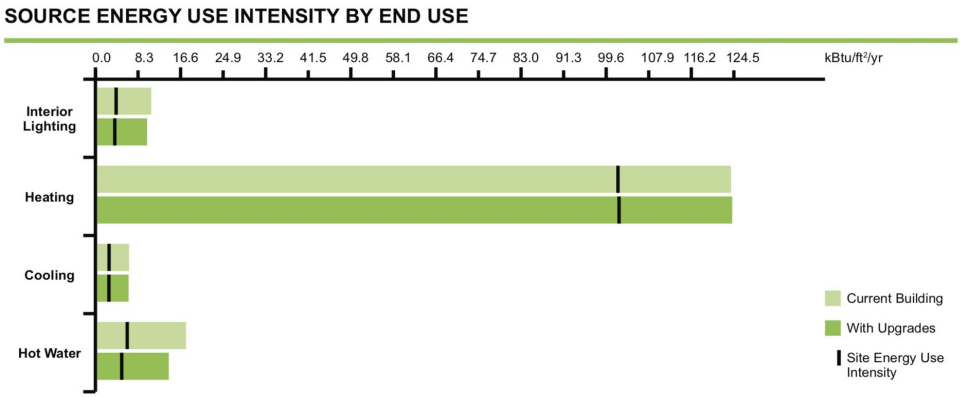
Bay Mart Gas Station

The Bay Mart Gas Station, completed in 1998, was rated by the DOE asset assessment at an 8.5. The building's occupancy was estimated at 31 persons, and its average weekly hours of use at 46.3.

Recommendations

The DOE assessment recommends upgrading all non-LED fixtures to LED lighting, a low investment improvement creating moderate efficiency improvements. Low-flow faucet upgrades were also identified as an improvement opportunity.

The recommended improvements would raise Bay Mart's score to a nine and create 2% in energy savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 17 DOE)

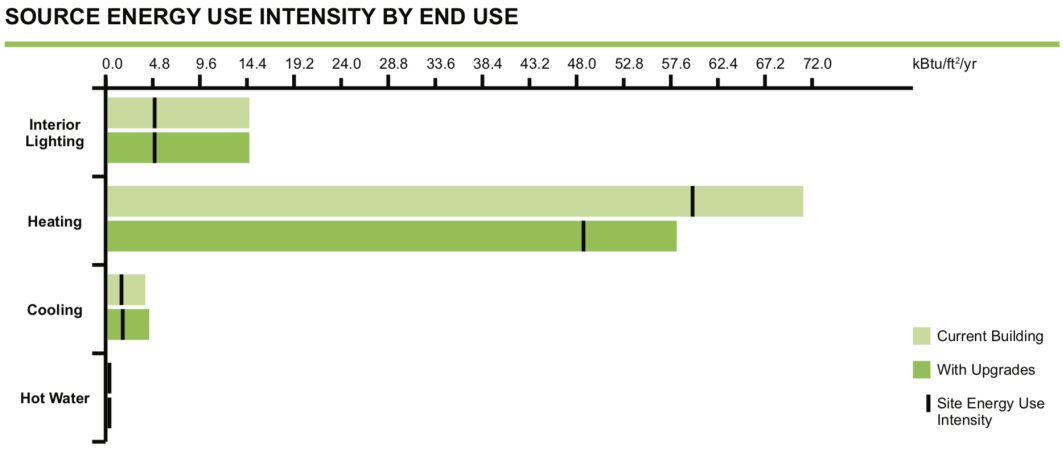
Four Seasons Market & Deli

The Four Seasons Market & Deli, built in 2020, received a ten on the DOE asset assessment. Occupancy was estimated at 95 persons and weekly hours of operation at 46.3.

Recommendations

The only DOE recommendation for the property is in regard to envelope improvement. Assessing potential leakage points, doors, windows, walls, attics, and basements for integrity under both negative and positive pressure can help identify points requiring improvement. Assessment and improvement stand to increase efficiency for a low to medium investment cost.

While the building's DOE score will remain a 10, these improvements stand to provide 13% in energy cost savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 18 DOE)

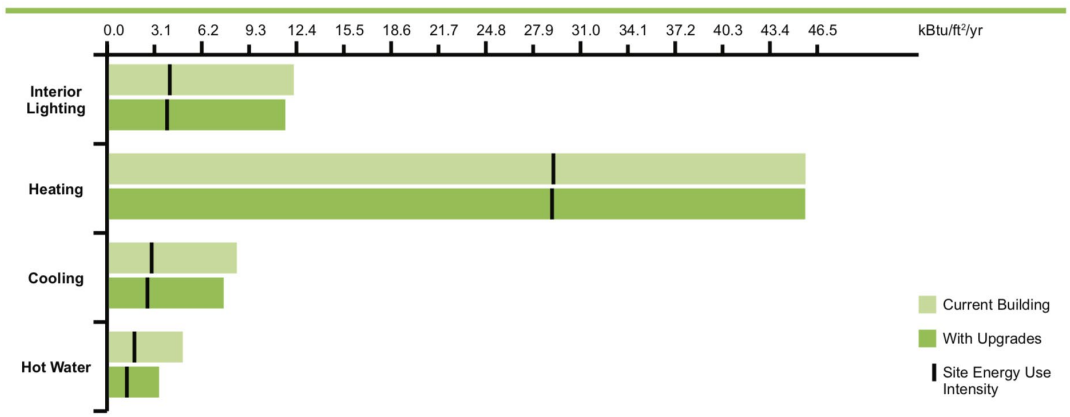
Bay Mills Fire Crew - Migizi Hall

Migizi Fire Hall, built in 1998, was rated a nine during the DOE assessment process. Its occupancy was estimated at 63 persons and the weekly average hours of operation at 48.6.

Recommendations

Lighting systems could be improved by installing occupancy sensors to limit overuse for a low to medium-cost investment. HVAC systems can be made more efficient by upgrading ventilation control to better align demand and supply. This upgrade could be further augmented through the addition of variable frequency drive fans; both improvements require a medium cost investment for a moderate efficiency increase. Finally, low-flow faucets would reduce water-heating waste for a medium investment cost.

The recommendations above will increase Migizi Fire Hall's rating to 9.5 and provide 3% energy savings. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 19 DOE)

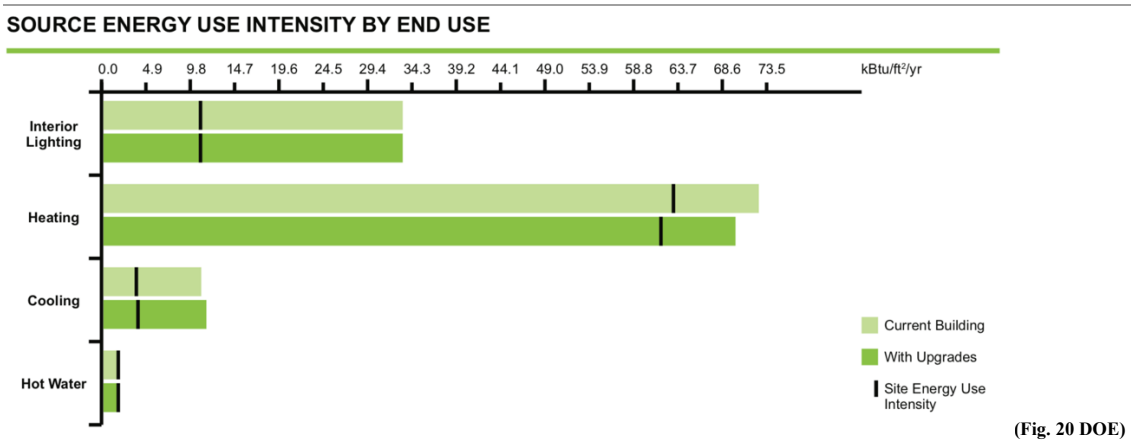
Ellen Marshall Health Center

The new Ellen Marshall Health Center, completed in 2022, received a 9 on the DOE asset rating scale. Its assumed occupancy was set at 159 persons and its average hours of use per week at 48.6.

Recommendations

Both recommended improvements create efficiency benefits in the building's HVAC system. Firstly, the DOE system recommends adjustments to the HVAC's VAV flow boxes where possible, lowering the minimum ventilation flows to reduce waste when demand is low. For a medium sized investment cost, this change would provide high efficiency gains. Secondly, the assessment recommends the addition of air temperature reset sensors. This technology automatically resets building average temperature in response to demand and outside weather conditions, moderately increasing efficiency for a low cost.

Adoption of the above upgrades would keep the Ellen Marshall Center's score at 9 while providing a 1% energy cost savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 20 DOE)

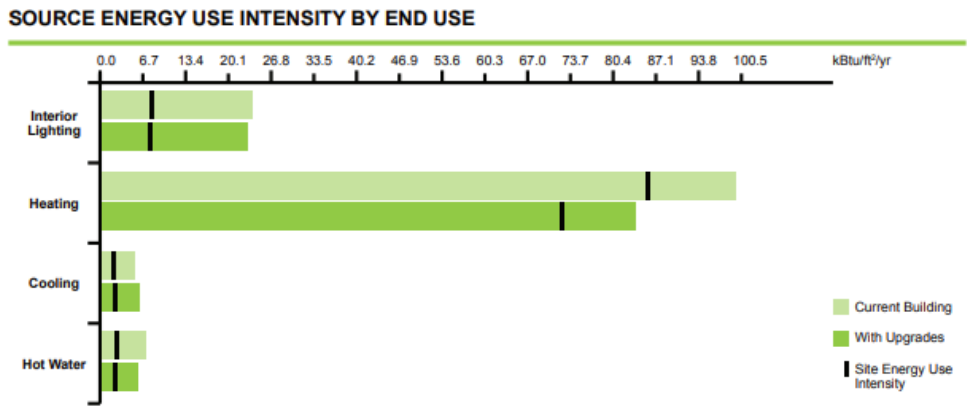
Waishkey Bay Farm

Waishkey Bay Farm, built in 2015, was scored at 5 on the DOE asset rating scale. Its assumed occupancy was set at 14 persons and its average hours of use per week at 48.6.

Recommendations

The DOE system generated several recommendations. For the building envelope, the tool recommends whole-building pressurization tests to determine leakage locations. Improving the building envelope for a moderate investment cost will improve efficiency. Occupancy sensors throughout the building can help reduce lighting systems waste for a moderate to high investment. Low-flow faucets will reduce how-water waste for a moderate investment.

Adoption of these improvements would improve Waishkey Bay Farm's score to a 5.5 with a 10% energy cost savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 21 DOE)

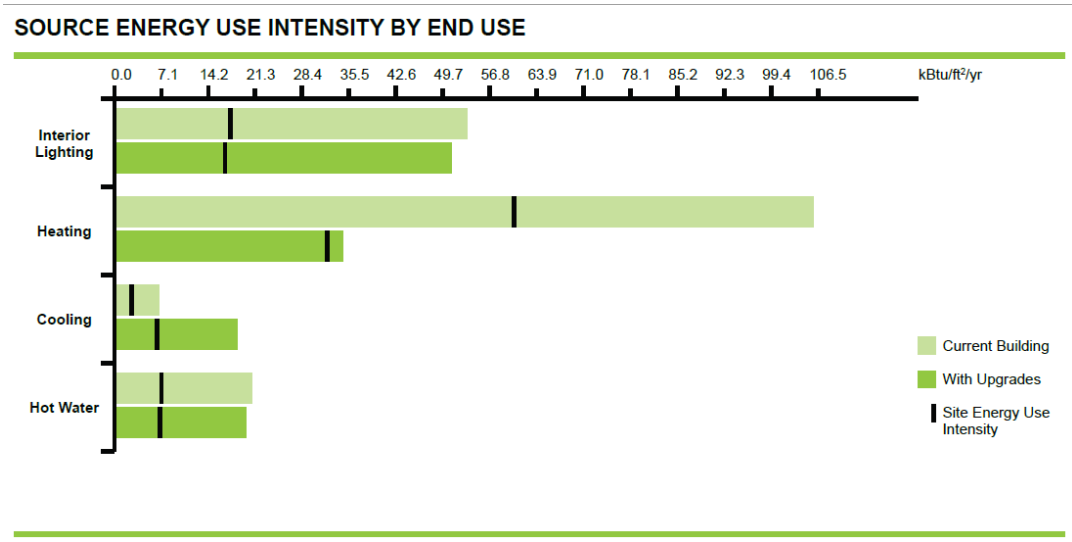
BMIC Maintenance Department

The DOE system generated several recommendations. The BMIC Maintenance Department building, finished in 2022, scored a 3 on the DOE asset rating scale. Its assumed average hours of use per week was set at 48.6. The structure is used for vehicle and equipment storage and office space.

Recommendations

Sealing the building envelope and upgrading the roof insulation will provide some benefit. Installing occupancy sensors for interior lighting was also recommended. Recommendations for HVAC and Hot Water are as follows. For the former, the tool recommends installing an air-side economizer system to allow for cooling with outside air. This low to moderate sized investment offers middle range efficiency improvements. Relatedly, installing a Variable Frequency Drive Fan Control will allow for demand synchronized air conditioning. Improving the HVAC for a medium sized investment cost will moderately improve efficiency. For Hot Water systems, low-flow faucets will improve efficiency for moderate cost.

Adoption of these improvements will improve the Maintenance Building's score to 6.0, and offer 28% energy cost savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 22 DOE)

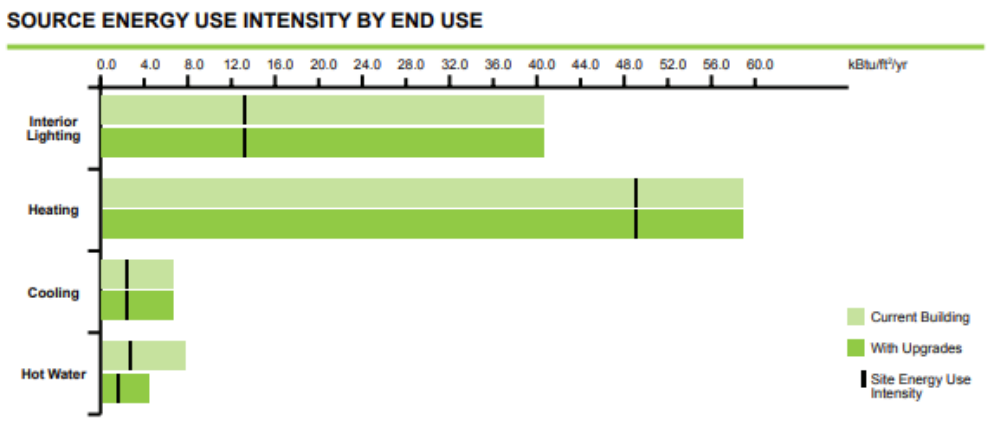
Northern Lights Cannabis Company

The Northern Lights Cannabis Company, constructed in 2019, scored a 9.5 on the DOE asset rating scale. Its assumed occupancy was 390 persons and average hours of use per week was set at 46.3.

Recommendations

Given how efficient this structure is, the only generated recommendation was the addition of low flow faucets. This would improve the hot water system's efficiency for a medium investment cost.

While, adoption of these improvements won't improve the building's score, they do offer 2% energy cost savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 23 DOE)

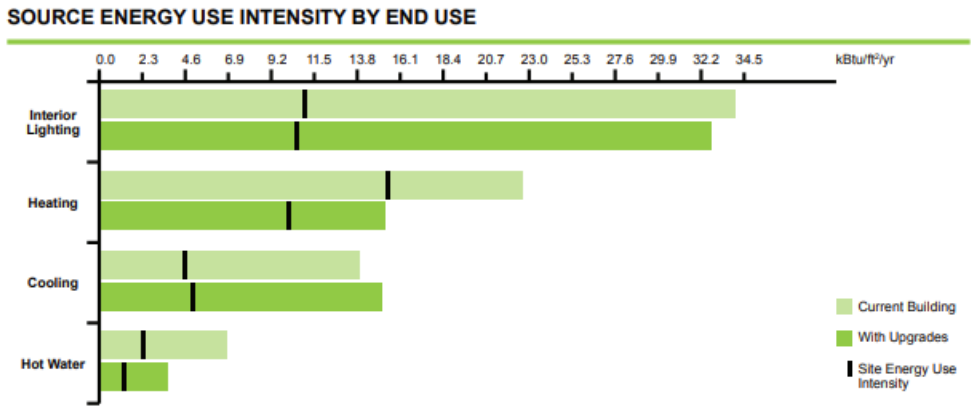
Bay Mills Community College

The Bay Mills Community College, opened in 2018, received an 8 on the DOE asset rating scale. Its assumed occupancy was 434 persons and average hours of use per week was calculated at 45.11.

Recommendations

There were a variety of improvement recommendations for the college. First, conducting pressure tests to identify building envelope leakage and enhancing the envelope's weak points and joints would reduce leakage for a medium sized investment. Occupancy lighting sensors would improve system efficiency by coordinating lighting supply and demand for moderate to large investment cost. Similarly, implementing demand controlled ventilation will moderately improve HVAC efficiency for medium cost. This improvement requires variable frequency drive supply fans, which will further improve efficiency for medium cost. Finally, installation of low flow faucets throughout the building will improve hot water efficiency for a medium investment.

Adopting these improvements will increase the Community College's score to a 9.5, conferring a 10% energy cost savings benefit. The improvements' effect in terms of fuel end use change is illustrated in the figure below.



(Fig. 24 DOE)

Conclusion

This energy efficiency audit elicited useful and actionable data for 27 BMIC properties constructed between 1981 and 2022. While the body of this report contains building-specific assessments and recommendations, several emergent recommendations, which apply to all or most structures considered, are worth noting.

All of the buildings audited utilize air conditioners, chillers, heat pumps, furnaces, and boilers for cooling and heating. The efficiency and quality of technology used in newer available iterations of this equipment have improved dramatically over the past forty years. Prior to 2000, the SEER (Season Energy Efficiency Ratio) rating for air conditioners and heat pumps when cooling was 10; in 2015, it increased to 14, a 40% increase in efficiency. Now, there are units available with a SEER as high as 22. HSPF (Heating Seasonal Performance Factor) is used to rate heat pumps during the heating season. Before 2000, the standard was 6.7. It was raised to eight in 2015. High-end units are now available with an HSPF of 13, almost double the old standard. Similarly, furnace and boiler efficiency standards have gone from 81% to 91%. There are many models available with 95+ % efficiency. Most units currently in use at BMIC do not warrant replacement based on energy savings alone. However, the useful life of air conditioners is 12 to 15 years and over 20 for furnaces and boilers. Therefore, building managers should keep track of repair bills; once they become comparable to replacement rates, upgrading to the most efficient equipment available should be considered.

Many buildings are only occupied 40 to 50 hours per week. Programmable thermostats should be used to maintain lower temperatures during the unoccupied hours during the heating season. Air conditioners should be turned off. After a general upgrade to LED lighting, lighting fixtures should be linked to occupancy sensors to reduce waste. The new Ellen Marshall Medical Center does have a Building Management System which has the capability of saving energy through supply-demand alignment; this model should stand as an example to other buildings as they are upgraded.

Please contact the Superior Watershed Partnership with any questions, more recommendations, or other inquiries.

SUPERIOR WATERSHED PARTNERSHIP and LAND CONSERVANCY

Provided by the
Superior Watershed Partnership

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Marquette, Michigan 49855
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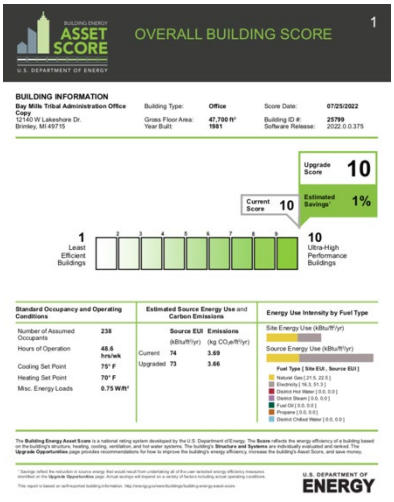
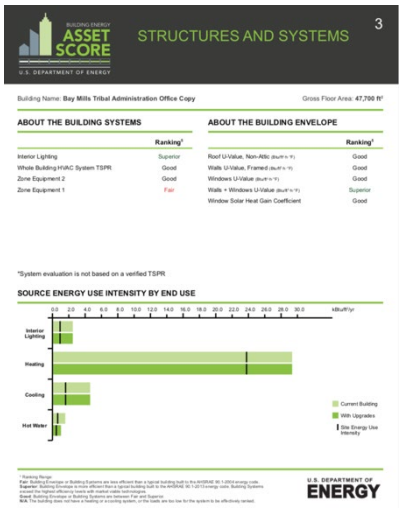
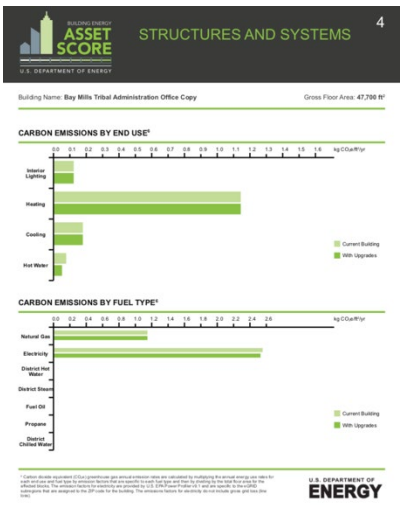
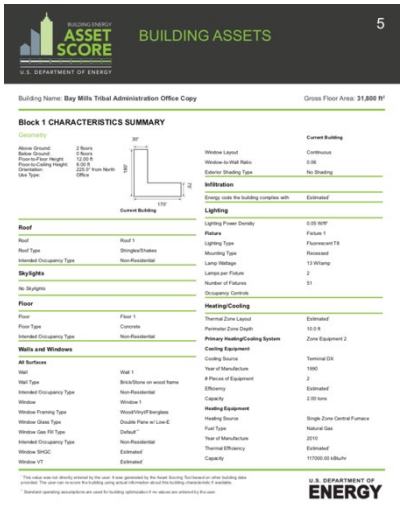
Appendix

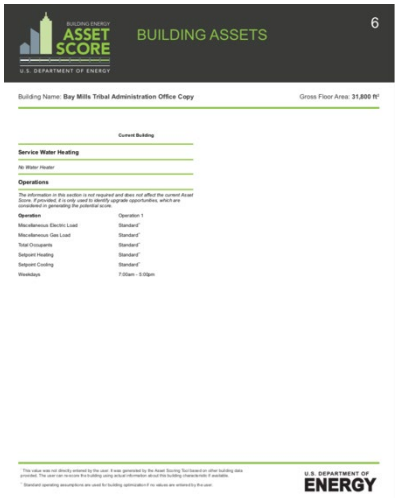
Tribal Administration

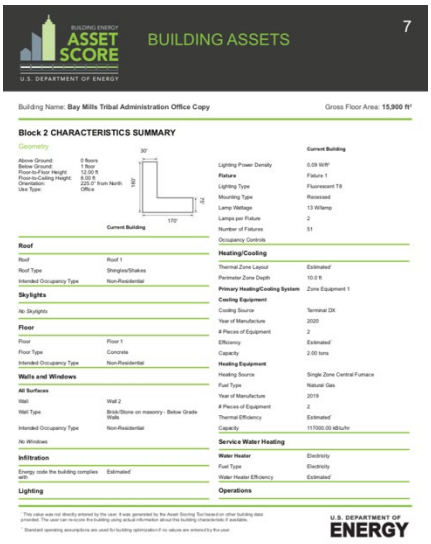












BUILDING ASSETS 7

Building Name: **Bay Mills Tribal Administration Office Copy** Gross Floor Area: **15,900 ft²**

Block 2 CHARACTERISTICS SUMMARY

Geometry

Above Ground:	0 floors
Below Ground:	1 floor
Floor-to-Floor Height:	12.00 ft
Floor-to-Ceiling Height:	8.00 ft
Orientation:	330.0° from North
Use Type:	Office

Current Building

Roof

Roof	Roof 1
Roof Type	Shingles/Shakes
Intended Occupancy Type	Non-Residential

Skylights

No Skylights

Floor

Floor	Floor 1
Floor Type	Concrete
Intended Occupancy Type	Non-Residential

Walls and Windows

All Surfaces

Wall	Wall 2
Wall Type	Brick/Stone on masonry - Below Grade Walls
Intended Occupancy Type	Non-Residential

No Windows

Infiltration

Energy code the building complies with: Estimated*

Lighting

	Current Building
Lighting Power Density	0.09 W/ft²
Fixture	Fixture 1
Lighting Type	Fluorescent T8
Mounting Type	Recessed
Lamp Wattage	13 Wlamp
Lamps per Fixture	2
Number of Fixtures	51
Occupancy Controls	

Heating/Cooling

Thermal Zone Layout	Estimated*
Perimeter Zone Depth	10.0 ft
Primary Heating/Cooling System	Zone Equipment 1
Cooling Equipment	
Cooling Source	Terminal DX
Year of Manufacture	2020
# Pieces of Equipment	2
Efficiency	Estimated*
Capacity	2.00 tons
Heating Equipment	
Heating Source	Single Zone Central Furnace
Fuel Type	Natural Gas
Year of Manufacture	2019
# Pieces of Equipment	2
Thermal Efficiency	Estimated*
Capacity	117000.00 kBtu/hr

Service Water Heating

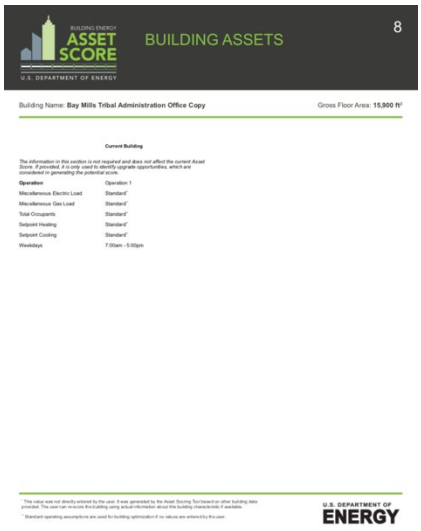
Water Heater	Electricity
Fuel Type	Electricity
Water Heater Efficiency	Estimated*

Operations

* This value was not directly entered by the user. It was generated by the Asset Scoring Tool based on other building data provided. The user can re-score the building using actual information about this building characteristic if available.

* Standard operating assumptions are used for building optimization if no values are entered by the user.

U.S. DEPARTMENT OF ENERGY



BUILDING ASSETS 8

Building Name: **Bay Mills Tribal Administration Office Copy** Gross Floor Area: **15,900 ft²**

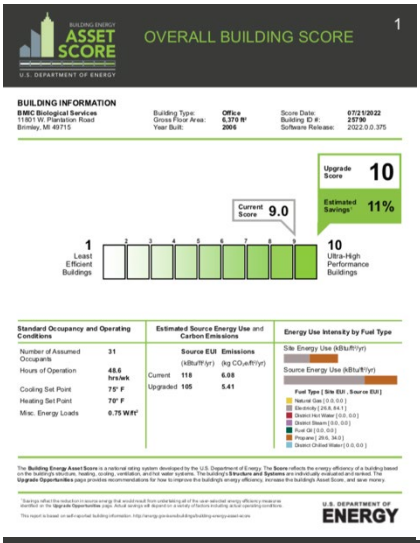
	Current Building
The information in this section is not required and does not affect the current Asset Score. If provided, it is only used to identify upgrade opportunities, which are considered in generating the potential score.	
Operation	Operation 1
Miscellaneous Electric Load	Standard*
Miscellaneous Gas Load	Standard*
Total Occupants	Standard*
Setpoint Heating	Standard*
Setpoint Cooling	Standard*
Weekdays	7:00am - 5:00pm

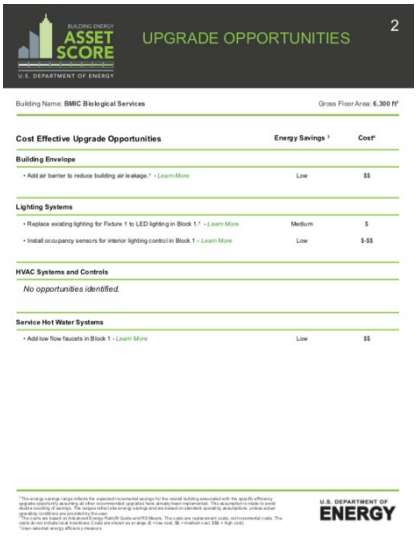
* This value was not directly entered by the user. It was generated by the Asset Scoring Tool based on other building data provided. The user can re-score the building using actual information about this building characteristic if available.

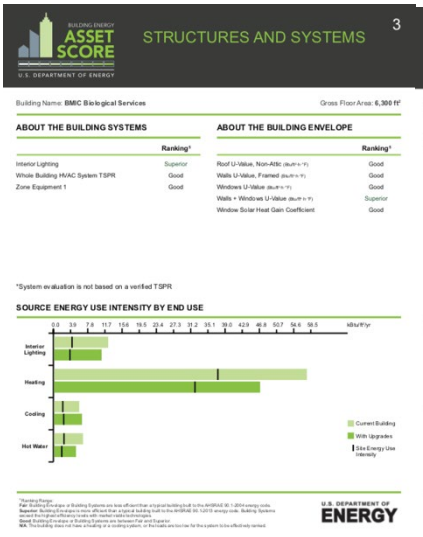
* Standard operating assumptions are used for building optimization if no values are entered by the user.

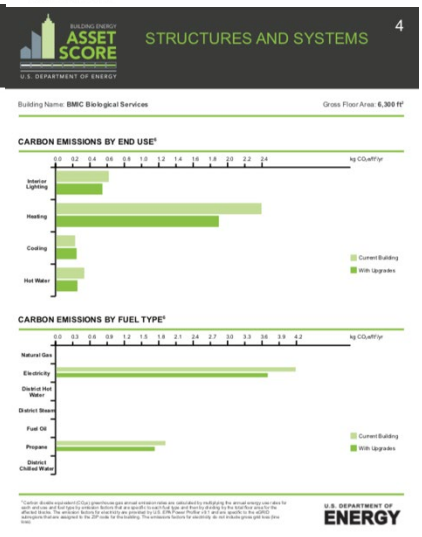
U.S. DEPARTMENT OF ENERGY

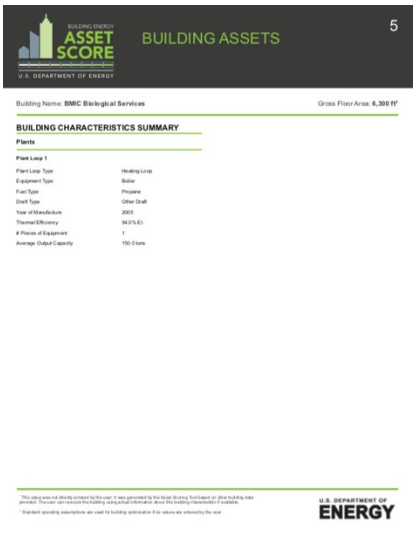
BMIC Biological Services & Conservation

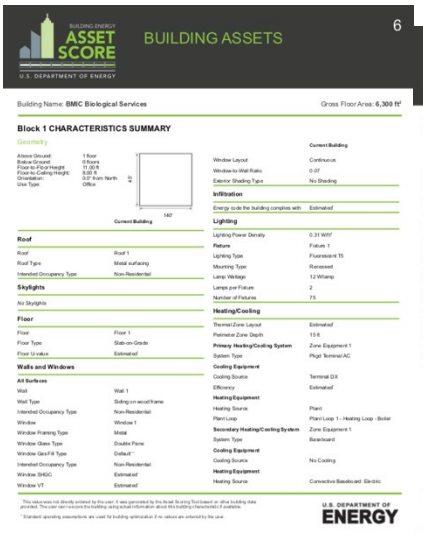




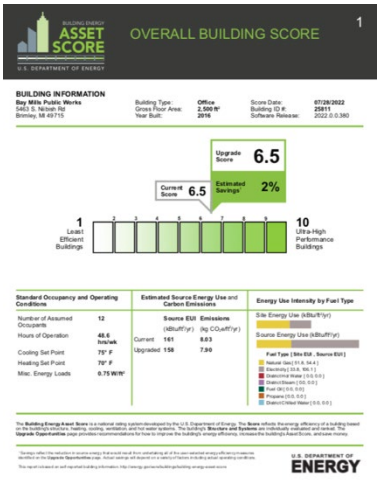


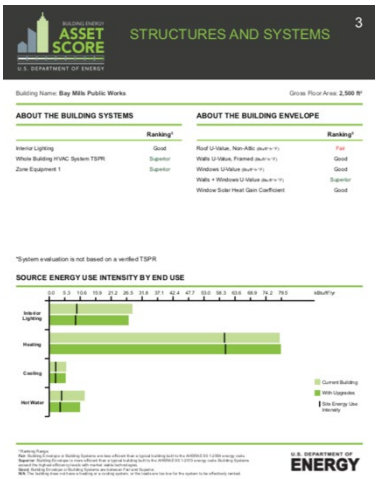


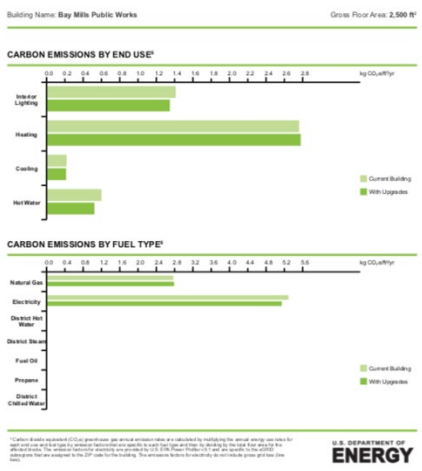




BMIC Public Works

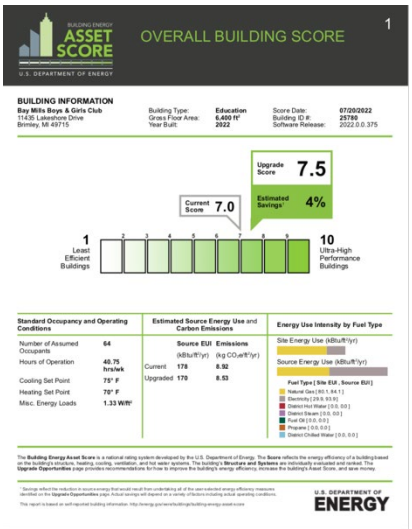


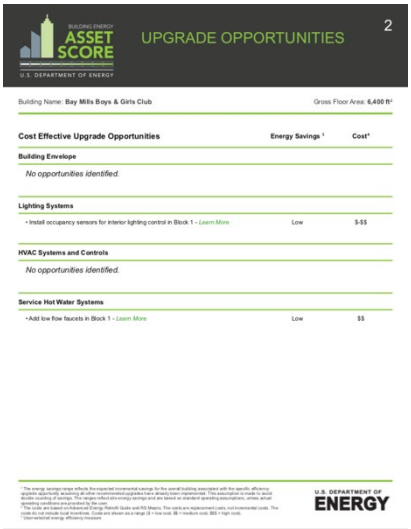


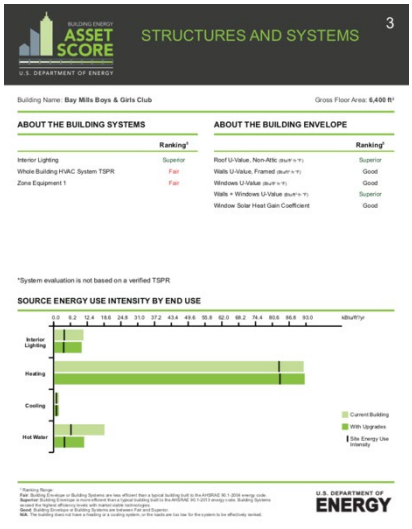


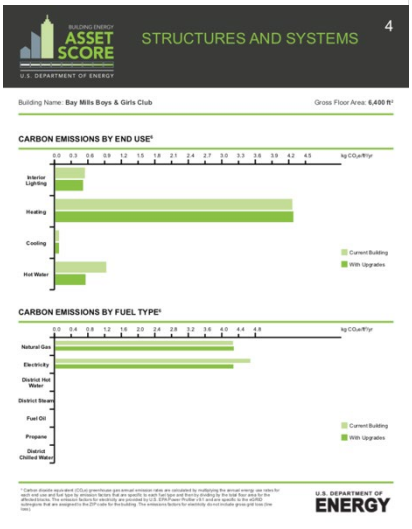
Advanced Office Technologies

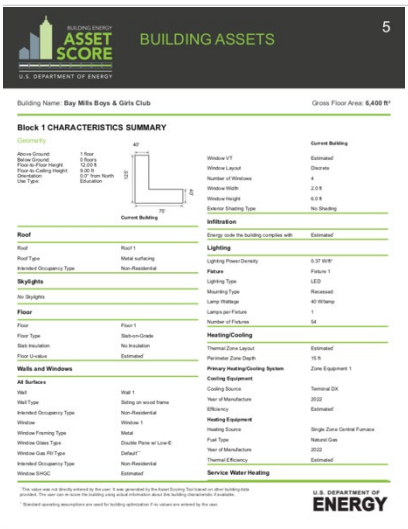
Boys and Girls Club of Bay Mills

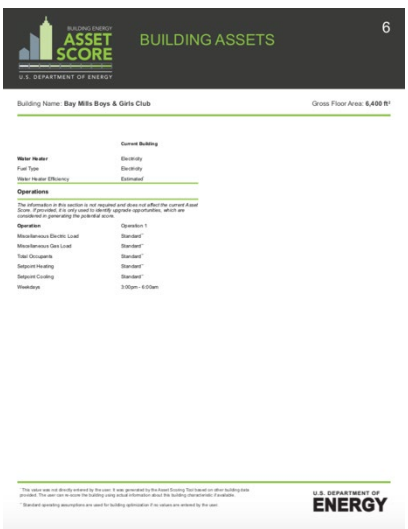




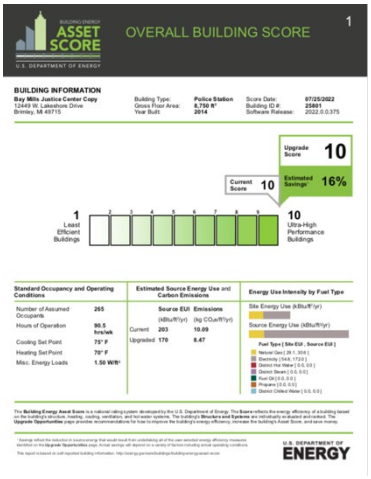


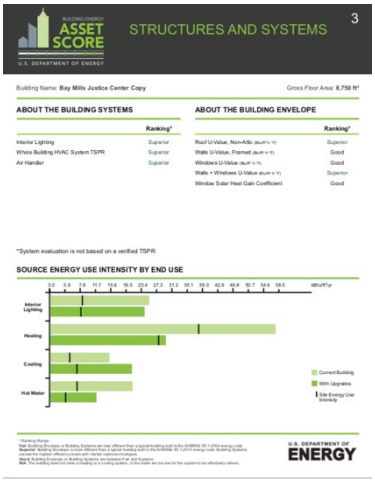


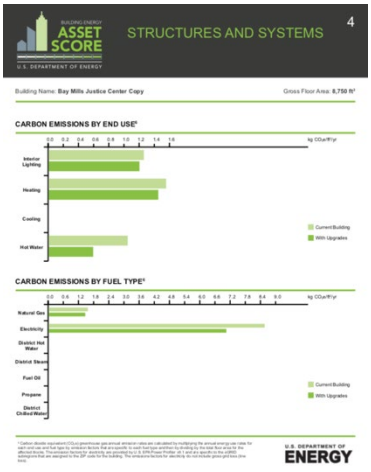


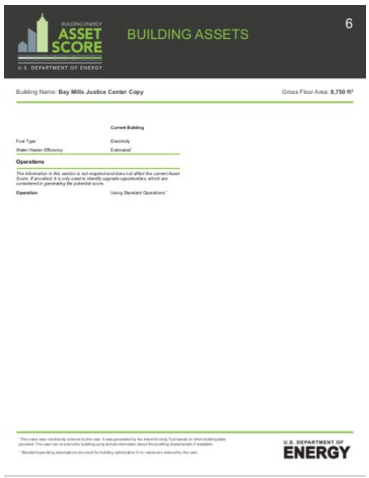


Bay Mills Justice Center

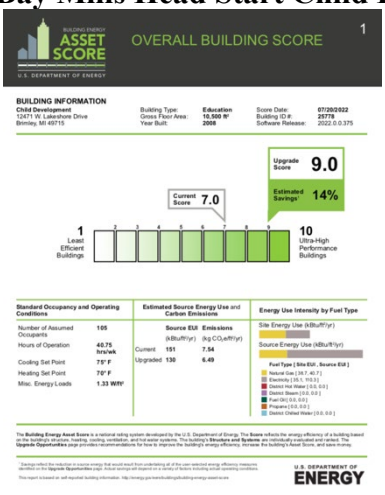








Bay Mills Head Start Child Development Center


OVERALL BUILDING SCORE 1

BUILDING INFORMATION
Child Development
12471 W. Lakeshore Drive
Brimley, MI 49715

Building Type: Education
Gross Floor Area: 10,500 ft²
Year Built: 2008

Score Date: 07/20/2022
Building ID #: 25779
Software Release: 2022.0.0.375

Upgrade Score 9.0
Estimated Savings¹ 14%
Current Score 7.0
1 Least Efficient Buildings
10 Ultra-High Performance Buildings

Standard Occupancy and Operating Conditions
Number of Assumed Occupants 105
Hours of Operation 40.75 hrs/wk
Cooling Set Point 75° F
Heating Set Point 70° F
Misc. Energy Loads 1.33 W/ft²

Estimated Source Energy Use and Carbon Emissions
Source EUI (kBtu/ft²/yr) Emissions (kg CO₂e/ft²/yr)
Current 151 7.54
Upgraded 130 6.49

Energy Use Intensity by Fuel Type
Site Energy Use (kBtu/ft²/yr)
Source Energy Use (kBtu/ft²/yr)

The Building Energy Asset Score is a national rating system developed by the U.S. Department of Energy. The Score reflects the energy efficiency of a building based on the building's structure, heating, cooling, ventilation, and hot water systems. The building's Structure and Systems are individually evaluated and ranked. The Upgrade Opportunities page provides recommendations for how to improve the building's energy efficiency, increase the building's Asset Score, and save money.

U.S. DEPARTMENT OF ENERGY


UPGRADE OPPORTUNITIES 2

Building Name: Child Development
Gross Floor Area: 10,500 ft²

Cost Effective Upgrade Opportunities | Energy Savings¹ | Cost²

Building Envelope
No opportunities identified.

Lighting Systems
• Replace existing lighting for Fixture 1 to LED lighting in Block 1 ¹ - Learn More — Medium — $
• Install occupancy sensors for interior lighting control in Block 1 - Learn More — Low — $-$$

HVAC Systems and Controls
• Implement demand controlled ventilation (DCV) in Block 1 - Learn More — Medium — $$
• Add variable frequency drive to supply fans in Block 1 - Learn More — Medium — $$

Service Hot Water Systems
• Add low flow faucets in Block 1 - Learn More — Low — $$

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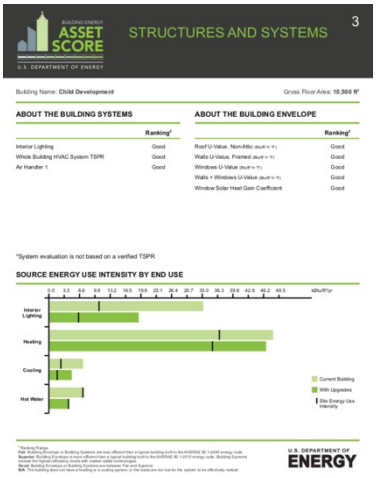
STRUCTURES AND SYSTEMS 3

Building Name: Child Development
Gross Floor Area: 10,500 ft²

ABOUT THE BUILDING SYSTEMS
Ranking²
Interior Lighting — Good
Whole Building HVAC System TSPR — Good
Air Handler 1 — Good

ABOUT THE BUILDING ENVELOPE
Ranking²
Roof U-Value, Non-Attic — Good
Walls U-Value, Framed — Good
Windows U-Value — Good
Walls + Windows U-Value — Good
Window Solar Heat Gain Coefficient — Good

*System evaluation is not based on a verified TSPR

SOURCE ENERGY USE INTENSITY BY END USE
Interior Lighting
Heating
Cooling
Hot Water
Current Building
With Upgrades
Site Energy Use Intensity

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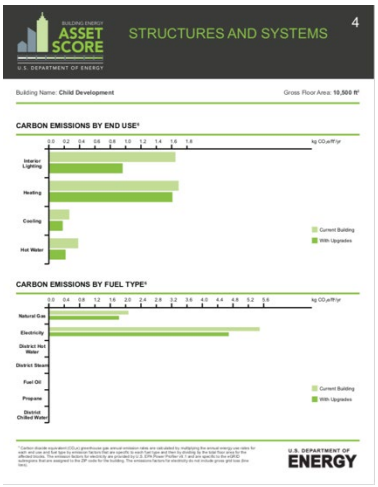

STRUCTURES AND SYSTEMS 4

Building Name: Child Development
Gross Floor Area: 10,500 ft²

CARBON EMISSIONS BY END USE¹
kg CO₂e/ft²/yr
Interior Lighting
Heating
Cooling
Hot Water
Current Building
With Upgrades

CARBON EMISSIONS BY FUEL TYPE¹
kg CO₂e/ft²/yr
Natural Gas
Electricity
District Hot Water
District Steam
Fuel Oil
Propane
District Chilled Water
Current Building
With Upgrades

U.S. DEPARTMENT OF ENERGY


BUILDING ASSETS 5

Building Name: Child Development
Gross Floor Area: 10,500 ft²

Block 1 CHARACTERISTICS SUMMARY
Geometry
Current Building

Roof
Walls and Windows
All Surfaces
Skylights
Floor
Infiltration
Lighting
Heating/Cooling
Heating Equipment
Cooling Equipment

U.S. DEPARTMENT OF ENERGY

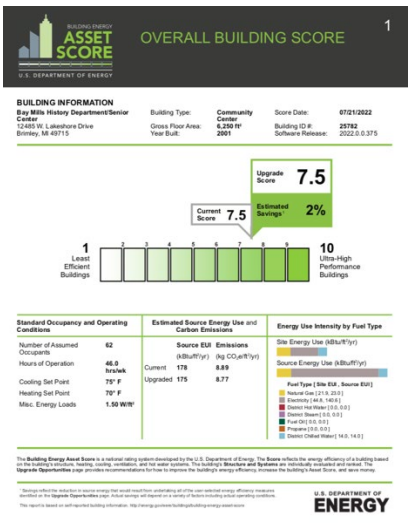

BUILDING ASSETS 6

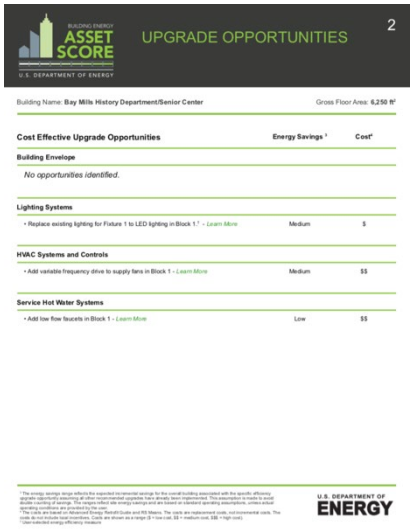
Building Name: Child Development
Gross Floor Area: 10,500 ft²

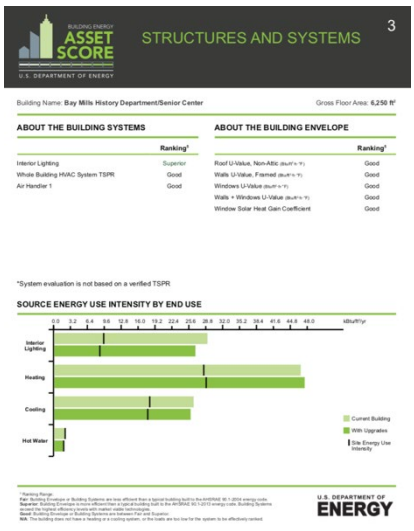
Current Building
Distribution
Fan Systems
Service Water Heating
Operations

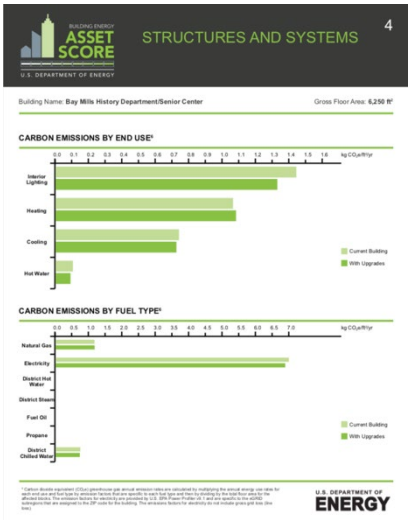
U.S. DEPARTMENT OF ENERGY

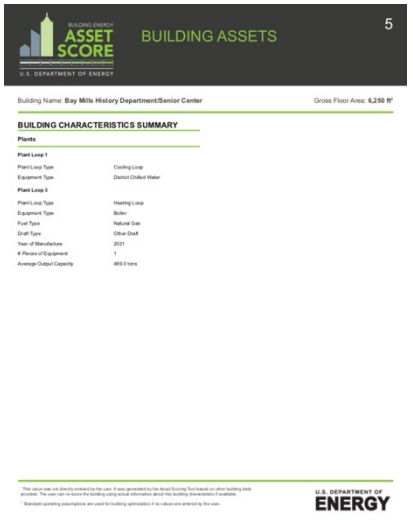
Armelia B. Parket Elder Center & History Department

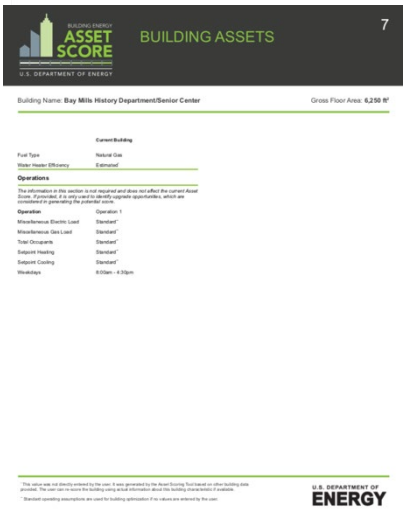






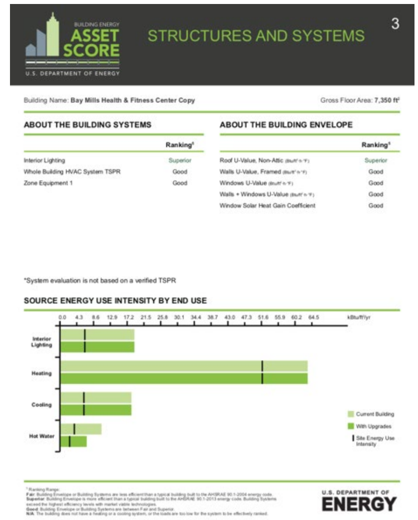


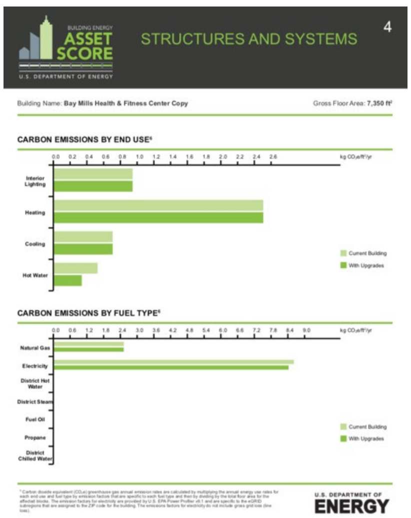




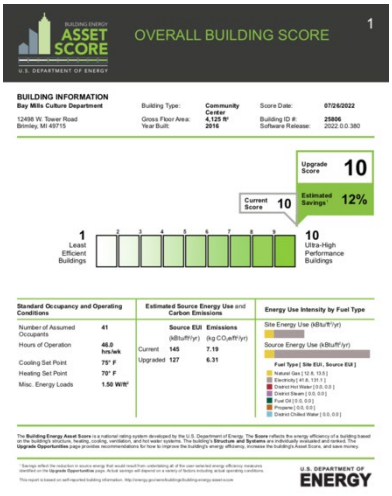
Commodity Foods

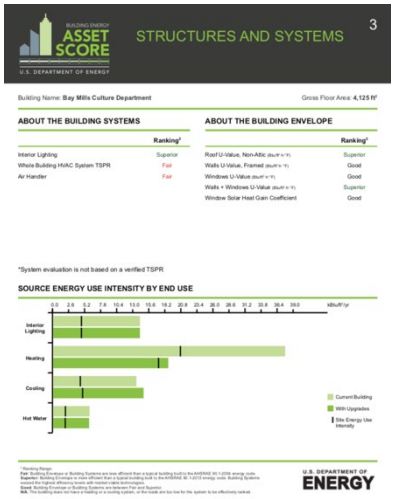
Mukwa Health & Fitness Center

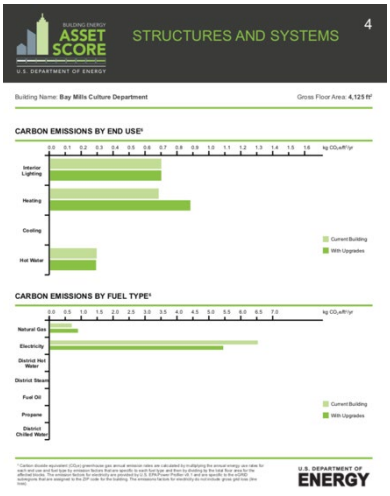




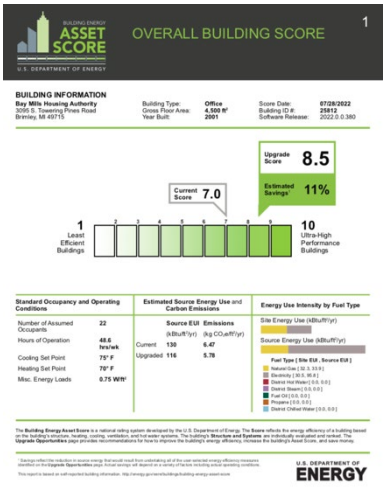
Culture Department

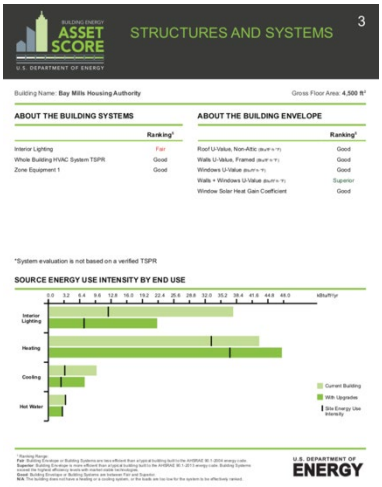


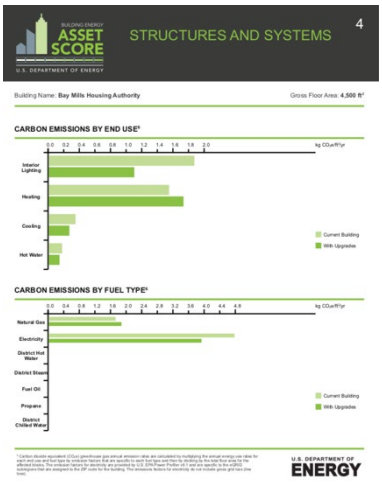




Bay Mills Housing Authority







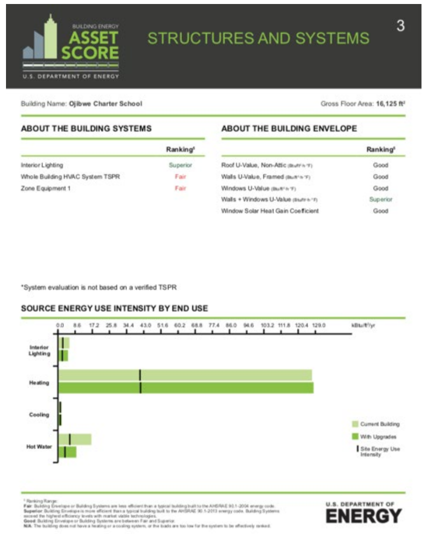
Ojibwe Charter School

2

UPGRADE OPPORTUNITIES

Building Name: **Ojibwe Charter School** Gross Floor Area: **16,125 ft²**

Cost Effective Upgrade Opportunities	Energy Savings [3]	Cost[4]
Building Envelope		
No opportunities identified.		
Lighting Systems		
• Replace existing lighting for Fixture 1 to LED lighting in Block 1.[7] - *Learn More*	Medium	$
• Install occupancy sensors for interior lighting control in Block 1 - *Learn More*	Low	$-$$
HVAC Systems and Controls		
No opportunities identified.		
Service Hot Water Systems		
• Add low flow faucets in Block 1 - *Learn More*	Low	$$



3

STRUCTURES AND SYSTEMS

Building Name: **Ojibwe Charter School** Gross Floor Area: **16,125 ft²**

ABOUT THE BUILDING SYSTEMS

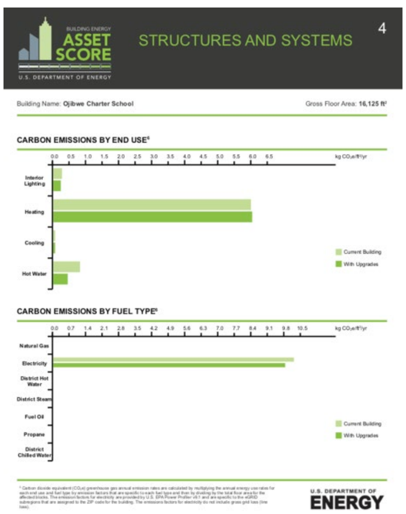
	Ranking[1]
Interior Lighting	Superior
Whole Building HVAC System TSPR	Fair
Zone Equipment 1	Fair

ABOUT THE BUILDING ENVELOPE

	Ranking[1]
Roof U-Value, Non-Attic (Btu/ft²·h·°F)	Good
Walls U-Value, Framed (Btu/ft²·h·°F)	Good
Windows U-Value (Btu/ft²·h·°F)	Good
Walls + Windows U-Value (Btu/ft²·h·°F)	Superior
Window Solar Heat Gain Coefficient	Good

*System evaluation is not based on a verified TSPR

SOURCE ENERGY USE INTENSITY BY END USE



4

STRUCTURES AND SYSTEMS

Building Name: **Ojibwe Charter School** Gross Floor Area: **16,125 ft²**

CARBON EMISSIONS BY END USE[6]

CARBON EMISSIONS BY FUEL TYPE[6]

5

BUILDING ASSETS

Building Name: **Ojibwe Charter School** Gross Floor Area: **16,125 ft²**

Block 1 CHARACTERISTICS SUMMARY

Geometry

Above Ground:	1 floor
Below Ground:	0 floors
Floor-to-Floor Height:	12.00 ft
Floor-to-Ceiling Height:	9.00 ft
Orientation:	0.0° from North
Use Type:	Education

	Current Building
Roof	
Roof	Roof 1
Roof Type	Shingles/Shakes
Intended Occupancy Type	Non-Residential
Skylights	
No Skylights	
Floor	
Floor	Floor 1
Floor Type	Slab-on-Grade
Floor U-value	Estimated*
Walls and Windows	
All Surfaces	
Wall	Wall 1
Wall Type	Siding on wood frame
Intended Occupancy Type	Non-Residential
Window	Window 1
Window Framing Type	Wood/Vinyl/Fiberglass
Window Glass Type	Double Pane
Window Gas Fill Type	Air
Intended Occupancy Type	Non-Residential
Window SHGC	Estimated*
Window VT	Estimated*

	Current Building
Window Layout	Continuous
Window-to-Wall Ratio	0.02
Exterior Shading Type	No Shading
Infiltration	
Energy code the building complies with	Estimated*
Lighting	
Lighting Power Density	0.19 W/ft²
Fixture	Fixture 1
Lighting Type	Fluorescent T5
Mounting Type	Recessed
Lamp Wattage	13 W/lamp
Lamps per Fixture	2
Number of Fixtures	105
Heating/Cooling	
Thermal Zone Layout	Estimated*
Perimeter Zone Depth	15 ft
Primary Heating/Cooling System	Zone Equipment 1
System Type	Pkgd Terminal Heat Pump
Cooling Equipment	
Cooling Source	Terminal DX
Efficiency	Estimated*
Heating Equipment	
Heating Source	Heat Pump
Fuel Type	Electricity
Condenser Type	Air
Thermal Efficiency	Estimated*
Service Water Heating	
Water Heater	Electricity
Fuel Type	Electricity
Water Heater Efficiency	Estimated*

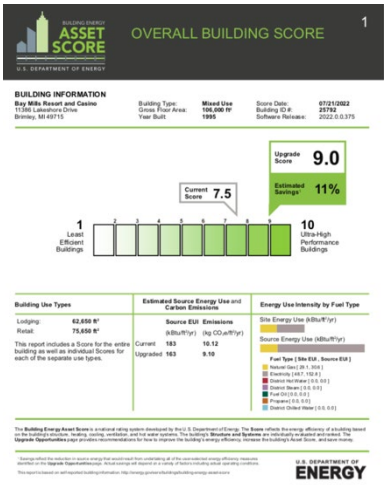
6

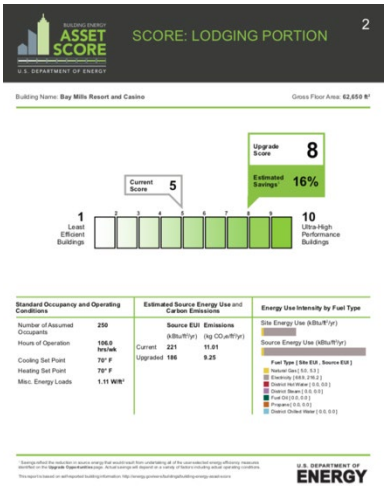
BUILDING ASSETS

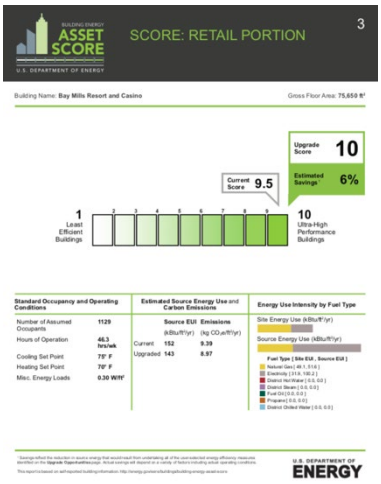
Building Name: **Ojibwe Charter School** Gross Floor Area: **16,125 ft²**

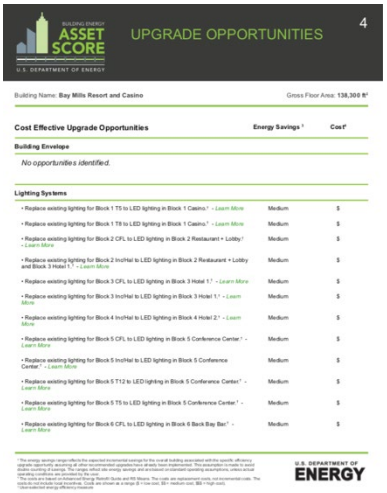
	Current Building
Operations	
The information in this section is not required and does not affect the current Asset Score. If provided, it is only used to identify upgrade opportunities, which are considered in generating the potential score.	
Operation	Using Standard Operations**

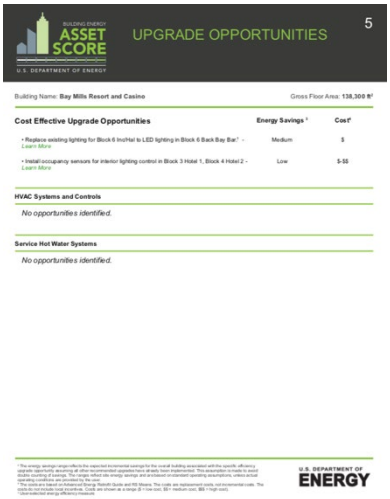
Bay Mills Resort & Casino

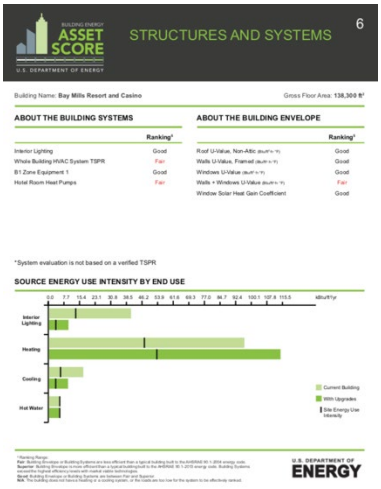


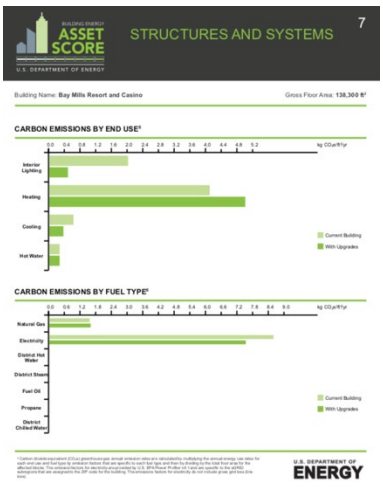








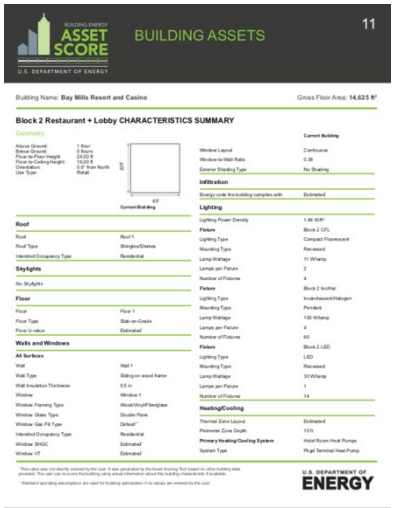


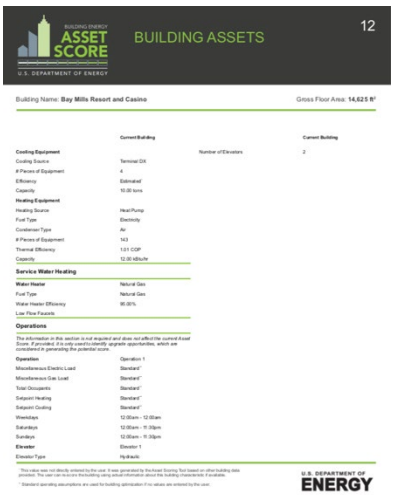

ASSET SCORE
U.S. DEPARTMENT OF ENERGY
STRUCTURES AND SYSTEMS
7
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 138,300 ft²
CARBON EMISSIONS BY END USE¹
kg CO2e/ft²/yr
Interior Lighting
Heating
Cooling
Hot Water
Current Building
With Upgrades
CARBON EMISSIONS BY FUEL TYPE²
kg CO2e/ft²/yr
Natural Gas
Electricity
District Hot Water
District Steam
Fuel Oil
Propane
District Chilled Water
Current Building
With Upgrades
U.S. DEPARTMENT OF ENERGY

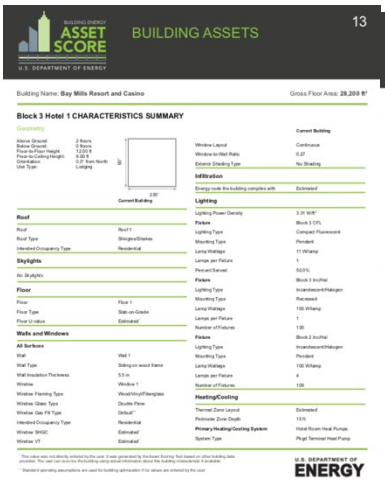

ASSET SCORE
U.S. DEPARTMENT OF ENERGY
BUILDING ASSETS
8
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 29,400 ft²
BUILDING CHARACTERISTICS SUMMARY
Plants
B1 Heating Loop
U.S. DEPARTMENT OF ENERGY


ASSET SCORE
U.S. DEPARTMENT OF ENERGY
BUILDING ASSETS
9
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 29,400 ft²
Block 1 Casino CHARACTERISTICS SUMMARY
Geometry
Current Building
Roof
Skylights
Floor
Walls and Windows
Infiltration
Lighting
Heating/Cooling
Cooling Equipment
U.S. DEPARTMENT OF ENERGY

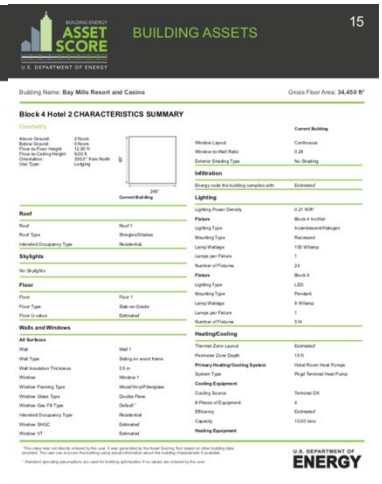

ASSET SCORE
U.S. DEPARTMENT OF ENERGY
BUILDING ASSETS
10
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 29,400 ft²
Current Building
Service Water Heating
Operations
U.S. DEPARTMENT OF ENERGY

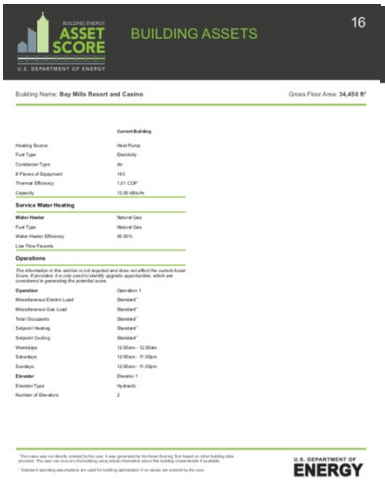

ASSET SCORE
U.S. DEPARTMENT OF ENERGY
BUILDING ASSETS
11
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 14,625 ft²
Block 2 Restaurant + Lobby CHARACTERISTICS SUMMARY
Geometry
Current Building
Roof
Skylights
Floor
Walls and Windows
Infiltration
Lighting
Heating/Cooling
U.S. DEPARTMENT OF ENERGY


ASSET SCORE
U.S. DEPARTMENT OF ENERGY
BUILDING ASSETS
12
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 14,625 ft²
Current Building
Service Water Heating
Operations
U.S. DEPARTMENT OF ENERGY


BUILDING ASSETS
13
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 28,200 ft²
Block 3 Hotel 1 CHARACTERISTICS SUMMARY
U.S. DEPARTMENT OF ENERGY

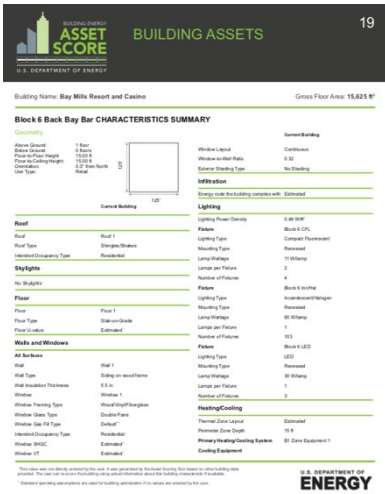

BUILDING ASSETS
14
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 28,200 ft²
U.S. DEPARTMENT OF ENERGY


BUILDING ASSETS
15
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 34,450 ft²
Block 4 Hotel 2 CHARACTERISTICS SUMMARY
U.S. DEPARTMENT OF ENERGY


BUILDING ASSETS
16
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 34,450 ft²
U.S. DEPARTMENT OF ENERGY

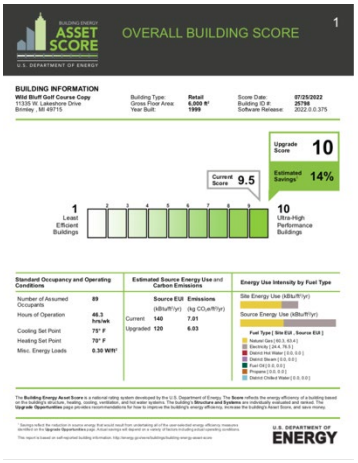

BUILDING ASSETS
17
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 16,000 ft²
Block 5 Conference Center CHARACTERISTICS SUMMARY
U.S. DEPARTMENT OF ENERGY

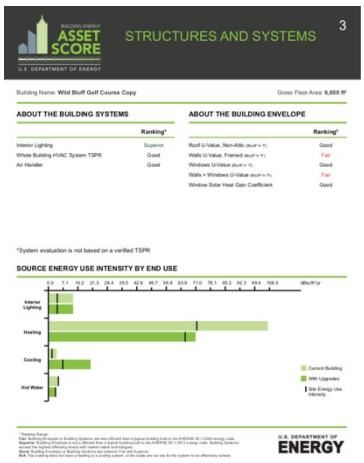

BUILDING ASSETS
18
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 16,000 ft²
U.S. DEPARTMENT OF ENERGY

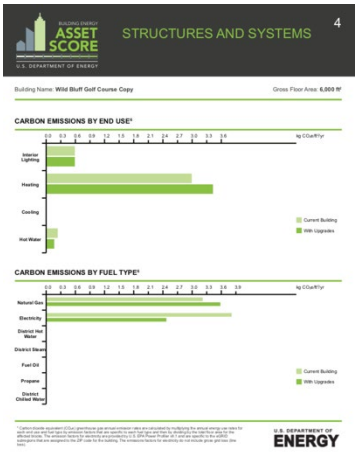

BUILDING ASSETS
19
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 15,625 ft²
Block 6 Back Bay Bar CHARACTERISTICS SUMMARY
U.S. DEPARTMENT OF ENERGY

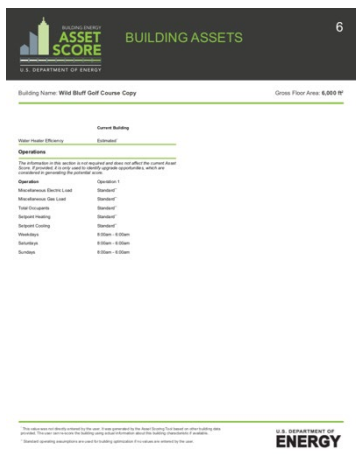

BUILDING ASSETS
20
Building Name: Bay Mills Resort and Casino
Gross Floor Area: 15,625 ft²
U.S. DEPARTMENT OF ENERGY

Wild Bluff Golf Course

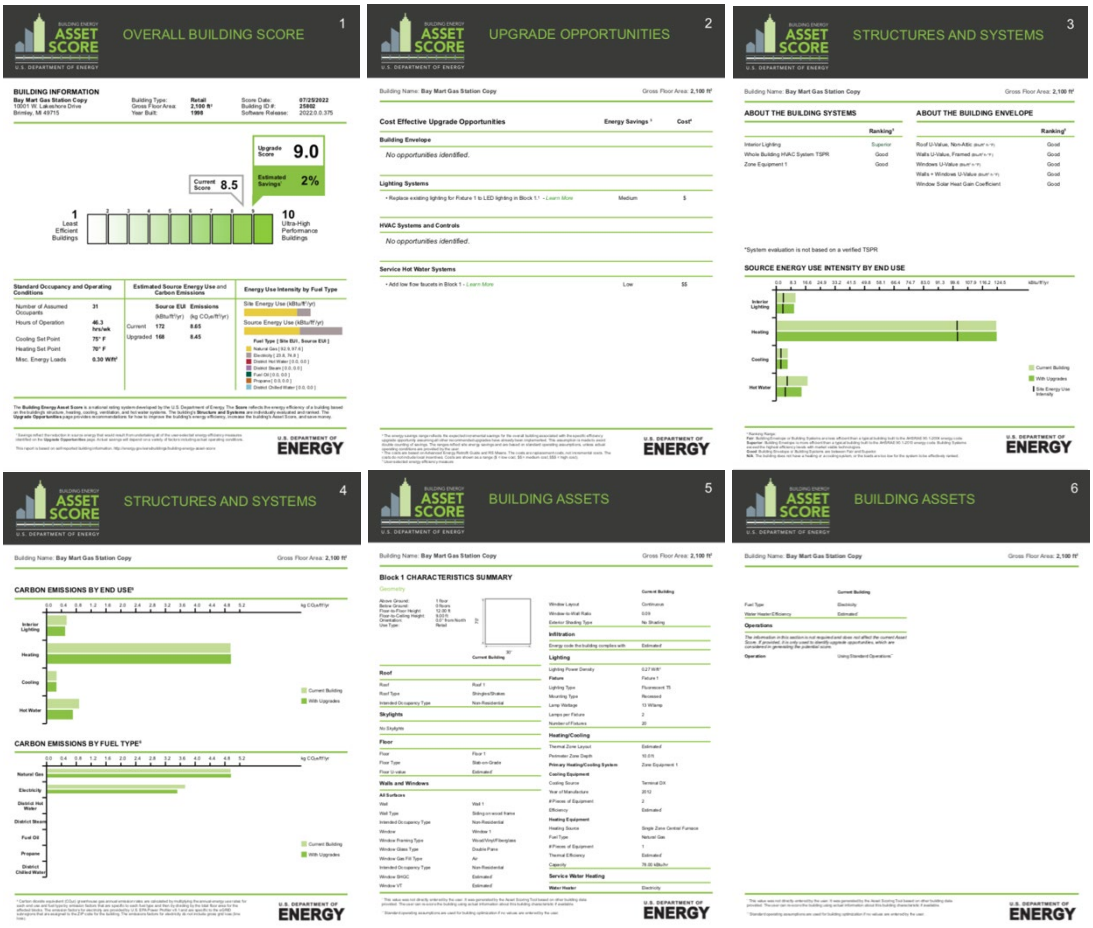




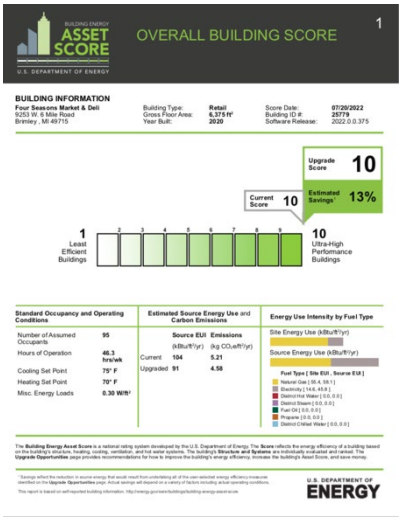


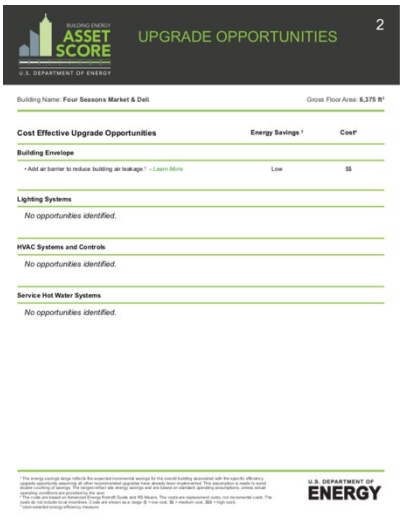


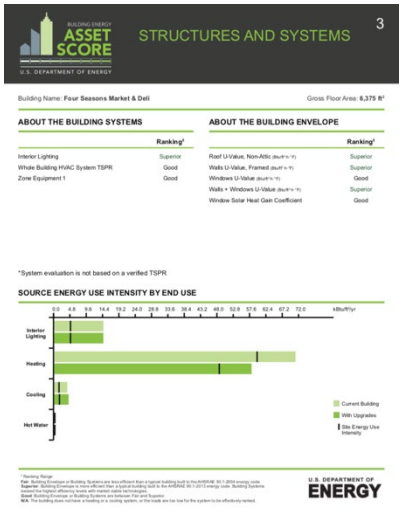
Bay Mart Gas Station

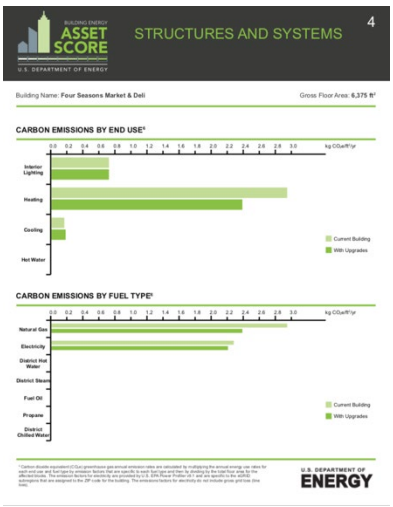


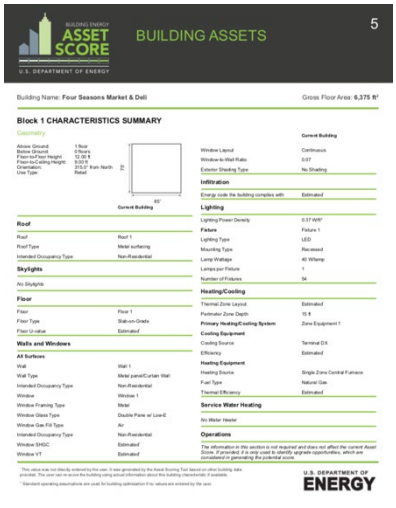
Four Seasons Market & Deli



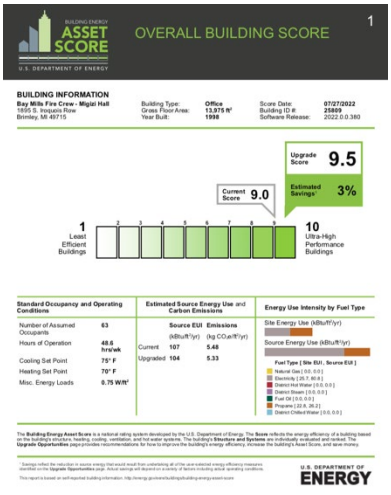


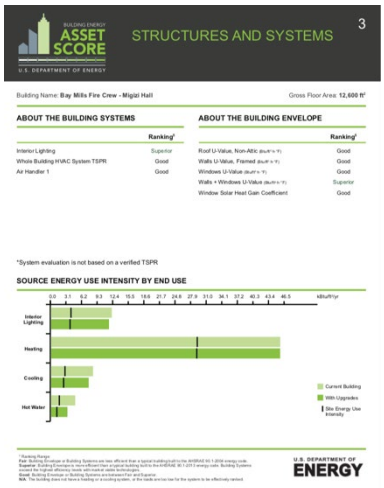


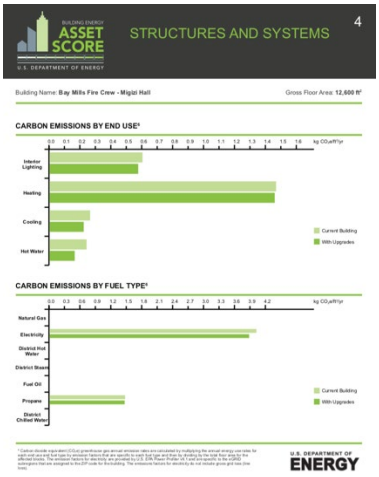


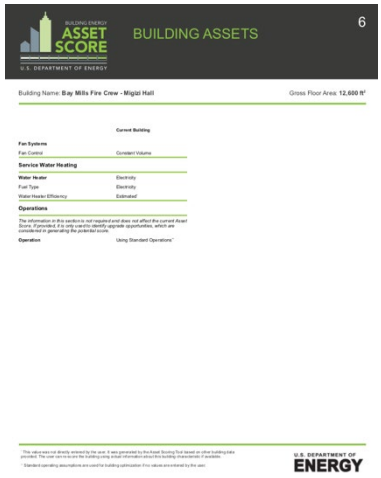


Bay Mills Fire Crew - Migizi Hall

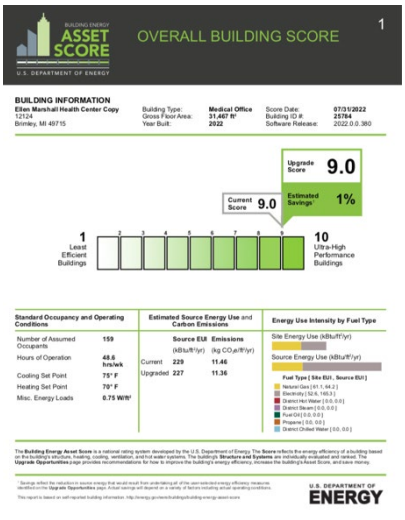


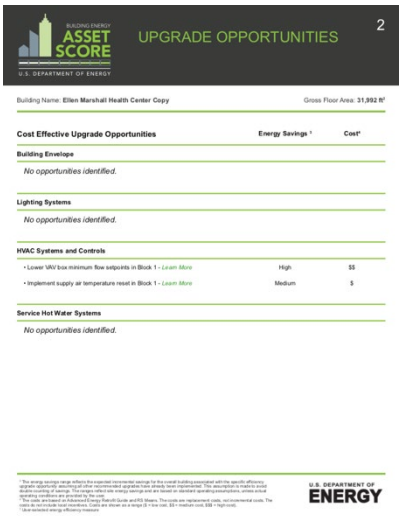


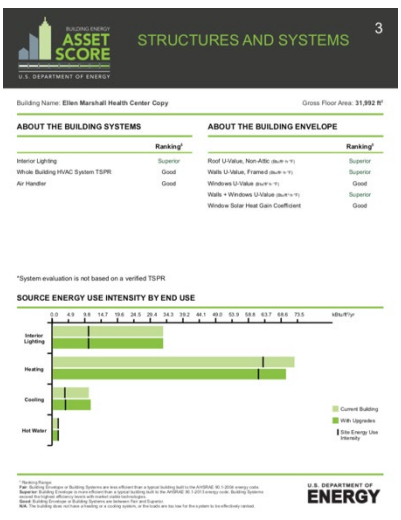


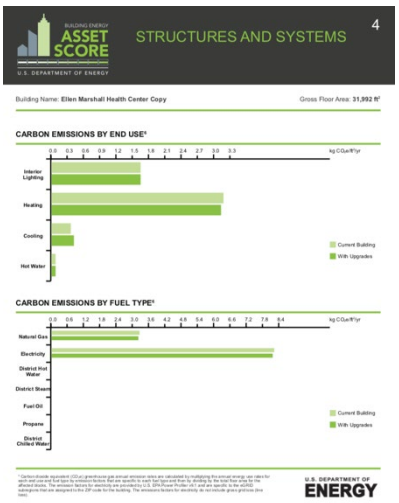


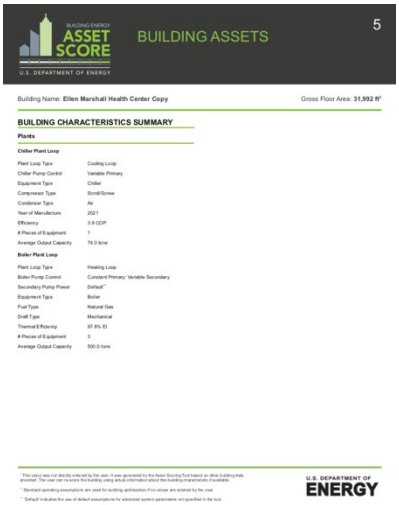
Ellen Marshall Health Center











Appendix C: Excerpts from 2011 Energy Efficiency Study

Energy Efficiency Feasibility Study
and
Resulting Plan for the Bay Mills Indian Community




To reduce energy consumption at Bay Mill Indian Community's most energy intensive buildings that will, in turn, reduce emissions at the source of energy production, reduce energy expenditures, create long lasting energy conscious practices and positively affect the quality of the natural environment.

Prepared by:

Funded by:

Tribal Energy Program

Executive Summary

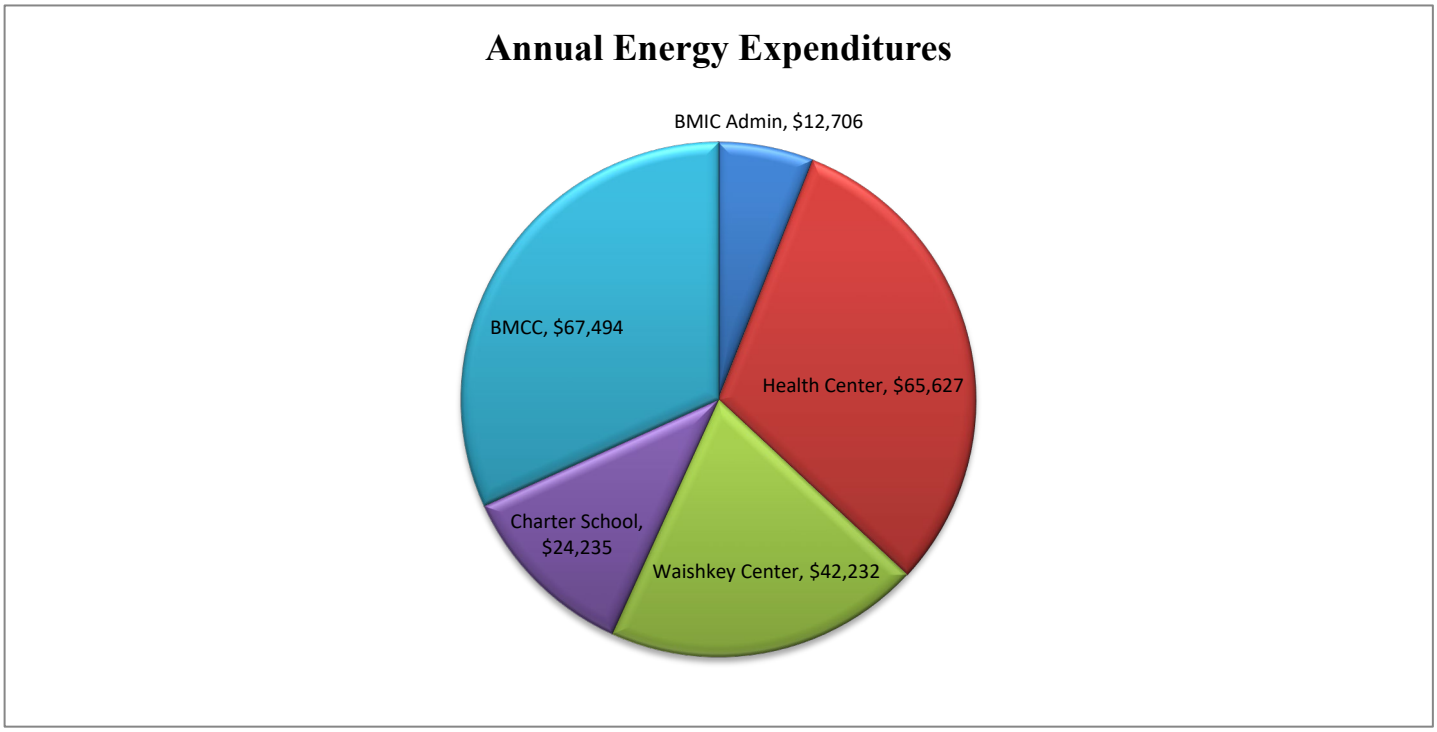
In 2011 the Inter-Tribal Council of Michigan, Inc. was awarded an Energy Efficiency Development and Deployment in Indian Country grant from the U.S. Department of Energy's Tribal Energy Program. This grant aimed to study select Bay Mills Indian Community community/government buildings to determine what is required to reduce each building's energy consumption by 30%. The Bay Mills Indian Community (BMIC) buildings with the largest expected energy use were selected for this study and include the Bay Mills Ellen Marshall Health Center building, Bay Mills Indian Community Administration Building, Bay Mills Community College, Bay Mills Charter School and the Waishkey Community Center buildings. These five sites are the largest energy consuming Community buildings and comprise the study area of this project titled "Energy Efficiency Feasibility Study and Resulting Plan for the Bay Mills Indian Community".

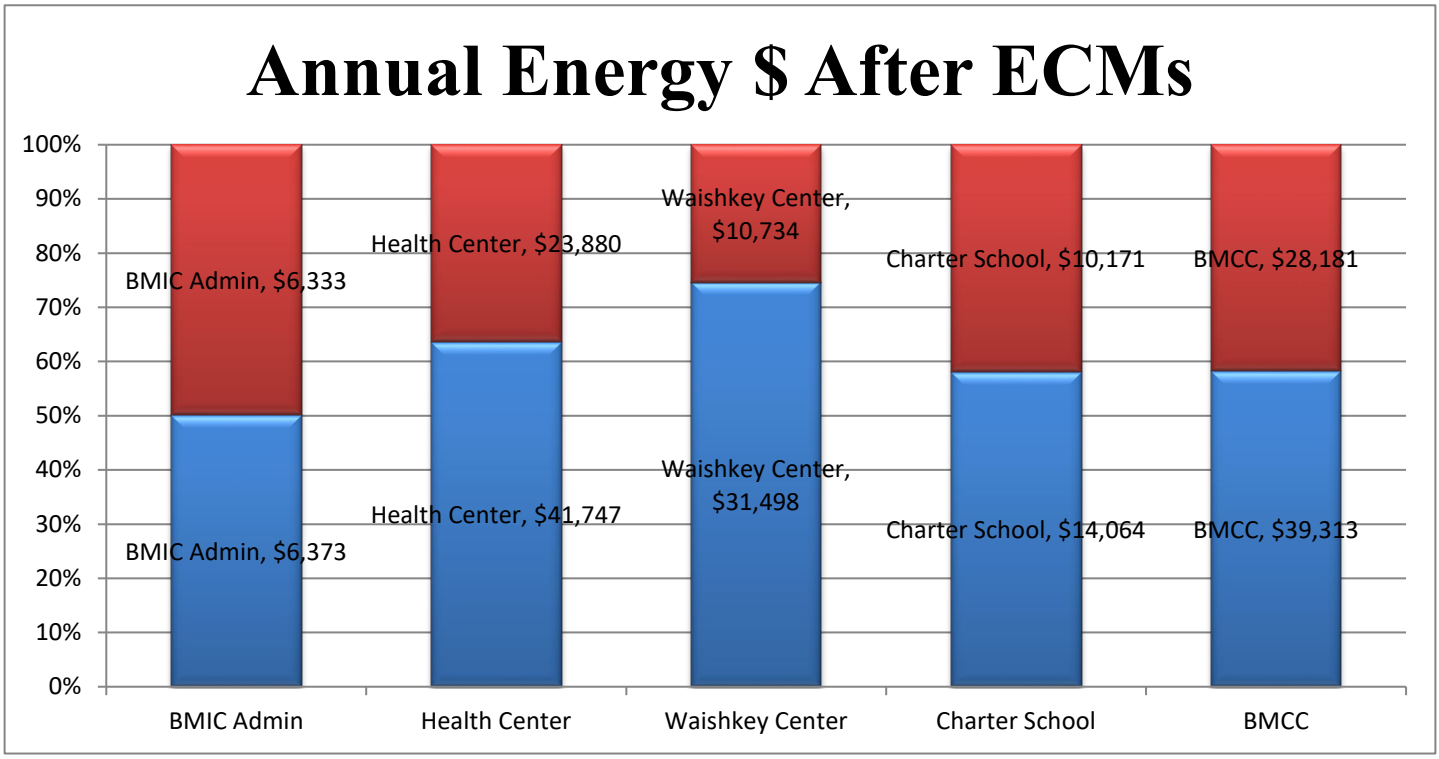
The ultimate objective of this study, plan and the Tribe is to reduce the energy consumption at the Community's most energy intensive buildings that will, in turn, reduce emissions at the source of energy production, reduce energy expenditures, create long lasting energy conscious practices and positively affect the quality of the natural environment.

This feasibility study and resulting plan act as a guide to the Community's first step towards planned energy management within its buildings/facilities. It aims to reduce energy consumption by 30% or greater within the subject facilities with an emphasis on energy conservation and efficiency. The primary goals of the plan are to maximize long-term savings and foster a culture of energy conservation. In order to meet these goals, this plan provides both specific strategies and efficiency items for reducing energy usage and a step-by-step planning guide. The document contains short-term, mid-term, and long-term action plans nested within the overall process. No cost conservation measure will constitute the short-term actions. The mid-term and long-term actions could be funded by contributing 50% of the cost savings to an energy savings account. This mechanism of reinvesting energy savings has been very successful in cutting energy cost over the long-term (Ann Arbor, MI has demonstrated great success since founding an energy fund in 1998). By utilizing this reinvestment mechanism this energy action plan stands as both a powerful resource and a model for successful energy management. This Plan is intended to be a living document that provides focus and resources for an ongoing process of planning, implementation, and evaluation of energy efficiency, conservation, and renewable energy measures.

The energy audits and related power consumption analyses conducted for this study revealed numerous significant energy conservation and efficiency opportunities for all of the subject buildings. In addition, many of the energy conservation measures require no cost and serve to help balance other measures requiring capital investment. Reoccurring deficiencies relating to heating, cooling and thermostat inefficiencies, powering computers, lighting, items linked to weatherization and numerous other items were encountered that can be mitigated with the energy conservation measures developed in the following plan.

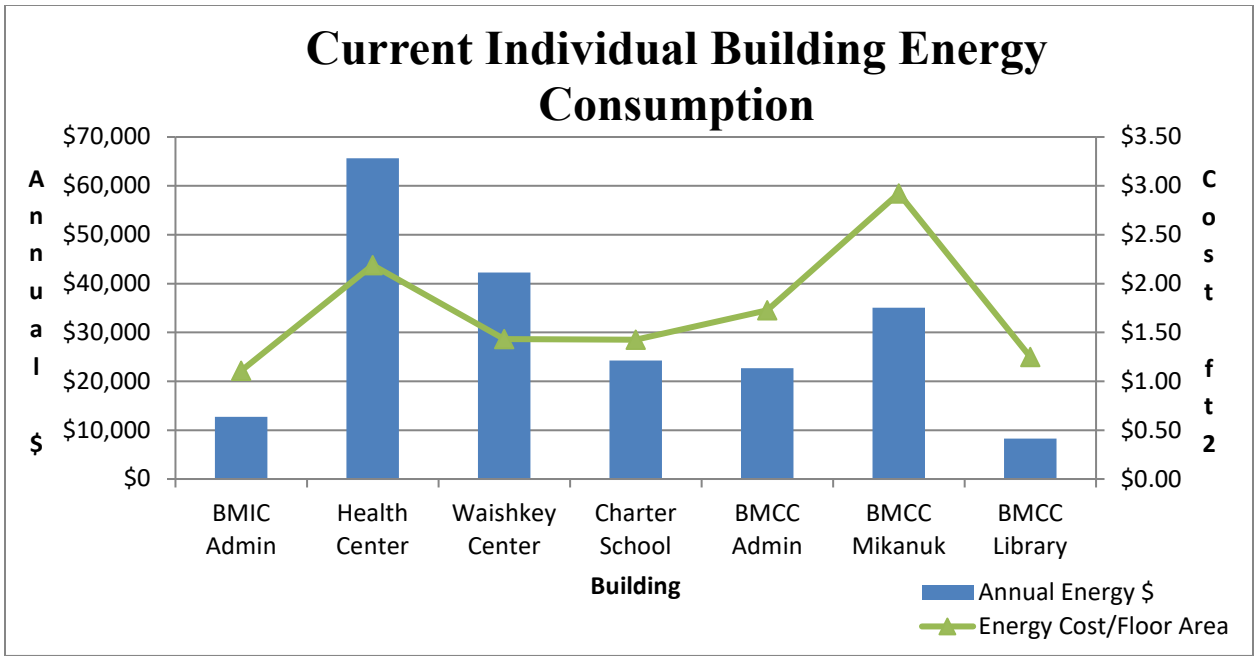
The two charts below depict the existing state of energy consumption within the subject buildings and that of the same buildings with the energy conservation measures developed in this project.

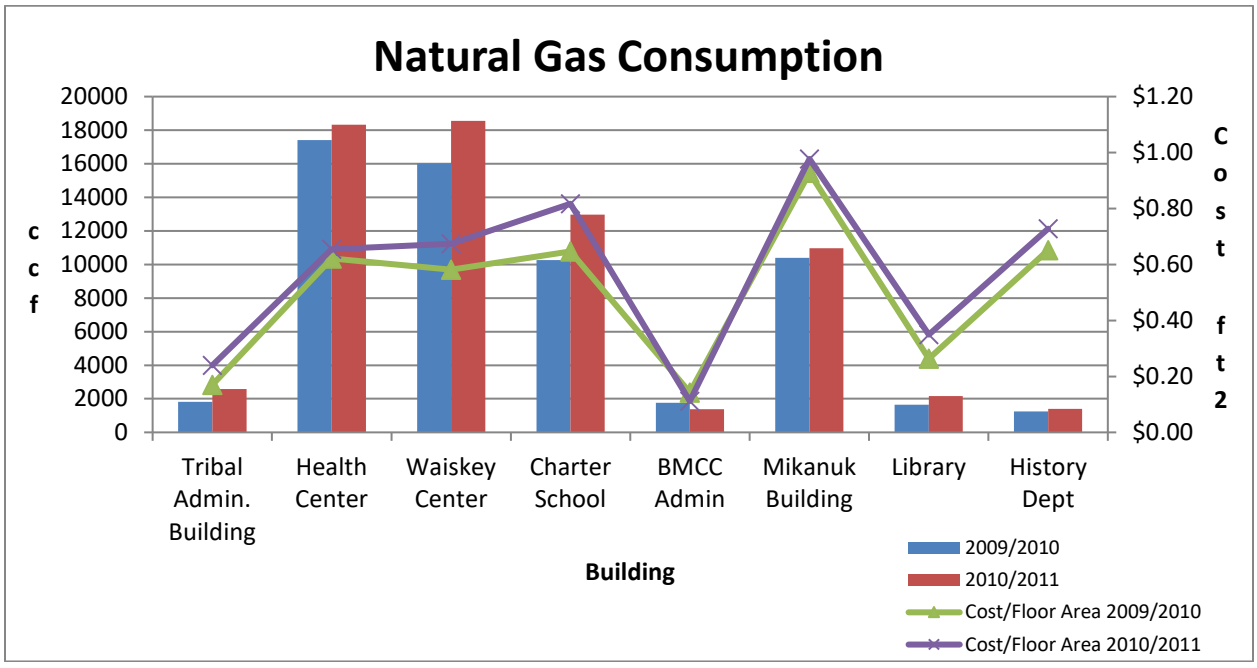


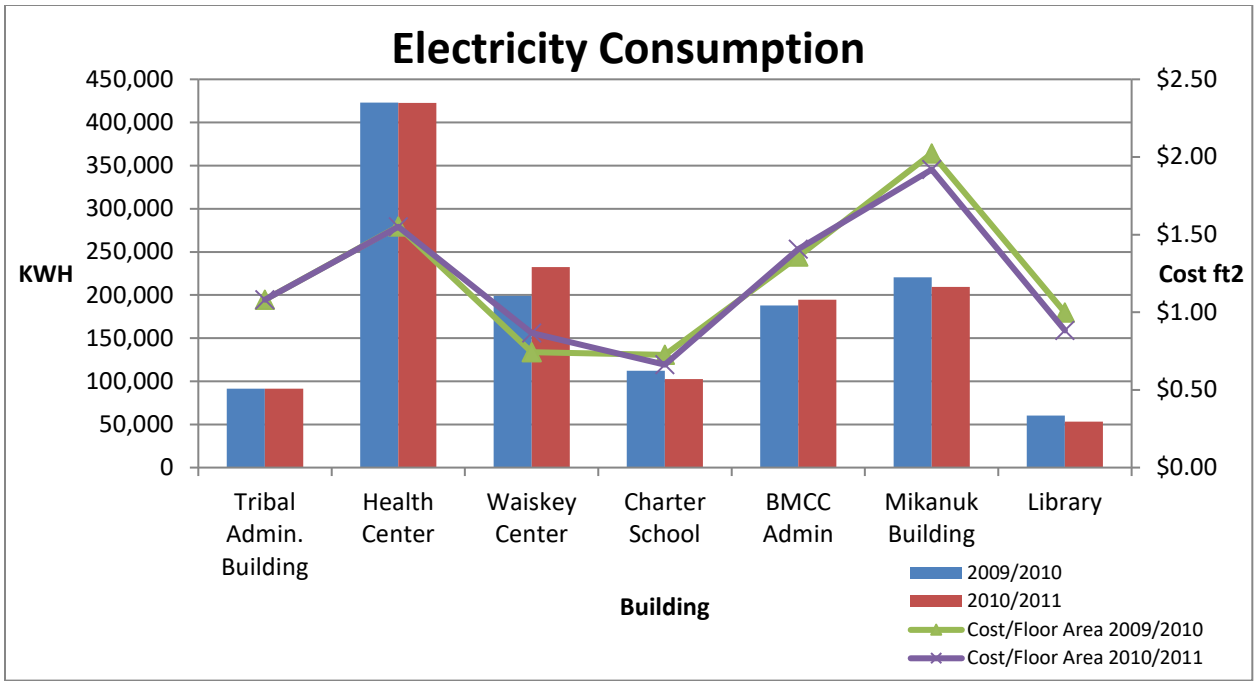


Based on each facility's energy use, estimates of greenhouse gas emissions were generated using Energy Star Portfolio Manager. The College consumed the most total site energy and also generating the greatest amount of GHG emissions at 411 MT CO2-e in 2011 and was close followed by the Ellen Marshall Health Center at 400 MT CO2-e. The total annual GHG emissions was 1,292 MT CO2-e, which to put in more tangible terms is equivalent to the annual emissions from 269 cars or the amount of carbon sequestered annually 1,059 acres of forest.[7] The following table and charts illustrate the current state of energy consumption in the subject buildings.

Building Energy Performance					
Building	**Energy Performance Rating (1-100)**	**Site Energy Intensity/National Median (kBtu/ft2/yr)**	**Source Energy Intensity/National Median (kBtu/ft2/yr)**	**Total Annual Site Energy (kBtu)**	**Total Annual GHG Emissions (MT CO_2-e)**
Tribal Administration Building	85	51/82	118/189 (-38%)	586,009	81
Ellen Marshall Health Center	44	111/104	227/213 (+7%)	3,329,503	400
BMIC Charter School	52	106/109	165/170 (-2%)	1,717,715	150
Waishkey Center Community Building	NA	88/39	145/100 (+45%)	2,589,427	242
Bay Mills Community College Library	NA	65/104	139/244 (-43%)	429,411	55
Bay Mills Community College Admin.	NA	70/104	186/244 (-24%)	926,286	148
Bay Mills Community College Mikanuk	NA	157/104	308/244 (+26%)	1,880,608	216
Source: Energy Star Portfolio Manager					


Current Individual Building Energy Consumption
Annual $
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
$3.50
$3.00
$2.50
$2.00
$1.50
$1.00
$0.50
$0.00
Cost ft2
BMIC Admin
Health Center
Waishkey Center
Charter School
BMCC Admin
BMCC Mikanuk
BMCC Library
Building
Annual Energy $
Energy Cost/Floor Area


Natural Gas Consumption
ccf
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
$1.20
$1.00
$0.80
$0.60
$0.40
$0.20
$0.00
Cost ft2
Tribal Admin. Building
Health Center
Waiskey Center
Charter School
BMCC Admin
Mikanuk Building
Library
History Dept
Building
2009/2010
2010/2011
Cost/Floor Area 2009/2010
Cost/Floor Area 2010/2011


Electricity Consumption
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
KWH
$2.50
$2.00
$1.50
$1.00
$0.50
$0.00
Cost ft2
Tribal Admin. Building
Health Center
Waiskey Center
Charter School
BMCC Admin
Mikanuk Building
Library
Building
2009/2010
2010/2011
Cost/Floor Area 2009/2010
Cost/Floor Area 2010/2011

C.1 BMIC Current Tribal Administration Building

(ECMs Totaling 50% Energy Reduction)

The Bay Mills Indian Community Administration Building is an 11,400ft^2 split level office building owned by the Tribe. The Administration Building was constructed in the early 1970s and is situated directly on the south shore of the Saint Marys River/Lake Superior. The Administration Building is connected via a hallway to the Kings Club Casino. The administration and casino portions of the building share an electric meter but separate gas meters. The shared electricity meter posed some challenge in differentiating electricity for just the administration activities portion but was successfully determined from the completed energy auditing performed in the project. Like many older buildings, the Administration Building has had additions and building alterations performed. The building serves approximately 25 staff and is utilized year round.

The Administration Building utilizes grid electricity and natural gas as sources of energy. Electricity is used for all items requiring energy and natural gas is the primary heating fuel source and is supplemented by electric baseboard heating in some parts of the building. Heating is controlled by two programmable thermostats, each tied to a natural gas forced air furnace and six upstairs offices with individual manual thermostats controlling electric baseboard heating. The six upstairs offices and the Tribal court offices have individual wall AC units.

The Administration Building features wood frame construction, fiberglass insulation, vinyl siding, a combination of wood framed and vinyl sliding windows, one glass/aluminum framed double exterior door, one single metal entry door, one sliding glass door, pitched roof and half of the building with a blocked basement and the other half on a slab foundation.

Analyses of the Administration Building's energy consumption history and energy audit information revealed that computers is the largest energy consuming item followed by heating, interior lighting, hot water, computer servers and other items shown in the following chart.

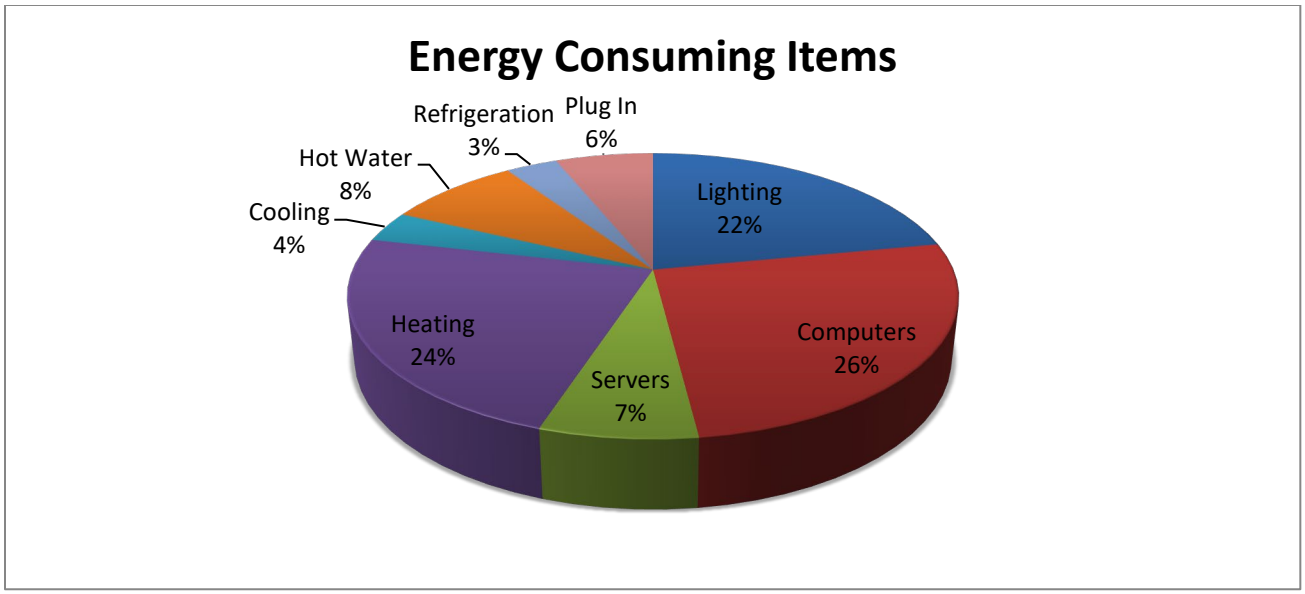


Figure B.1. Energy Consuming Items

To improve building energy performance, the following Energy Conservation Measures (ECMs) were developed in response to energy audit and analyses findings. Each ECM is further described below.

Table B.1. Energy Conservation Measures

ECM	Description of **Energy Conservation Measures**	% Energy Use Savings	Total Cost Savings ($/year)	Estimated Capital Cost ($)	Simple Payback (years)
1	Hibernate computers during non-work hours	67.4%/13.8%	$1,753	$0	0
2	Interior Lighting (T8 Fixtures, bulbs and occupancy sensors)	49.4%/9.5%	$1,208	$8,372	6.93
3	Energy Efficient Water Heaters (2)	62%/5.2%	$665	$2,298	3.46
4	Thermostat optimization (6pm-6am 10 degree setback/stepup; thermostat heat setting @ 70 degrees; 76 degrees AC) & Turning Off Electric Baseboard and Wall AC Units at Close of Work Day	29%/7.7%	$968	$0	0
5	Energy Efficient Refrigerators (Replace 2 w/ 1 Efficient fridge)	89.4%/2.6%	$336	$945	2.81
6	Replace Incandescent Bulbs with CFLs	78.3%/2.0%	$256	$14	0.06
7	Timed Power Supplies (Copiers, Printers, Postage)	53.4%/1.6%	$200	$323	1.61
8	Coffee Makers w/Insulated Carafe	92%/1.0%	$132	$130	0.98

9	Eliminate Redundant Items (Space heaters, ½ fridge)	100%/0.7%	$88	$0	0
10	Energy Star Water Cooler	45.2%/0.3%	$40	$191	4.81
11	Insulation & Air Sealing (Air seal attic deck and wall AC; Insulate attic and foundation)	20%/5.4%	$687	$10,000	14.5
	Total	**49.8%**	**$6,333**	**$22,273**	**3.51**

ECM 1: Computer Power Management

Existing Conditions

The energy audit of the Administration Building determined that work station computer systems largely remain powered on 24 hours per day. Computers that remain on after work cause unnecessary power consumption and can be mitigated by hibernating computers after/before work hours.

Energy Conservation Measure

Hibernating is a power management setting that every computer operating system has for reducing energy consumption. Utilizing this feature to power down computers outside of work hours will reduce the current wasted energy associated with keeping computers powered on when the building is unoccupied. Enabling the Hibernate feature to the specifications below will cause each computer to consume near zero energy outside of work hours (approximately 14 hours/day) and thereby result in a significant reduction in energy.

Computer Type	Existing Condition	New Condition
Workstation	Powered on 24/7	Enable Hibernate feature in each computer's Power Management settings after 90 minutes of inactivity.

Savings

Computer energy reduction: 67.4%
Overall building energy reduction: 13.8%
Annual savings: $1,753
Capital investment: $0
Payback: 0 years

Savings are calculated using the following: twenty-seven computers operating 261 week days calculated with 10 work hours and 14 efficency mode hours, 72 weekend days calculated with 100% hibernation/efficiency mode.

ECM 2: Interior Lighting

Existing Conditions

The Administration Building's interior is equipped with T12 fluorescent bulbs and fixtures on manual light switches. While these lights are more efficient than incandescent bulbs, newer and more efficient T8 bulbs and occupancy sensors would result in greater energy savings.

Energy Conservation Measure

Purchase and install T8 fixtures, bulbs and occupancy sensors for 24 rooms/offices that will consume less energy from higher efficiency lights and electricity conservation by automatically turning off lights when room is unoccupied. Multi-technology sensors would be used and prevent lights from unintentionally being turned off (see Appendix – Lighting for recommended Leviton occupancy sensor unit). U.S. EPA estimates 25% savings when occupancy sensors are used in office settings.

Lighting Item	Existing Condition	New Condition
Interior Lighting	Ceiling T8 fixtures and bulbs with manual on/off switches	Purchase and install 70 X 2 T8 lamp fixtures (Grainger item #2PFV4 @ $71.35 each); 10 X 4 T8 lamp fixtures (Grainger item # 3XY83 @ $146.05); 24 Leviton Multi-Technology Occupancy Sensor Units @ $79.86).

Savings

Interior lighting reduction: 49%
Overall building energy reduction: 9.5%
Annual savings: $1,208
Capital investment: $8,372
Payback: 6.93 years

Calculations for energy savings are based on increased efficiency of T8 fixtures over T12 and a 25% reduction relating to the use of occupancy sensors.

ECM 3: High Efficiency Water Heaters

Existing Conditions

The Administration Building currently uses two 40 gallon electric water heater to meet its need for hot water. Of the various types of common ways to heat water, electric water heaters are amongst the most expensive and double that of natural gas or hybrid/heat pumps. Hot water demand is for kitchen needs and the two restrooms.

Energy Conservation Measure

Replace the existing electric waters heater with hybrid/heat pump water heaters. This measure would result in cutting energy used for hot water in half while remaining safe and reliable. In heat pump mode, these water heaters will use heat from ambient air and transfer it to the water in the tank. This type of water heater will be especially beneficial in the furnace/server room where excessive heat is generated and can be used for water heating.

Appliance	Existing Condition	New Condition
Water Heater	Two 40 gallon standard electric water heaters.	Replace two existing water heaters with hybrid/heat pump water heaters that would consume approximately ½ of the existing energy of existing the standard electric water heaters.

Savings
Hot water energy reduction: 62%
Overall building energy reduction: 5.2%
Annual savings: $665
Capital investment: $2,298
Payback: 3.46 years

ECM 4: Thermostat Optimization

Existing Conditions
Currently, the building's heating and cooling operates in a steady-state/occupied scenario 24 hours a day and 365 days a year. During energy audit visits, heat thermostat settings averaged 72 degrees on two programmable thermostats and widely varied on manual thermostats controlling electric baseboards. The electric baseboard heat is typically set in the mid 70s with no setback to compensate for cold and drafty north offices. Summer air conditioning thermostat settings average 72 degrees for two central AC units with two programmable thermostats and seven manually operated wall mounted AC units. Significant energy is wasted for excessive heating and cooling temperatures and heating and cooling of building during unoccupied times.

Energy Conservation Measure
Optimize thermostat heating and cooling programming to the EPA recommended temperature during work hours. In addition, program setbacks and step ups outside of occupied times for programmable thermostats and implement procedure to turn electric baseboard heat at the end of each work day. See Appendix – Thermostat Optimization for breakdown of savings/wasted energy.

Thermostat Setting	Existing Condition	New Condition
Heat – Forced Air	Avg. 72°F 24hrs/auto	Weekdays 6am-6pm: 70°F Weekdays 6pm-6am & Weekends 60°
Heat – Electric Baseboard	Avg. 74°F 24hrs/manual	Weekdays office hours: 70°F Weekdays 6pm-6am & Weekends: Electric baseboard heat turned off at the close of each work day.
Cooling – Central AC	Avg. 72°F 24hrs/auto	Weekdays 6am-6pm: 76°F Weekdays 6pm-6am & Weekends: off

Cooling – Wall AC Units	Avg. 72°F 24hrs/manual	Weekdays office hours: 76°F Weekdays 6pm-6am & Weekends: Wall AC units turned off at the close of each work day.

Savings
Building heating & cooling energy reduction: 29%
Overall building energy reduction: 7.7%
Annual savings: $968
Capital investment: $0
Payback: 0 years

ECM 5: High Efficiency Refrigerators

Existing Conditions

The Administration Building currently uses two standard/non-high efficiency refrigerators. These refrigerators are located in the staff kitchen and the Bay Mills News office and consume approximately double the electricity of current high efficiency units. In addition, the number of staff working in the Tribal Administration building could utilize one full size refrigerator instead of two full size units.

Energy Conservation Measure

Replace the two existing refrigerators with one high efficiency refrigerator in the staff kitchen.

Appliance	Existing Condition	New Condition
Refrigerators	Two non-high efficiency refrigerators.	Replace the two existing refrigerators with one high efficiency refrigerator that would consume significantly less electricity.

Savings
Refrigeration energy reduction: 89.4%
Overall building energy reduction: 2.6%
Annual savings: $336
Capital investment: $945
Payback: 2.81 years

ECM 6: Replacing Incandescent Light Bulbs

Existing Condtions

The vast majority of interior lighting at the school is fluorescent lighting but there are some remaining incandescent bulbs. Incandescent bulbs use approximately four times the electricity as energy efficient alternative bulbs and can be easily and cheaply replaced.

Energy Conservation Measure

Purchase and replace incandescent bulbs with energy efficient compact fluorescent bulbs. Benefits of CFLs will include significantly less energy consumption for comparable light output and longer bulb life.

Savings

Energy reduction from incandescent bulbs: 78.3%
Overall building energy reduction: 2.0%
Annual savings: $256
Capital investment: $14
Payback: 0.06 years

ECM 7: Timed Power Supplies

Existing Condtions

Various electronic items throughout the building continue to draw "phantom" power as they sit idle after class/work hours. Energy auditing showed that copiers and printers continue to draw electricity even when idle and building is unoccupied.

Energy Conservation Measure

Purchase seven APC P11GTV power strips to power down printers with master device/hibernating computer automatically and three APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day.

Plug In Device	Existing Condition	New Condition
Printer	Seven printers that are inconsistently powered off	Purchase and utilize APC P11GTV power strips to power down printers when master device/hibernating computer powers down
Copier	Three copy machines that continue to draw power unnecessarily after work hours	Purchase and utilize APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day
Postage	One postage machine that is powered on 24/7	Purchase and utilize APC Day & Time Timer/Surge Protector to limit power to postage machine to 10 hours per day

Savings

Timed electronic energy reduction: 49%
Overall building energy reduction: 0.7%
Annual savings: $163
Capital investment: $233

Payback: 1.5 years

ECM 8: Replacing Conventional Coffee Pot with Thermal Carafe Unit

Existing Condtions

The staff kitchen has a coffee machine with hot plate that remains on and drawing electricity throughout the work day to heat coffee pot.

Energy Conservation Measure

Purchase and replace conventional coffee machine with unit that heats water/coffee during brew and maintains heat by means of insulated carafe and doesn't require electricity beyond brew time. Benefits of thermal carafe unit will include significantly less energy consumption for coffee.

Appliance	Existing Condition	New Condition
Staff Kitchen Coffee Machine	One coffee machine that draws power throughout the day for heating elements.	Replace with Bunn BT Velocity Brew Drip Coffee Maker with Insulated Carafe

Savings

Energy reduction from thermal carafe style coffee maker: 92.0%
Overall building energy reduction: 1.0%
Annual savings: $132
Capital investment: $130
Payback: 0.98 years

ECM 9: Removing Redundant Energy Consuming Items

Existing Condtions

Space heaters and a ½ size refrigerator are convenient but are redundant when a staff refrigerator is available in the building and central heating combined with improved weatherization would provide necessary heat.

Energy Conservation Measure

Eliminate ½ size refrigerator and utilize existing refrigerator in the staff kitechen. Eliminate space heaters and improve building's heat retention with air sealing and improved insulation (see ECM 11: Air Sealing and Insulation).

Savings

Energy reduction from eliminating redundant items: 100%
Overall building energy reduction: 0.7%
Annual savings: $88

Capital investment: $0
Payback: 0 years

ECM 10: Energy Star Water Cooler

Existing Condtions

The existing water cooler located in the BMIC News office is a standard/non-Energy Star water cooler. Higher efficiency units are available that would reduce energy consumption tied to water cooler units.

Energy Conservation Measure

Purchase and replace existing water cooler with Energy Star water cooler.

Savings

Energy reduction from Energy Star water cooler: 45.2%
Overall building energy reduction: 0.3%
Annual savings: $40
Capital investment: $191
Payback: 4.81 years

ECM 11: Building Air Sealing & Insulation

Existing Condtion

While a blower test was not possible for the Administration Building, energy auditing and building weatherization inspection revealed that there are air sealing and insulation deficiencies. Weatherization deficiencies found include insufficient air sealing and insulation along foundation, insufficient air sealing of attic deck and insufficient attic insulation. These items contribute to building heat loss and consequently increase energy consumption and lower occupant comfort.

Energy Conservation Measure

Improve building's weatherization by preventing air infiltration/exfiltration through air sealing and resistance to heat loss during winter months and heat gain during summer months through improved insulation.

Weatherization Component	Existing Condition	New Condition
Air sealing	Insufficient air sealing in attic deck, perimeter of windows and attic access doors.	Air seal top plates in attic with 1" closed cell spray foam. Caulk perimeter of window trim and attic access doors.

Attic insulation	Variable: No insulation to R24 fiberglass batts	Additional R44 of blown cellulous in attic.
Foundation insulation/air seal	No insulation evident	2” of closed cell spray foam (R21) on foundation walls above grade and into rim joist area (insulates and air seals).

Savings

Heating & cooling energy reduction: 20.0%
Overall building energy reduction: 5.4%
Annual savings: $687
Capital investment: $10,000
Payback: 14.5 years

C.2 Ojibwe Charter School original building

BMIC Ojibwe Charter School (ECMs Totaling 42% Energy Reduction)

The Bay Mills Indian Community Charter School is a single story 17,000ft^2 K-6 elementary school owned by the Tribe. The school was opened in 2003 in its current building, a new modular structure that was intended to be used for approximately five years during the interim of when a permanent structure would be built. Ten years later and the structure continues to be used with no concrete plans to replace the school building. The school has XX students, XX staff and has 180 days of classroom instruction per year.

The school utilizes grid electricity and natural gas as sources of energy. Electricity is used for all items requiring energy except for building heating where natural gas is used. Each room has its own wall mounted combination heat and air conditioning unit with programmable thermostat.

The school building features wood frame construction, wood siding, vinyl sliding windows, three sets of double metal utility exterior doors, one single metal entry door, flat roof and elevated off the ground with skirting along perimeter.

Analyses of the school's energy consumption history and energy audit information revealed that heating is the largest energy consuming item followed by interior lighting, refrigeration, computers, cooling and other items shown in the following chart.

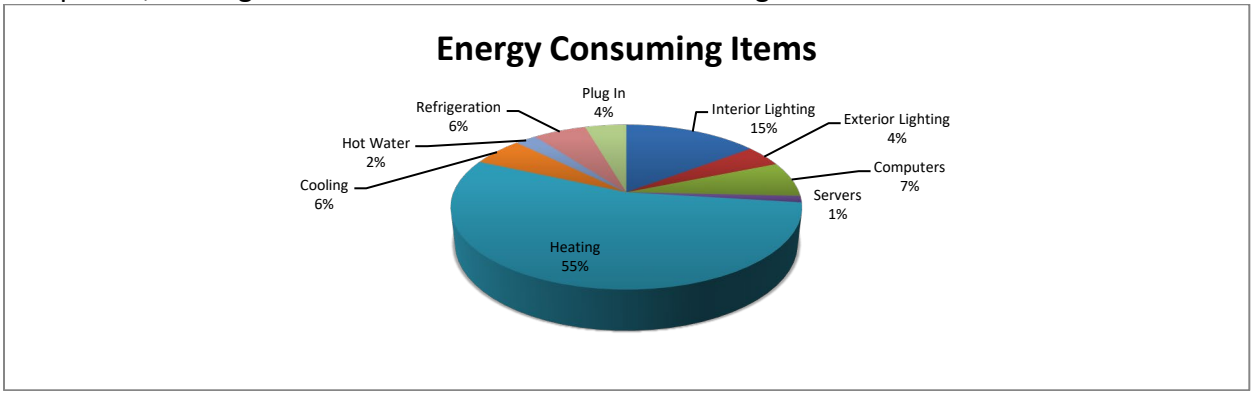


Figure C2. Energy Consuming Items

To improve building energy performance, the following Energy Conservation Measures (ECMs) were developed in response to energy audit and analyses findings. Each ECM is further described below.

Table C2. Energy Conservation Measures

ECM	Description of **Energy Conservation Measures**	% Energy Use Savings	Total Cost Savings ($/year)	Estimated Capital Cost ($)	Simple Payback (years)
1	Thermostat optimization (6pm-6am 10 degree setback/stepup; thermostat heat setting @ 69 degrees; 78 degrees AC)	41%/23.3%	$5,619	$0	0
2	Hibernate computers during non-work hours	62%/3.9%	$1066	$0	0
3	Interior Lighting (Occupancy sensors)	40.0%/5.4%	$1,297	$2,156	1.66
4	Exterior Lighting (LED retrofits and reduce on time)	94.4%/3.7%	$897	$5,127	5.71
5	Energy Efficient Water Heaters	62%/1.4%	$333	$1,149	3.46
6	Unplug Appliances During Summer (Kitchen freezer, fridge, icemaker, drinking fountain)	37%/2.5%	$598	$0	$0
7	Replace Incandescent Bulbs with CFLs	78.3%/0.3%	$67	$4	0.06
8	Timed Power Supplies (Copiers, Printers, Postage)	49%/0.7%	$163	$233	1.5
9	Eliminate Redundant Items (½ fridge)	100%/0.3%	$76	$0	0
10	Exterior Door Air Sealing	0.4%/0.23%	$55	$200	3.6
	Total	**42%**	**$10,171**	**$8,869**	**0.9**

ECM 1: Thermostat Optimization

Existing Conditions

Currently, the building's heating and cooling operates in a steady-state/occupied scenario 24 hours a day and 365 days a year. During energy audit visits, the average thermostat heat setting was 74 degrees and thermostat air conditioning settings at 72 degrees. The building is already equipped with programmable thermostats for nearly every room. Significant energy is wasted for excessive heating and cooling temperatures and heating and cooling of building during unoccupied times.

Energy Conservation Measure

Optimize thermostat heating and cooling programming to in the classroom, cafeteria and offices to the EPA recommended temperature during school hours. In addition, program setbacks and step ups outside of occupied times. See Appendix – Thermostat Optimization for breakdown of savings/wasted energy.

Thermostat Setting	Existing Condition	New Condition
Heat	Avg. 74°F 24hrs/auto	Weekdays 6am-6pm: 69°F Weekdays 6pm-6am & Weekends 59° Classrooms & Cafeteria: Heat Off During Summer
Cooling	Avg. 72°F 24hrs/auto	Classrooms & Cafeteria: AC Off During Summer Office Weekdays 7am-5pm: 78°F Office Weekdays 5pm-7am & Weekends 78°F

Savings

Building heating energy reduction: 38%
Building cooling energy reduction: 41%
Overall building energy reduction: 23.3%
Annual savings: $5,619
Capital investment: $0
Payback: 0 years

ECM 2: Computer Power Management

Existing Conditions

The energy audit of the Charter school determined that work station computer systems largely remain powered on 24 hours per day and teachers' laptops are powered during school hours as they are often taken home for work. Computers that remain on after work cause unnecessary power consumption and can be mitigated by hibernating computers after/before school hours.

Energy Conservation Measure

Hibernating is a power management setting that every computer operating system has for reducing energy consumption. Utilizing this feature to power down computers outside of class/work hours will reduce the current wasted energy associated with keeping computers powered on when the building is unoccupied. Enabling the Hibernate feature to the specifications below will cause each computer to consume near zero energy outside of class/work hours (approximately 14 hours/day).

Computer Type	Existing Condition	New Condition
Workstation	Powered on 24/7	Enable Hibernate feature in each computer's Power Management settings after 90 minutes of inactivity.
Laptop	On average, removed after hours	Enable Hibernate feature in each computer's Power Management settings after 90 minutes of inactivity.

Savings
Computer energy reduction: 62%
Overall building energy reduction: 3.9%
Annual savings: $957
Capital investment: $0
Payback: 0 years

Savings are calculated using the following: four computers operating 261 week days calculated with 10 work hours and 14 efficency mode hours, 72 weekend days calculated with 100% hibernation/efficiency mode; 33 computers operating 180 week days calculated with 10 work hours and 14 efficiency mode hours, 72 weekend days calculated with 100% hibernation/efficiency mode.

ECM 3: Interior Lighting

Existing Conditions
The school's interior is equipped with energy efficient T8 fluorescent bulbs and fixtures on manual light switches. While these lights are efficient, additional electricity can be conserved by utilizing occupancy sensors to automatically turn a room's lights off when unoccupied. U.S. EPA estimates 40-47% savings when occupancy sensors are used in school settings.

Energy Conservation Measure
Purchase and install occupancy sensors in 27 rooms that will result in lights automatically turning off when room is unoccupied. Multi-technology sensors would be used and prevent lights from unintentionally being turned off (see Appendix – Lighting for recommended Leviton occupancy sensor unit).

Lighting Item	Existing Condition	New Condition
Interior Lighting	High efficiency interior lighting controlled manually by on/off switches.	Purchase and install 27 occupancy sensor that will automatically detect if the room is occupied/unoccupied and control lights by turning on when occupied and turning off when unoccupied.

Savings

Interior lighting reduction: 40%
Overall building energy reduction: 5.4%
Annual savings: $1,297
Capital investment: $2,156
Payback: 1.66 years

Calculations for energy savings are based on a 40% reduction of current electricity associated with interior lighting.

ECM 4: Exterior Lighting

Existing Conditions

The parking lot and building exterior is currently lighted by twelve 450 watt high pressure sodium lights on a timer that has the lights remaining on ten hours per night. Both the bulbs' high wattage and timer on throughout the night cause energy consumption that can be mitigated.

Energy Conservation Measure

Replace existing 450 watt high pressure sodium bulbs with 56 watt LED retrofit bulbs and optimize timer for 2 hours on before the start of school and 2 hours after school. Significant energy will be saved through conservation (reduced on time) and high efficiency bulb replacement. LED lights also provide advantages from long operational life.

Exterior Light	Existing Condition	New Condition
High Pressure Sodium Lights	Twelve 450 watt exterior lights remaining on 10 hours per night.	Replace 450 watts HPS bulbs with 56 watt LED retrofit bulbs. Reset timer to 2 hours on in morning and 2 hours on in the afternoon/evening weekdays only.

Savings

Exterior lighting reduction: 94.4%

Overall building energy reduction: 3.7%
Annual savings: $897
Capital investment: $5,127
Payback: 5.71 years

ECM 5: High Efficiency Water Heater

Existing Conditions

The school currently uses a 40 gallon electric water heater to meet its need for hot water. Of the various types of common ways to heat water, electric water heaters are amongst the most expensive and double that of natural gas or hybrid/heat pumps. Hot water demand is for kitchen needs and the two restrooms.

Energy Conservation Measure

Replace the existing electric water heater with a power vented natural gas or hybrid/heat pump water heater. Both alternatives would result in cutting energy used for hot water in half while remaining safe and reliable.

Appliance	Existing Condition	New Condition
Water Heater	One 40 gallon standard electric water heater.	Replace existing water heater with power vented natural gas water heater.

Savings

Hot water energy reduction: 62%
Overall building energy reduction: 1.4%
Annual savings: $333
Capital investment: $1,149
Payback: 3.46 years

ECM 6: Unplugging Unutilized Items During Summer Months

Existing Conditions

Energy auditing revealed that several items that are not utilized/necessary during the summer vacation months remained on and consuming energy. Items that remained on included a commercial kitchen freezer, commercial size refrigerator, residential size refrigerator, icemaker and drinking fountain. With the cafeteria unused during the summer months, unplugging these appliances is an excellent means of conserving electricity.

Energy Conservation Measure

Unplug the commercial sized freezer, commercial sized refrigerator, residential sized refrigerator, commercial icemaker and drinking fountain during the summer.

Appliance	Existing Condition	New Condition

Kitchen Commercial Freezer	Powered on all year	Unplug between school dismissal in spring and fall start of school.
Kitchen Commercial Refrigerator	Powered on all year	Unplug between school dismissal in spring and fall start of school.
Kitchen Refrigerator	Powered on all year	Unplug between school dismissal in spring and fall start of school.
Kitchen Icemaker	Powered on all year	Unplug between school dismissal in spring and fall start of school.
Drinking Fountain	Powered on all year	Unplug year round. Drinking water supply originates from deep groundwater and is cold without refrigeration.
Teachers' Lounge Refrigerator	Powered on all year	Remain plugged in all year for office staff working during summer.

Savings
Subject appliance energy reduction: 23%
Overall building energy reduction: 2.9%
Annual savings: $684
Capital investment: $0
Payback: 0 years

ECM 7: Replacing Incandescent Light Bulbs

Existing Condtions
The vast majority of interior lighting at the school is from energy efficient fluorescent lighting but there are some remaining incandescent bulbs. Incandescent bulbs use approximately four times the electricity as energy efficient alternative bulbs and can be easily and cheaply replaced.

Energy Conservation Measure
Purchase and replace incandescent bulbs with energy efficient compact fluorescent bulbs. Benefits of CFLs will include significantly less energy consumption for comparable light output and longer bulb life.

Savings
Energy reduction from incandescent bulbs: 78.3%
Overall building energy reduction: 0.3%
Annual savings: $67
Capital investment: $4

Payback: 0.06 years

ECM 8: Timed Power Supplies

Existing Condtions

Various electronic items throughout the building continue to draw "phantom" power as they sit idle after class/work hours. Energy auditing showed that copiers and printers continue to draw electricity even when idle and building is unoccupied.

Energy Conservation Measure

Purchase five APC P11GTV power strips to power down printers with master device/hibernating computer automatically and three APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day.

Plug In Device	Existing Condition	New Condition
Printer	Five printers that are inconsistently powered off	Purchase and utilize APC P11GTV power strips to power down printers when master device/hibernating computer powers down
Copier	Three copy machines that continue to draw power unnecessarily after work hours	Purchase and utilize APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day

Savings

Timed electronic energy reduction: 49%
Overall building energy reduction: 0.7%
Annual savings: $163
Capital investment: $233
Payback: 1.5 years

ECM 9: Removing Redundant Energy Consuming Items

Existing Condtions

½ size refrigerator is redundant when other refrigerators are available in building.

Energy Conservation Measure

Eliminate ½ size refrigerator and utilize other existing refrigerators in the building.

Savings

Energy reduction from eliminating redundant items: 100%
Overall building energy reduction: 0.3%
Annual savings: $76
Capital investment: $0
Payback: 0 years

ECM 10: Exterior Door Air Sealing

Existing Condtion

Overall assessment of the building's weatherization is good with the exception of exterior doors that all lack a good seal resulting in air infiltration/heat loss. The doors are in good condition but lack proper sealing into door frame because of worn weather stripping and/or improper fit.

Energy Conservation Measure

Purchase durable door seals/weather strip kits to effectively seal door into frame and thereby reduce air infiltration/heat loss from leaky closed doors. In addition, adjust strike plates to ensure that door closes snugly against door seal.

Savings

Heating & cooling energy reduction: 0.4%
Overall building energy reduction: 0.23%
Annual savings: $55
Capital investment: $200
Payback: 3.6 years

C.3 Waishkey Center

Waishkey Center Building (ECMs Totaling 35.1% Energy Reduction)

The Waishkey Center is largely a single story 29,475ft^2 multi-purpose community building owned by the Tribe. The Waishkey Center was constructed in 1971 and has been utilized for numerous purposes. Currently, the main functions of the building are the gymnasium, and will become part of the OSC expansion.

The Waishkey Center utilizes grid electricity and natural gas as sources of energy. Electricity is used for all items requiring energy except for building heating where natural gas is used. HVAC controls have largely been gutted leaving the HVAC system operating in an inefficient steady state.

The Waishkey Center building features block construction, brick exterior, aluminum sliding windows, three sets of double metal utility exterior doors, three single metal entry door, flat roof and slab foundation.

Analyses of the Waishkey Center's energy consumption history and energy audit information revealed that heating is the largest energy consuming item followed by ventilation, interior lighting, computers, hot water and other items shown in the following chart.

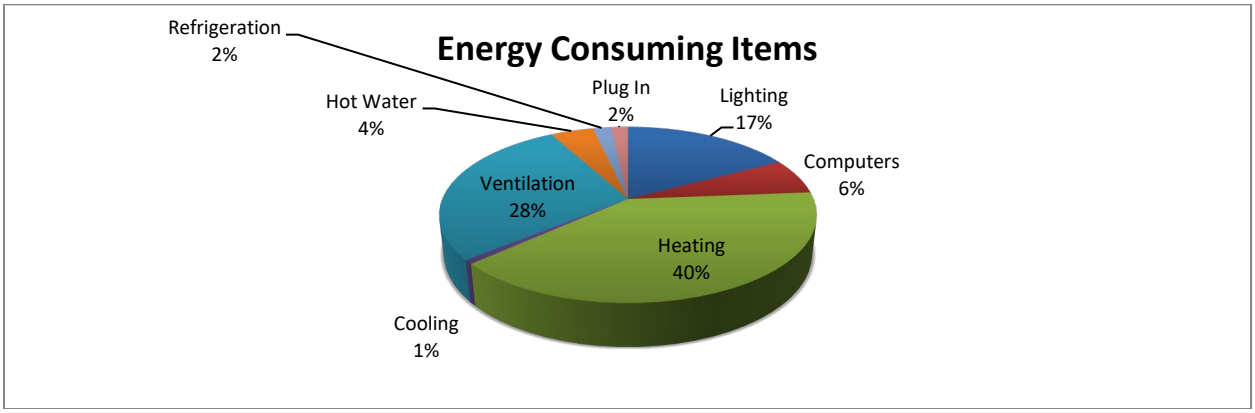


Figure C3. Energy Consuming Items

To improve building energy performance, the following Energy Conservation Measures (ECMs) were developed in response to energy audit and analyses findings. Each ECM is further described below.

Table C3. Energy Conservation Measures

ECM		Description of **Energy Conservation Measures**	Energy Use Savings	Total Cost Savings ($/year)	Estimated Capital Cost	Simple Payback
1		Hibernate computers during non-work hours	67.4%/4.3%	$1,818	$0	0
2		HVAC Upgrade – New Rooftop Furnace & AC Units, Direct Digital Controls, Air Handlers, Duct Optimization, Duct Cleaning and Thermostat Optimization	28%/19.2%	$8,111	$175,000	21.6
3		Replace Incandescent Bulbs with CFLs	78.3%/.2%	$94	$5	0.06
4		Energy Efficient Gymnasium Lights (T5 High Bay Fixtures & Bulbs)	29.3%/1.2%	$508	$2,585	5.09
5		Exterior Lights w/ LED Retrofit Bulbs	75%/.8%	$325	$1,677	5.16
6		Interior Lighting (Occupancy sensors and limited T8 Fixtures and bulbs)	26.1%/3.1%	$1,291	$4,395	6.93
7		Coffee Makers w/Insulated Carafe	84%/0.4%	$169	$130	0.77
8		Timed Power Supplies (Copiers, Printers)	63.5%/0.5%	$213	$180	.85
9		Eliminate Redundant Items (Space heaters, ½ fridge)	100%/0.3%	$112	$0	0
10		Energy Efficient Refrigerators	78.7%/1.4%	$592	$3,780	6.39
11		Energy Star Water Cooler	45.2%/0.2%	$79	$382	4.81
12		Air Sealing Exterior Doors	5%/2.0%	$851	$5,000*	5.9*
13		High Efficiency Water Heater(s) & Thermostat Optimization	35%/1.5%	$647	$2,300	3.55
		Total	**35.1%**	**$14,810**	**$195,434**	**13.2**

ECM 1: Computer Power Management

Existing Conditions

The energy audit of the Waishkey Center determined that work station computer systems largely remain powered on 24 hours per day. Computers that remain on after work cause

unnecessary power consumption and can be mitigated by hibernating computers after/before work hours.

Energy Conservation Measure

Hibernating is a power management setting that every computer operating system has for reducing energy consumption. Utilizing this feature to power down computers outside of work hours will reduce the current wasted energy associated with keeping computers powered on when the building is unoccupied. Enabling the Hibernate feature to the specifications below will cause each computer to consume near zero energy outside of work hours (approximately 14 hours/day) and thereby result in a significant reduction in energy.

Computer Type	Existing Condition	New Condition
Workstation	Powered on 24/7	Enable Hibernate feature in each computer's Power Management settings after 90 minutes of inactivity.

Savings

Computer energy reduction: 67.4%
Overall building energy reduction: 4.3%
Annual savings: $1,818
Capital investment: $0
Payback: 0 years

Savings are calculated using the following: eighteen computers operating 261 week days calculated with 10 work hours and 14 efficency mode hours, 72 weekend days calculated with 100% hibernation/efficiency mode.

ECM 2: HVAC Upgrades

Existing Conditions

Currently, the building's heating and cooling operates in a steady-state/occupied scenario 24 hours a day and 365 days a year as a result of old and compromised HVAC controls and air handlers. The two boilers in the heating system are two years old and reliable but the remaining HVAC system has not had necessary upgrades and as a result the control system is gutted and doesn't offer adequate control of heating and ventilation. In addition to running the air handlers continuesly, the air handlers are old, inefficient and intended for a building with a different purpose when an indoor swimming pool was housed in the Waishkey Center. The indoor swimming pool has been removed and converted to the Boys and Girls Club activity space and office space. No documented duct cleaning has surely led to restricted airflow and decreased HVAC efficiency.

During energy audit visits, phnuematic controlled heat thermostat settings averaged 72 degrees but actual temperature varied widely throughout the building due to heat supply imbalance and air leakage around exterior doors and gymnasium roof.

Air conditioning is present only in the Police Department portion of the building. Summer air conditioning thermostat were set at 74 degrees for the rooftop AC unit.

As with all other buildings in this project, significant energy is wasted for excessive heating and cooling temperatures and heating and cooling of building during unoccupied times.

Energy Conservation Measure

Replace existing HVAC equipment that is in need of replacement with high efficiency heating, cooling and ventilation system. In addition, take advantage of programmobility of new system to optimize thermostat heating and cooling to the EPA recommended temperature during work hours along with setbacks and step ups outside of occupied times. See Appendix – Thermostat Optimization for breakdown of savings/wasted energy.

HVAC Component	Existing Condition	New Condition
Engineered Design	NA	Waishkey Center would have design and specifications of high efficiency HVAC created for heating and cooling load of building.
HVAC Controls	Pnuematic temperature controls with very limited functionality	● Direct Digital Controls for zone by zone thermostat programming ● Demand Control Ventilation for on demand ventilation ● Speed control capability of new rooftop heat & AC units ● Sensor controls for exhaust fans
Furnace & Air Conditioning	Two natural gas boilers with an estimated 72% efficiency; One rooftop AC unit for Police Department	Replace existing boilers and AC unit with four natural gas fired rooftop units. Each unit would be 17.5 ton cooling and 300 MBH heating. Heat units would be 81% efficient.
Air handlers	Continously running and inefficient to available equipment	Air handlers would be incorporated in the rooftop units in the above measure.
Ducts	Ducts are restricted and imbalanced	Clean ducts to improve airflow and reroute to optimize heat and cooling supply and return.
Thermostat - Heating	Avg. 72°F 24hrs	Weekdays 6am-6pm: 70°F Weekdays 6pm-6am & Weekends 60°
Thermostat - Cooling	Police Department AC Avg. 74°F 24hrs/auto	Entire Waishkey Center Weekdays 6am-6pm: 76°F Weekdays 6pm-6am & Weekends: off

Savings
Building heating & cooling energy reduction: 28%
Overall building energy reduction: 19.2%
Annual savings: $8,111
Capital investment: $175,000
Payback: 21.6 years

ECM 3: Replacing Incandescent Light Bulbs

Existing Condtions
The vast majority of interior lighting at the Waishkey Center is fluorescent lighting but there are some remaining incandescent bulbs. Incandescent bulbs use approximately four times the electricity as energy efficient alternative bulbs and can be easily and cheaply replaced.

Energy Conservation Measure
Purchase and replace incandescent bulbs with energy efficient compact fluorescent bulbs. Benefits of CFLs will include significantly less energy consumption for comparable light output and longer bulb life.

Savings
Energy reduction from incandescent bulbs: 78.3%
Overall building energy reduction: 0.2%
Annual savings: $94
Capital investment: $5
Payback: 0.06 years

ECM 4: Gymnasium Interior Lighting

Existing Conditions
The Waishkey Center's gymnasium is equipped with eleven 450 watt metal halide bulbs and fixtures on manual light switches. This arrangement of lights is more energy intensive than fluorescent alternatives.

Energy Conservation Measure
Purchase and replace existing metal halide lighting with eleven T5 high bay fluorescent fixtures and bulbs.

Lighting Item	Existing Condition	New Condition
Interior Lighting	Eleven 450 watt metal halide bulbs and fixtures.	Replace 11 Gymnasium Lights with T5 High Bay Fluorescent Fixtures and Bulbs (VaporTight High Bay 6 Lamp T5 Fixture $194.99; T5HO 54W bulb $39.98/6pack)

Savings

Gymnasium lighting reduction: 29.3%
Overall building energy reduction: 1.2%
Annual savings: $508
Capital investment: $2,585
Payback: 5.09 years

ECM 5: Exterior Lighting

Existing Conditions

The parking lot and building exterior is currently lighted by six 150 watt high pressure sodium lights on a timer that has the lights remaining on twelve hours per night. Both the bulbs' high wattage and timer on throughout the night cause energy consumption that can be mitigated.

Energy Conservation Measure

Replace existing 150 watt high pressure sodium bulbs with 45 watt LED retrofit bulbs and optimize timer for 5 hours on before scheduled building occupancy and 5 after. Significant energy will be saved through conservation (reduced on time) and high efficiency bulb replacement. LED lights also provide advantages from long operational life.

Exterior Light	Existing Condition	New Condition
High Pressure Sodium Lights	Six 150 watt exterior lights remaining on 12 hours per night.	Replace 150 watts HPS bulbs with 45 watt LED retrofit bulbs. Reset timer to 5 hours on in morning and 5 hours on in the afternoon/evening weekdays only.

Savings

Exterior lighting reduction: 75%
Overall building energy reduction: 0.8%
Annual savings: $325
Capital investment: $1,677
Payback: 5.16 years

ECM 6: Interior Lighting

Existing Conditions

The majority of the Waishkey Center's interior is equipped with T8 fluorescent bulbs and fixtures on manual light switches but some less efficient T12 lights remain. While T12 lights are more efficient than incandescent bulbs, newer and more efficient T8 bulbs and occupancy sensors would result in greater energy savings.

Energy Conservation Measure

Purchase and install T8 fixtures and bulbs for the Boys and Girls Club main room and 47 occupancy sensors for remaining room/offices. This alternative will consume less energy from higher efficiency lights and electricity conservation by automatically turning off lights when room is unoccupied. Multi-technology sensors would be used and prevent lights from unintentionally being turned off (see Appendix – Lighting for recommended Leviton occupancy sensor unit). U.S. EPA estimates 25% savings when occupancy sensors are used in office settings.

Lighting Item	Existing Condition	New Condition
Interior Lighting	Mix of T8 and T12 fixtures and bulbs with manual on/off switches	Purchase and install 9 X 2 T8 lamp fixtures (Grainger item #2PFV4 @ $71.35 each)
Light switches	Manual on/off switches	47 occupany sensors (Leviton Multi-Technology Occupancy Sensor Units @ $79.86)

Savings

Interior lighting reduction: 26.1%
Overall building energy reduction: 3.1%
Annual savings: $1,291
Capital investment: $4,395
Payback: 6.93 years

Calculations for energy savings are based on increased efficiency of T8 fixtures over T12 and a 25% reduction relating to the use of occupancy sensors.

ECM 7: Replacing Conventional Coffee Pot with Thermal Carafe Unit

Existing Condtions

The staff kitchen has a coffee machine with hot plate that remains on and drawing electricity throughout the work day to heat coffee pot.

Energy Conservation Measure

Purchase and replace conventional coffee machine with unit that heats water/coffee during brew and maintains heat by means of insulated carafe and doesn't require electricity beyond brew time. Benefits of thermal carafe unit will include significantly less energy consumption for coffee.

Appliance	Existing Condition	New Condition

Staff Kitchen Coffee Machine	One coffee machine that draws power throughout the day for heating elements.	Replace with Bunn BT Velocity Brew Drip Coffee Maker with Insulated Carafe

Savings
Energy reduction from thermal carafe style coffee maker: 84.0%
Overall building energy reduction: 0.4%
Annual savings: $169
Capital investment: $130
Payback: 0.77 years

ECM 8: Timed Power Supplies

Existing Condtions
Various electronic items throughout the building continue to draw "phantom" power as they sit idle after class/work hours. Energy auditing showed that copiers and printers continue to draw electricity even when idle and building is unoccupied.

Energy Conservation Measure
Purchase four APC P11GTV power strips to power down printers with master device/hibernating computer automatically and two APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day.

Plug In Device	Existing Condition	New Condition
Printer	Four printers that are inconsistently powered off	Purchase and utilize APC P11GTV power strips to power down printers when master device/hibernating computer powers down
Copier	Two copy machines that continue to draw power unnecessarily after work hours	Purchase and utilize APC Day & Time Timer/Surge Protector to limit power to copiers 10 hours per day

Savings
Timed electronic energy reduction: 63.5%
Overall building energy reduction: 0.5%
Annual savings: $213
Capital investment: $180
Payback: 0.85 years

ECM 9: Removing Redundant Energy Consuming Items

Existing Condtions

Space heaters and a ½ size refrigerator are convenient but are redundant when a staff refrigerator is available in the building and central heating combined with improved HVAC system would provide necessary heat.

Energy Conservation Measure

Eliminate one ½ size refrigerator and utilize existing refrigerator in the staff kitchen. Eliminate three space heaters and improve balance of building's HVAC system (see ECM 2: HVAC Upgrades).

Savings

Energy reduction from eliminating redundant items: 100%
Overall building energy reduction: 0.3%
Annual savings: $112
Capital investment: $0
Payback: 0 years

ECM 10: High Efficiency Refrigerators

Existing Conditions

The Waishkey Center currently uses four standard/non-high efficiency refrigerators. These refrigerators are located in the Police Department staff kitchen, Boys and Girls Club room and two in the Boys and Girls Club classroom and consume approximately double the electricity of current high efficiency units.

Energy Conservation Measure

Replace the four existing refrigerators with high efficiency refrigerators.

Appliance	Existing Condition	New Condition
Refrigerators	Four non-high efficiency refrigerators.	Replace the four existing refrigerators with four high efficiency refrigerators that would consume significantly less electricity.

Savings

Refrigeration energy reduction: 78.7%
Overall building energy reduction: 1.4%
Annual savings: $592
Capital investment: $3,780
Payback: 6.39 years

ECM 11: Energy Star Water Cooler

Existing Condtions

The two existing water coolers located in the Police Department conference room and the Boys and Girls Club teen room are standard/non-Energy Star water coolers. Higher efficiency units are available that would reduce energy consumption tied to water cooler units.

Energy Conservation Measure

Purchase and replace two existing water coolers with Energy Star water coolers.

Savings

Energy reduction from Energy Star water cooler: 45.2%
Overall building energy reduction: 0.2%
Annual savings: $79
Capital investment: $382
Payback: 4.81 years

ECM 12: Exterior Door Air Sealing

Existing Condtion

Overall assessment of the building's weatherization is fair/poor with one component being exterior doors that lack a good seal resulting in air infiltration/heat loss. The three sets of aluminum framed glass double doors and three single steel doors are in good condition but lack proper sealing into door frame because of worn weather stripping and/or improper fit.

Energy Conservation Measure

Purchase durable door seals/weather strip kits to effectively seal door into frame and thereby reduce air infiltration/heat loss from leaky closed doors. In addition, adjust strike plates to ensure that door closes snugly against door seal.

Savings

Heating & cooling energy reduction: 5.0%
Overall building energy reduction: 2.0%
Annual savings: $851
Capital investment: $5,000
Payback: 5.9 years

ECM 5: High Efficiency Water Heater

Existing Conditions

The Waishkey Center currently has two 100 gallon natural gas atmospheric vented water heaters to meet its low demand for hot water. The two large water heaters were sized for a past period of time when the locker rooms and showers were more utilized. Hot water demand is now much lower. Downsizing to two smaller and more efficient

natural gas water heaters would significantly reduce energy associated with heating water.

Energy Conservation Measure

Replace the two existing 100 gallon atmospheric vented 75% AFUE water heaters with two 50 gallon power vented natural gas water heaters and reduce thermostat to 120 degrees.

Appliance	Existing Condition	New Condition
Water Heater	Two 100 gallon natural gas water heaters with temperature setting set near Max.	Replace two existing water heaters with 50 gallon power vented natural gas water heater and set thermostat for 120 degree water.

Savings

Hot water energy reduction: 35%
Overall building energy reduction: 1.5%
Annual savings: $647
Capital investment: $2,300
Payback: 3.55 years

ECM 13: Recommend for Future Upgrade (Considered but not included in this plan - Gymnasium Roof Insulation and Air Sealing

Existing Condition

Overall assessment of the building's weatherization is fair/poor with one component being exterior doors that lack a good seal resulting in air infiltration/heat loss and the other being the gymnasium roof with significant air infiltration and poor insulation at the ceiling/roof level. The roof was recently replaced with a new membrane roof with minimal insulation and no air sealing.

Energy Conservation Measure

Plan for necessary roof/ceiling insulation and air sealing at a point in time when roof is needing replacement.

Onsite Energy Audit Recommendations
Goal Setting
A Plan of Action
    Overview
    Short-Term Actions