

Green Capital Needs Assessment and Replacement Reserve Analysis

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The Old Marvin

CHFA # 97054D

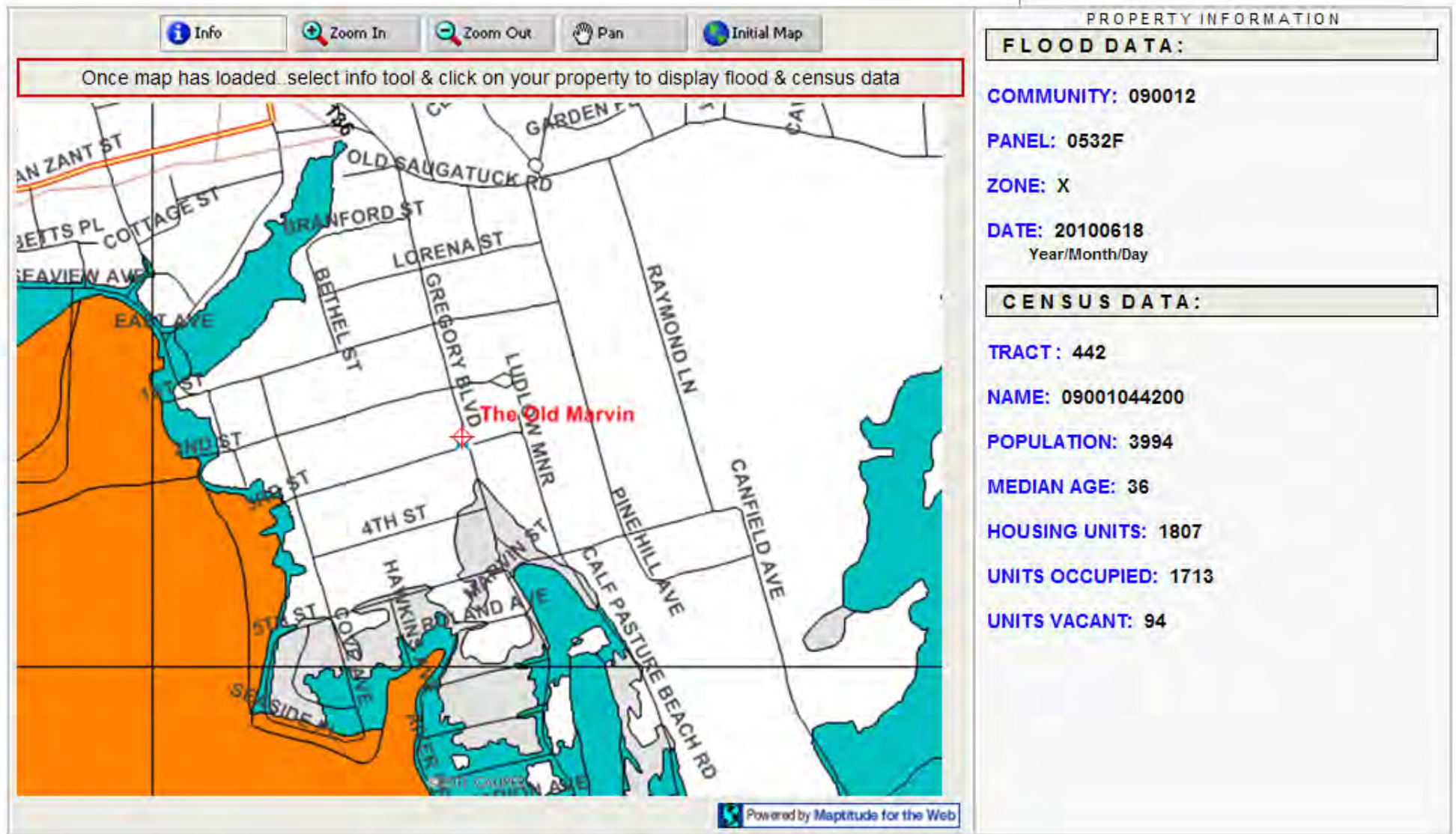
Under One Roof, Inc.
Norwalk, CT

May 9, 2013

Final Report



The Old Marvin
60 Gregory Boulevard
Norwalk, CT 09855



The Old Marvin

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Norwalk, CT 06855

Zone X = Outside the 500-year floodplain and
Outside the 1% and 0.2% annual chance floodplains

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HOW TO READ THIS REPORT

The report is divided into two sections: "Findings and Recommendations" and "Supporting Data".

Findings and Recommendations: The three elements comprising this section constitute the main content of the report. A comprehensive list of the recommended green options and their benefits, and a snapshot of key energy findings, are included in the Executive Summary. Additional detail regarding the property's existing conditions, current and future capital needs, and green recommendations are illustrated in the narrative and photo pages.

Supporting Data: These nine sections contain the support data and calculations used in determining the feasibility of the green recommendations. Hard costs estimates and replacement/repair timing are presented in the capital needs worksheets. The Capital Needs Summaries and Replacement Reserve Analyses highlight the total 20-year capital costs for both the conventional and green scenarios pitted against current funding circumstances. Cost-benefit analyses are included in the Simple Payback and Life Cycle Cost "cut sheets" at the end of the report.

Executive Summary

Overview and Goals

This Green Capital Needs Assessment (GCNA) has been undertaken on behalf of Connecticut Housing Finance Authority. It is aimed at determining the development's current and prospective physical circumstances, on both a traditional and green basis. A traditional CNA focuses on those capital activities that reasonably can be expected to ensure that a property is viable and in good condition over a twenty-year horizon. In a traditional CNA, it is common for On-Site Insight (OSI) to informally comment on maintenance practices, or suggest discretionary upgrades that might affect operations, marketability, or occupant well being. This GCNA is aimed at more rigorously and more formally identifying green alternatives to conventional replacement of major components and systems. It offers options aimed at helping:

- improve energy and water efficiency,
- reduce operating and capital costs through the use of durable materials and improved maintenance,
- safeguard indoor environmental quality (IEQ) for residents, and
- reduce the property's environmental impact.

We see a number of sensible green opportunities, now and in the future, to replace existing elements with more durable and/or environmentally friendly materials and technology. In both the narrative and detailed capital needs worksheets that follow, conventional and green capital activities are presented in parallel. Capital needs summaries are presented separately for conventional and green models. The green opportunities described in the plan fall into one of two categories: energy and water conservation measures (EWCs), or green measures (GMs), expanded in detail below:

Executive Summary

A Note on NPV

Net present value (NPV) is the difference in total life cycle costs between the conventional recommendation and the green recommendation. The EWCMs and GMs that carry a negative NPV are viewed as cost-prohibitive, despite potential environmental benefits or additional energy savings. In this report, OSI does not recommend measures that carry a negative NPV.

Energy and Water Conservation Measures (EWCMs):

In the report, 13 energy and water conservation measures (EWCMs) are identified. Energy and water conservation measures are upgrades and improvements to existing mechanical and electrical systems that have a direct impact on energy consumption, and therefore potential utility (electric, gas, oil, water, sewer) savings if implemented appropriately. As part of the inspection process, the property's utility data was analyzed. This information is then used as part of the EWCM recommendation and calculation process.

Certain EWCMs are interactive. In order to achieve the projected annual energy savings for an interactive group, the EWCMs must be implemented in concert with one another. If any of the interactive EWCMs are deferred or foregone, there may be a significant impact on the utility savings outlook. For example, replacement of an inefficient boiler system may not achieve projected utility savings associated with that system if inefficient windows remain in place.

The energy conservation measure specifications (i.e. boiler efficiencies, R-values, U-values) presented in this plan are mostly derived from the International Energy Code and the American Society of Heating, Refrigeration and Air-Conditioning (ASHRAE) Handbook. These measures represent one conceptual option; various alternatives may yield different results. It must be noted that a number of factors may affect the estimated annual energy savings and simple payback periods, and therefore the figures outlined in this report are not guaranteed.

Executive Summary

Green Measures (GMs):

The report identifies 7 Green Measures (GMs). Green measures are replacements of existing materials and systems that do not have a direct impact on energy consumption; however, they represent opportunities to reduce capital and operational expenditures in the future due to increased durability, enhanced performance, and increased expected useful life (EUL) potential. Additionally, if implemented properly, GMs can improve indoor environmental quality and can benefit resident and staff health, safety, and well-being.

The life cycle costs for the GMs are calculated in the attached worksheets with the comparative life cycle cost for the conventional replacement alternatives. Other GMs included in the plan do not represent enhanced performance or extended expected useful lives, and therefore the life cycle costs for these GMs are not calculated. Many of the projected savings are based on certain performance and EUL criteria for the respective systems and materials. Several factors may impede upon the expected performance and may skew the estimated savings. In this case, the savings presented in the plan are estimated and cannot be guaranteed.

Building Modeling Methodology

This report uses an energy model created in TREAT to determine the energy loads (electric and fossil fuel uses including heating, domestic hot water, and non-heating systems) for this property. The TREAT model is based on building-specific construction, HVAC systems, and other building systems (i.e. lighting, appliances, etc.) as identified by the inspection team. The energy model also incorporates 12 months of utility bills, and matches weather data to the utility billing period.

Using the SUNREL™ energy simulation software developed by the National Renewable Energy Laboratory (NREL), TREAT calculates energy uses on an hourly basis (again factoring in weather/climate, existing HVAC systems, and internal gains) for an entire year. The result produces calculated energy use for the property, and proposed energy savings for identified measures. The energy savings are shown both independently and with full interaction of all measures.

Executive Summary

Additional measures such as water usage, which is currently not modeled in TREAT, has been presented using OSI's existing utility models. Also, since TREAT evaluates the building as a whole, it is possible that measures reduce electric consumption, could also show an increase in heating requirements (i.e. lighting reduction reduces heat typically produced by the original lighting system and in turn would require an increase to the heating load). The calculated loads (electricity, natural gas) are reconciled against billed utility loads within a 10% margin.

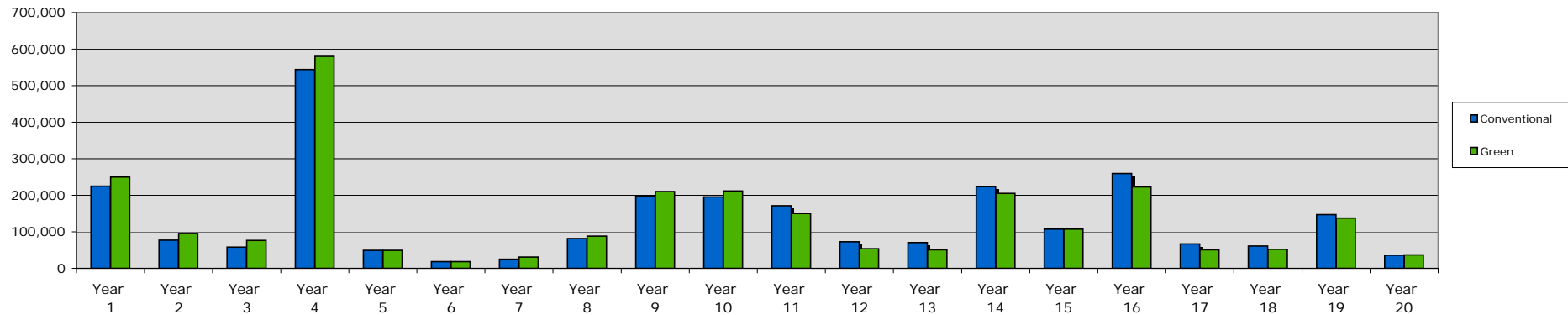
Executive Summary

Dashboard

Property Data

Location:	Norwalk
Year Built:	1898
Number of Units:	50
Number of Buildings:	1

Comparison of Capital Needs - Conventional vs. Green



Environmental Impact

(Total Carbon Release Based on Current Annual Energy Usage)

Building Square Footage:	23,562
Resident Population (estimated):	55

	BTUs/yr	Conversion	lbs CO ₂	lbs CO ₂ / Res
Gas	4,088,832,000	x 11.023100	450,716	8,195
Oil	0	x 11.023100	0	0
Electricity	1,293,826,988	x 1.582917	600,065	10,910
Total	5,382,658,988		1,050,781	19,105

Replacement Reserve Analysis

Conventional

Plan #1: Capital costs exceed reserves in Years 2 - 20.
Plan #2: Infusion of \$1,350,000 in Year 1.

Green

Plan #1: Capital costs exceed reserves in Years 2 - 20.
Plan #2: Infusion of \$1,375,000 in Year 1.

Health and Safety

Hazardous Materials

	Identified	Location / Notes
Lead Based Paint (LBP):	Not Tested	Possible due to age
Asbestos Containing Materials (ACMs):	Not Tested	-
Mold:	Not Observed	-

Indoor Ventilation

Mechanical ventilation and operable windows

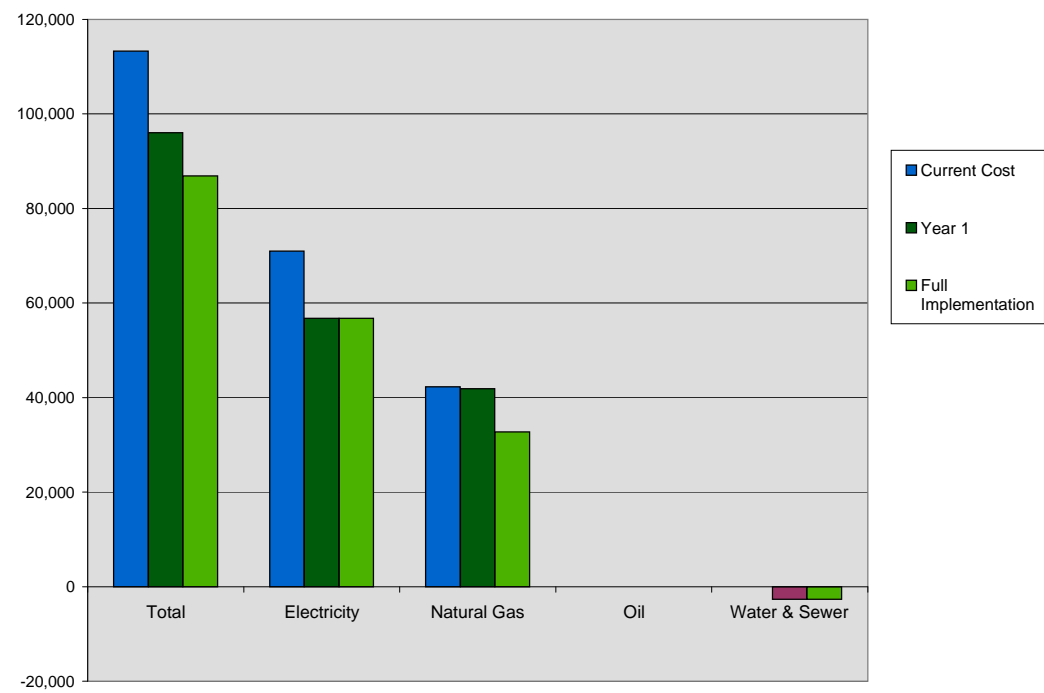
Indoor Air Quality (IAQ)

	Design Specification	Actual Read	Notes
Air Flow Rate	N/A	Not Measures	-
Thermal Comfort	68-72	67-74	Conditioned Spaces
Carbon Monoxide	0	0	-
Carbon Dioxide	<1000	840 - 1009 ppr	Conditioned Spaces

Executive Summary

Energy Savings

Current and Projected Energy Cost



Energy Intensity / Benchmarking Data

TREAT Modeled Data

Building Square Footage: 23,562

Heating Degree Days: 5,731

TREAT Model

	Amount	Units	BTUs/yr	Energy Intensity (BTUs/(HDDs x SF))
Heating	29,706	therms	2,970,576,652	22
Cooling	0	kWh	0	0
DHW	14,461	therms	1,446,077,614	11
Electricity	379,199	kWh	1,293,826,988	10
Total			5,710,481,254	42

	Gallons/yr	Gallons/sf/yr
Water	0	0

Energy Usage Summary

Billing Data

Utility	Current Usage	Current Cost	Projected Usage	Projected Cost	% Savings
Electricity	379,199 kWh	\$71,015	303,303 kWh	\$56,801	20.0%
Natural Gas	40,888 therms	\$42,306	31,634 therms	\$32,731	22.6%
Oil	0 gallons	\$0	0 gallons	\$0	n/a
Water & Sewer	0 gallons	\$0	#DIV/0!	(\$2,647)	n/a
Total		\$113,321		\$86,886	23.3%

Executive Summary

Green Improvement Plan

						Annual Utility Savings									
Measure	Upfront Cost	EUL	Simple SIR ¹	Incremental Cost ²	Green NPV ⁴	Electric		Gas		Oil		Water & Sewer		Total \$	Recommended Timing
						KWh	\$	Therms	\$	Gallons	\$	Gallons	\$		

Recommended EWCMs (Based on Financial Analysis)

Interactive Group															
EWCM 2 - Replace Boiler - Exterior	38,700	20	2.88	2,700	75,265			5,392	5,579					5,579	Future
EWCM 3 - Replace DHW Tank	35,017	20	0.62	2,397	9,614			1,055	1,092					1,092	Future
EWCM 4 - Replace Glass Doors	16,550	30	0.20	1,155	676			108	112					112	Future
EWCM 5 - Replace Window	305,079	30	0.23	21,284	17,558			2,290	2,370					2,370	Future
EWCM 7 - Convert Lighting Halls	15,480	15	9.32	15,480	99,204	53,375	9,996	(369)	(382)					9,614	Immediate
EWCM 8 - Converted Lighting Comm.	9,235	15	2.52	9,235	9,832	8,471	1,586	(33)	(34)					1,552	Immediate
EWCM 9 - Convert Exit Lighting	2,090	20	9.40	2,090	11,929	5,659	1,060	(75)	(78)					982	Immediate
EWCM 10 - Replace Refrigerator	720	15	0.31	150	111	128	24	(9)	(9)					15	Immediate
EWCM 11 - Washing Machines	0	12	0.00	0	4,088	246	46	75	78			#DIV/0!	311	435	Immediate
EWCM 12 - Replace Showerheads	925	20	64.01	925	49,735			886	916			#DIV/0!	2,044	2,960	Immediate
Interactive Group Total ⁵	423,796			55,416			12,691		9,575				2,355	24,621	
EWCM 1 - Convert Lighting - Exterior	17,050	20	1.79	11,998	18,859	8,129	1,522							1,522	Immediate
EWCM 13 - Replace Toilets - DU	22,038	25	0.33	1,538	2,841							#DIV/0!	292	292	Immediate
EWCM Subtotal	462,884			68,952		8,129	14,213	0	9,575	0	0	#DIV/0!	2,647	26,435	

Recommended GMs (Based on Financial Analysis)

GM 2 - Replace Vinyl	47,025	25		4,275	16,721	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 3 - Repalce Carpeting	36,812	25		16,733	329	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 4 - Replace Carpeting (DU)	101,409	25		46,095	906	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 5 - Replace Vinyl (DU)	6,600	25		600	1,706	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM Subtotal	191,846			67,703		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Total	654,730			136,655		8,129	14,213	0	9,575	0	0	#DIV/0!	2,647	26,435	

Optional Actions

EWCM 6 - Add Roof Insulation	168,810	20	0.00	25,321	(23,112)									0	Immediate
GM 1 - Pervious Pavers	90,057	35		55,672	(44,063)									0	Future
GM 6 - Replace Kitchen Cabinetry	169,313	25	0.00	11,813	(11,813)									0	Immediate
GM 7 - Replace Countertops	43,750	30	0.00	16,058	(8,829)									0	Immediate

Notes:

- Simple SIR is calculated as (Total Annual Savings * Estimated Useful Life) / Upfront Cost.
- Incremental Cost is the difference in cost between the green and conventional alternatives.
- Green SIR (Savings to Investment Ratio) is a relative measure that reflects the ratio of total savings to total investment of Green vs. Conventional. Unlike Simple SIR, this calculation takes into account maintenance costs, inflation, discounting, and differences in expected useful life.
- Green NPV is the net present value of installing a green vs. conventional product.
- Interactive group total recognizes full interaction of all measures based on the TREAT model.

Narrative

The Old Marvin Senior Apartments is a development designed for occupancy by seniors. The building contains a total of 50 units, all of which are accessed through a series of interior common hallways and stairwells. All units are one-bedroom apartments. The original school building was constructed in 1898 and was converted to for its current use in 1997. A section of the first floor is designated for use as a daycare facility. The rooms and appliances used by the daycare are not included in this report unless otherwise noted.

Site

Site Surface

The Old Marvin is located on a relatively small parcel of land in Norwalk, CT. The No capital costs are carried for landscaping improvements, as they are understood to be handled from operations. If, at some future date, management contemplates re-landscaping, OSI recommends attention to sustainable design. Conventional landscaping relies on large lawns, non-native species, extensive irrigation, and heavy use of fertilizers and pesticides. This type of landscaping also tends to be labor-intensive. There are design features that can enhance soil quality, and reduce storm water run-off and pollution. Such measures can also minimize water usage, maintenance costs, and green waste.

Roadways and Parking Areas		
Existing conditions	Capital needs	Green alternative
Private parking areas are located on either side of the building. The asphalt paved parking areas were observed to be in fair condition.	Costs to resurface the parking areas are shown starting in Year 4. Costs to crack-fill and sealcoat the surfaces are shown in Years 1, 9, 14, and 19.	GM #1 Install pervious concrete pavers. Pervious pavers will reduce storm water runoff and reduce the “heat island” effect caused by dark colored asphalt materials that retain solar heat.

Narrative

Courtyard & Pedestrian Walkways		
Existing conditions	Capital needs	Green alternative
The concrete pedestrian walkways were observed to be in good overall condition.	Periodic allowances to repair the pedestrian walkways and courtyard area are shown throughout the report.	Repairs and replacements using Portland cement with at least 20% recycled-content materials is recommended. This measure increases the durability and strength of the concrete and reduces greenhouse gas emissions associated with cement production. Where contractors are familiar with the product, there is little or no incremental cost to this option; however we are uncertain about local market circumstances with regard to this. A separate cost option is not shown for this here.

Narrative

Site Lighting

Existing conditions	Capital needs	Green alternative
Pole mounted site lighting is located at each parking area. The fixtures are fitted with mercury vapor lamps.	Costs to replace poles and fixtures are shown in Year 1 and 16.	EWCM #1 Install efficient pole mounted LED lamps. LED lamps use significantly less electricity than existing mercury vapor lamps and are long-lived fixtures that don't require frequent lamp replacement.

Fencing & Gates

Existing conditions	Capital needs	Green alternative
A wood shadow-box fence runs along the rear property line (near the courtyard area). The fence was observed to be in fair to poor condition. Some sections of the fence were observed to be damaged and leaning.	Costs to replace the wood fencing area are shown in Year 2 of the plan.	Replace with FSC certified wood.

Narrative

Dumpster Enclosure

Existing conditions	Capital needs	Green alternative
The wood dumpster enclosure was observed to be in fair overall condition.	Costs to replace the enclosure are shown in Year 4 of the plan.	Replace with FSC certified wood.

Accessibility Ramp

Existing conditions	Capital needs	Green alternative
A concrete wheel chair ramp is located at the front entrance. The surface was recently repaired; however site staff reports ongoing maintenance issues with the ramp. The corners and sides of the concrete ramp exhibit spalling, cracking, and flaking. Rust noted at the base of each handrail may also be contributing to the deterioration of the ramp.	Costs are shown in Year 1 to repair/rebuild the ramp and replace the handrail.	Specify recycled content/Portland cement.

Narrative

Handicap Accessibility / Section 504 Analysis

As part of this assessment, the common areas and dwelling units at the development were examined for compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS). The development is partially compliant with UFAS; however deficiencies were noted at several locations. Costs for handicap accessibility modifications and/or improvements at these locations are shown in Year 1 unless otherwise noted.

Circulation

Existing conditions	Capital needs	Green alternative
The development contains one compliant parking space with an access aisle.	As part of the Year 1 striping and sealcoating work, additional parking spaces should be striped with compliant access aisles.	Specify low VOC paint products.

Interior Common Areas

Existing conditions	Capital needs	Green alternative
No major deficiencies were noted.		No green alternatives.

Narrative

Dwelling Units		
Existing conditions	Capital needs	Green alternative
Barrier free units are largely compliant with accessibility standards. Some minor deficiencies were noted.	Costs are included to reposition bathroom grab bars, lower thermostat controls, and lower wall mounted cabinetry.	No green alternatives.

Narrative

Mechanical Room

The central mechanical room contains the heating and domestic hot water (DHW) systems. The heating system consists of a natural gas-fired module boiler, rated at 1,500 MBH total input capacity. There are two base mounted 2-horsepower service water circulating pumps used to distribute hydronic heat. The DHW system features an A.O. Smith boiler rated at 1,210 MBH and two steel storage tanks.

Boilers & Controls

Existing conditions	Capital needs	Green alternative
The natural gas-fired boiler is a standard efficiency model (85%) The boiler is reportedly 16 years old. No problems were reported with respect to the boiler itself. However, site staff reported that inadequate heat is a problem throughout the building.	Costs to replace the boiler is shown in Year 9 after twenty-five years of service.	EWCM #2 Install a high efficiency condensing boiler with weather controls. A condensing boiler will typically have a combustion efficiency of 93% to 96% and operate with lower hydronic supply and return temperatures (160°F and 135°F, respectively). The resultant flue gases are also low temperature (below 100°F) and require either stainless steel or heat-resistant plastic (CPVC) flues to address corrosive flue vapors. The replacement cost also includes the boiler controls. The dedicated boiler would be sized appropriately to produce adequate hot water for the building.

Narrative

Service Water Pumps

Existing conditions	Capital needs	Green alternative
Two base mounted circulating pumps circulate hot water throughout the building. The existing pumps are premium efficiency models (89.5% Nema eff.).	Costs to replace the remaining original circulator pump are shown in Year 4 of the plan. Future replacement costs are shown in Years 19.	No green alternative.

Domestic Hot Water

Existing conditions	Capital needs	Green alternative
Domestic hot water is produced by a dedicated A.O.Smith boiler rated at 1,210 MBH with two domestic hot water storage tanks.	Costs to replace the domestic hot water boiler are shown in Year 9. The storage tanks are shown for replacement in Years 1 and 16.	EWCM #3 Install a high efficiency condensing hot water boiler. A condensing boiler with storage tanks tank will typically have a combustion efficiency of 93% to 96% and operate much like a high efficiency condensing boiler (described above).

Narrative

Flues/Combustion Air		
Existing conditions	Capital needs	Green alternative
A louvered wall vent in the boiler room ensures adequate combustion air to each boiler. Metal flues channel combustion gases produced by all boilers and the hot water tank to the outside. No major problems were observed or reported. It is worth noting that the flues for each heating boiler exhibit rust.	The boiler replacement costs include replacing metal flues in the event of a conventional replacement.	The boiler replacement costs include additional costs associated with installing a directly vented CPVC or stainless steel flue.

Narrative

Building Mechanical and Electrical Systems

The major building systems include fire suppression, distribution piping systems for hydronic heat, domestic hot and cold water, sanitary wastewater, and natural gas services, as well as heating and ventilation, electrical, fire detection, security and elevators.

Commercial Kitchen Equipment

Existing conditions	Capital needs	Green alternative
Commercial kitchen equipment varies in age and condition. The commercial kitchen equipment includes refrigeration and cooking equipment.	An allowance is shown throughout the plan for as needed replacement.	No green alternative. The existing refrigeration equipment is Energy Star rated.

Building Fire Suppression

Existing conditions	Capital needs	Green alternative
The sprinkler system operates off of city pressure. The "dry" side system is fitted with a small compressor.	Costs to replace the compressor are shown in Year 2 and 20.	No green alternative suggested.

Narrative

Building HVAC

Existing conditions	Capital needs	Green alternative
Four Trane rooftop units (RTU) serve several areas of the building. The RTU's are gas fired units with compressors.	Costs are shown to replace the RTU's in Year 4 of the plan.	Consider installing high efficiency unit (SEER 15 or greater). <i>The cooling load is not sufficient to calculate the electric usage of these units.</i>

Building Exhaust

Existing conditions	Capital needs	Green alternative
The mushroom type exhaust fans are located on the flat roof section. The fans date to the 1997 rehab.	Costs to replace the exhaust fans are shown in Year 4. Costs are shown to replace the kitchen exhaust fan in Year 9 of the plan.	No green alternative.

Emergency Generator

Existing conditions	Capital needs	Green alternative
The facility is served by an emergency generator. The estimated size of the generator is 175 kW.	Costs to rebuild/repair the generator are shown in Year 1. Future replacement costs are shown in Year 19 to replace the emergency generator.	No green alternative.

Narrative

Building Electrical

Existing conditions	Capital needs	Green alternative
No problems were observed or reported with respect to the fire alarm control panel (FACP). Site staff could not provide the exact age of the FACP. The facility features a security system with cameras and monitor.	The FACP is shown being upgraded in Year 4 of the plan. Costs are shown for as needed repairs as needed.	No green alternative suggested.

Elevators

Existing conditions	Capital needs	Green alternative
A 30-horsepower hydraulic elevator provides access to all four floors of the building. The elevator machinery is maintained under a full service contract.	<p>Costs to replace the elevator controls and hydraulic pump package are shown in Year 14 of the plan after 35 years of service.</p> <p>Costs to refurbish cab interiors and replace door operators (items not typically covered under a service contract) are shown in Year 1 of the plan.</p>	No green alternative suggested.

Narrative

Building Architectural Systems

Building Exterior

The Old Marvin is a four-story building with 50 apartments. The building is constructed on a poured concrete. No issues were observed or reported with regard to the building framing, and it should be monitored going forward.

Doors		
Existing conditions	Capital needs	Green alternative
The main entrance features a large sliding glass door with automatic openers. The door was observed to be in good overall condition.	Costs to replace the doors are shown in Year 15 of the plan.	No green alternative recommended.
Secondary doors and egress doors are single and double leaf aluminum/glass doors.	Costs to replace the aluminum glass doors are shown in Year 14.	EWCM #4 Replace the service entry doors with fiberglass models. Fiberglass doors are more durable to metal or wood doors since they are resistant to rusting, impact-related damage, and deterioration associated with wood or metal options. Not only are they more durable, but they also lower operations costs since they don't require periodic painting, and therefore have a lower life cycle cost than the traditional alternatives.

Narrative

Siding

Existing conditions	Capital needs	Green alternative
The brick exterior was observed to be in good overall condition. The original school building exhibits more spalling and mortar loss than is typical of the newer addition.	Costs to point/repair approximately 7.5% of the addition are shown every seven years throughout the plan. Costs are shown to point/repair approximately 20% of the original brick walls.	Specify recycled/Portland cement.
The expansion joints were observed to in fair to poor condition.	Costs to cut and replace the caulking are shown in Years 1 and 11.	Specify low VOC products.

Trim, soffit, Fascia

Existing conditions	Capital needs	Green alternative
Painted wood trim and fascia were observed to be fair to poor condition.	Costs to paint and repair the wood trim and fascia is shown in Year 1 and 11.	Specify low VOC paint.

Narrative

Fire Escape

Existing conditions	Capital needs	Green alternative
The painted steel fire escape exhibits surface rust and peeling paint.	Costs to prepare and paint the fire escape are shown in Years 1, 8, and 15.	Specify low VOC paint.

Windows / Curtain Walls

Existing conditions	Capital needs	Green alternative
<p>The property features several different styles of windows. Most are single-hung aluminum framed models. The original school section features large single hung models with a fixed panel transom at the top. The newer section features double-pane, aluminum framed windows. The windows were observed to be in fair condition.</p> <p>Site staff reports that the windows are leaky and in need of replacement.</p>	Costs are shown to replace all windows with comparable double-pane, single-hung models are shown in Year 4.	<p>EWCM #5</p> <p>Replace existing aluminum framed models with fiberglass-framed, double-glazed models with a low-E (low emissivity) coating, and a gas fill between the glazing layers. The low-e coating will reflect heat from entering the building during the summer and can also effect radiant infrared energy from escaping the building during the heating months. A gas fill (such as argon) between the glazing layers will reduce heat transfer through the glass similar to the low-e coating.</p>

Narrative

Existing conditions	Capital needs	Green alternative
		It is recommended that the windows be monitored and appropriately caulked going forward to keep air infiltration to a minimum.

Roof

Existing conditions	Capital needs	Green alternative
The roof is covered with a rubber membrane. No active leaks were reported and no problems were observed. One section was replaced in 2003; the other was replaced in 2009.	Costs to replace the roof sections are shown in Years 10 and 16 of the plan.	EWCM #6 Install a white surface instead of the traditional dark membrane, and specify insulation with a higher R-value (in this case total R value of R-30). The additional insulation will reduce heat transfer from the building interior during the heating months. While a dark membrane retains heat, the white will reflect solar heat during the summer months.

Narrative

Existing conditions	Capital needs	Green alternative
The original school section features a pitched roof structure covered with composite shingles.	Costs to replace the composite shingles are shown in Year 4.	No green alternative.
The decorative wood brackets and soffit were observed to be in fair condition. Sections of the paint were observed to be peeling	Costs to paint and repair the wood soffit and brackets are shown in Year 1, 8, and 15.	Specify low VOC paint.

Note:

We do not, as yet, recommend a 'green vegetative roof' – the installation of soil and vegetation on a waterproof membrane - as an option. While these may also reduce roof temperatures and cooling loads, and reduce storm water run-off, they are much more expensive than conventional systems, and we see too many questions about performance and maintenance.

Narrative

Building Interior Common Areas

The building interior includes the common hallways and stairwells, several community rooms, a management office with conference room, a public laundry facility, and a set of public restrooms. Wall and ceiling surfaces are painted drywall throughout. Allowances are shown throughout the plan for as-needed repairs and painting. As a green measure, the plan specifies low-VOC or recycled-content paint for painting cycles at no additional premium.

Interior Finishes

Existing conditions	Capital needs	Green alternative
The painted walls were observed to be in fair overall condition.	Costs to paint the walls are shown in Years 1 and 11 of the plan.	Specify low volatile organic compound (VOC) and/or recycled-content paint (content should be at least 50% recycled; VOCs should not exceed 250 grams per liter). In addition specify low VOC wallpaper and adhesives.
The hallways, lounges, and vestibules feature mostly carpet-covered floors. Some areas feature VCT flooring (mostly original). In recent years new Faux wood vinyl flooring was installed in the first floor corridor.	Costs to replace the carpeting are shown starting in Years 7 and 17. Costs to replace the vinyl flooring are shown starting in Year 1 and 16 of the plan.	GM #2 & #3 Replace carpet and vinyl flooring with linoleum products. Linoleum is a natural product (containing linseed oil, powdered wood or cork, ground limestone, resin binders, natural jute backing), which has

Narrative

Existing conditions	Capital needs	Green alternative
		<p>been found to be more durable than its vinyl tile counterpart.</p> <p>Linoleum tile hardens over time, and therefore becomes less susceptible to scratching and cracking. Installation of linoleum has a lower annual life cycle cost than vinyl and keeps the vinyl product out of our landfills in the future.</p> <p>Refinish hardwood flooring with a low VOC, water based product at no additional premium.</p>
The stairwells feature VCT covered landings and rubber stair treads. .	Costs to replace the VCT are shown in Years 1 and 16.	<p>GM #3</p> <p>Replace vinyl flooring with linoleum products.</p>

Narrative

Interior Lighting

Existing conditions	Capital needs	Green alternative
Interior lighting is a mix of mostly T8, T12, and CFL bi-pin lamps. Interior fixtures were observed to be in good overall condition.	Maintain from Operating	EWCM #7 and #8 Retrofit existing fixtures with LED lamps and occupancy sensors in some of the support rooms. LED lamps will reduce utility costs and reduce operations costs.
Fluorescent exit lighting is found throughout interior common areas.	Maintain from Operating	EWCM #9 Install LED exit lighting. LED lighting will reduce utility and operations costs.

Narrative

Laundry room		
Existing conditions	Capital needs	Green alternative
The laundry room features non Energy Star washers and gas dryers. The equipment is owned by the development.	Costs to replace are shown in Years 1 and 13.	EWCM #11 Request Energy Star models from the vendor. High-efficiency models (specifically, models with an Energy Star rating) utilize less water (as much as 40% less) than traditional washing machines, and the lower demand for hot water also has an energy-savings component. No green recommendation is included for the dryers, since no high-efficiency models are available.

Narrative

Dwelling Units

During the course of the assessment, OSI gained access to 5 units accounting for 10% of the total. These were distributed among all unit types. A sample of this size is felt to be sufficient given the age, tenancy, design, and location of the development. Additional information about units and capital replacements was obtained from discussions with residents during inspections and additional capital history forms submitted by management.

Living Area Finishes		
Existing conditions	Capital needs	Green alternative
Units feature painted walls and ceilings.	Operating	<p>Specify low VOC products when refinishing interior surfaces.</p> <p>Conventional paint, wallpaper, and adhesives contain thousands of chemicals, many of which are know toxins. Some of the most harmful chemicals are volatile organic compounds (VOCs).</p> <p>VOCs are unstable, carbon-containing compounds that readily vaporize into the air causing air pollution and poor indoor air quality.</p>

Narrative

Existing conditions	Capital needs	Green alternative
<p>Unit living areas feature carpet covered floors. The carpeting is mostly original.</p> <p>Bathroom floors feature ceramic tile flooring.</p> <p>Kitchen areas are covered with vinyl flooring products.</p>	<p>Costs are shown to replace the carpeting in the first four years of the plan.</p>	<p>GM #4 & #5</p> <p>Replace carpet and vinyl flooring with linoleum products. Linoleum is a natural product (containing linseed oil, powdered wood or cork, ground limestone, resin binders, natural jute backing), which has been found to be more durable than its vinyl tile counterpart.</p> <p>Linoleum tile hardens over time, and therefore becomes less susceptible to scratching and cracking. Installation of linoleum has a lower annual life cycle cost than vinyl and keeps the vinyl product out of our landfills in the future.</p> <p>Refinish hardwood flooring with a low VOC, water based product at no additional premium.</p>

Narrative

Bathrooms

Existing conditions	Capital needs	Green alternative
Bathrooms have fiberglass tubs and surrounds. Overall tubs were observed to be in fair condition. Bathroom showers feature 2.5 gpm showerheads.	Costs to refinish tubs as needed are shown throughout the plan.	EWCM #12 Install low flow 1.7 gpm showerheads to reduce water consumptions and domestic hot water use.
Bathrooms feature wall mounted sinks.	Costs to replace sink in-kind are shown starting in Year 9.	No green improvement recommended.
Dwelling unit toilets are 1.6 gpf low flow models.	Costs to replace the toilets are shown through the first half of the plan.	EWCM #13 Replace 1.6 gpf models with high efficiency 1.28 gpf models to achieve the maximum water savings and lower water/sewer bills.

Narrative

Kitchens

Existing conditions	Capital needs	Green alternative
Kitchen cabinets are plywood models with LPB countertops. All cabinetry dates back to the rehab. Most cabinets were observed to be in fair overall condition.	Costs to replace cabinets and countertops are shown starting in Year 9. Countertop replacements costs are shown starting in Year 1 of the plan.	GM #6 & #7 Cabinets are shown being replaced with a comparable green product such as bamboo or wood cabinets that are certified by the Forest Stewardship Council (FSC). Replace countertops with either a stone surface or stone/ceramic tile countertop.
Units feature 30-inch electric ranges and frost-free non Energy Star refrigerators. Most of the ranges and refrigerators date to the rehab.	Costs are shown for as needed replacement.	Consider installing Energy Star rated refrigerators.

Narrative

Unit Mechanical

Existing conditions	Capital needs	Green alternative
Dwelling units feature wall mounted mercury dial thermostats.	Costs to replace the thermostats are shown over the first five years of the plan.	No green alternative recommended.
The hydronic baseboard radiators were observed to be in fair overall condition.	Costs to replace damaged/missing radiator covers are shown throughout the plan.	No green alternative.

Unit Electrical

Existing conditions	Capital needs	Green alternative
Dwelling units feature smoke detection devises.	Replacement costs are shown throughout the plan. Costs are shown to add carbon monoxide detectors in Year 1. Future replacement costs are shown ever seven Years throughout the plan.	No green alternative.

Narrative

Health and Safety

Resident and Staff Concerns:

As part of the assessment, the property was examined for potential resident and staff health and safety concerns.

Lead-Based Paint and Asbestos:

- OSI did not conduct any testing for asbestos containing material (ACMs) or for lead-based paint (LBP). Therefore, this section should not be interpreted as a comprehensive or conclusive identification of ACMs or LBP. No areas or components containing LPBs or ACMs were identified or reported.

Other Health and Safety Issues:

- DHW temperatures should be in the range of 110°F to 130°F; at temperatures of 140°F, burns (scalding) can occur.

Indoor Air Quality:

Ventilation (Common Areas and Apartments):

This building has mechanically supplied fresh air and each occupied space has a series of operable windows to provide fresh air. There is a series of rooftop vents used to remove stale air from kitchens and bathrooms. The exhaust fans are located in each unit and run as needed.

Narrative

Temperature, Humidity, Carbon Dioxide (CO₂)

Space temperature and humidity are the key components for comfort level. Temperature and relative humidity was measured in conditioned spaces (management office, dwelling unit, common hallway). The temperature of the conditioned spaces ranged between 67-74°F db, and the humidity ranged from 39-36% rH.

Carbon dioxide levels were measured during the inspection, and are included in Table B below. Carbon Monoxide was also tested during the inspection and is included in Table C below.

Mold and airborne concerns:

No mold was observed on the interior of the apartments, nor in any common spaces at the property.

Reporting:

The tables below describe actual conditions versus design specifications for flow rate and carbon dioxide. The “Notes” column describes a possible reason for a discrepancy between these values where applicable.

Table A. Flow Rate:

Conditioned Space	Actual Read	Design Specification	Notes
Hallways / Stairwells			Not measured
Community Room			N/A No mechanical ventilation
Office			N/A No mechanical ventilation
Apartment			N/A No mechanical ventilation

Narrative

Table B. Carbon Dioxide:

Space	Actual Read	Design Specification	Notes
Hallways / Stairwells	875	< 1,000 ppm	Conditioned space
Community Room	731	< 1,000 ppm	Conditioned space
Office	850	< 1,000 ppm	Conditioned space
Apartment	840	< 1,000 ppm	Conditioned space
Apartment	1120	< 1,000 ppm	Conditioned space
Apartment	1046	< 1,000 ppm	Conditioned space
Apartment	981	< 1,000 ppm	Conditioned space

Table C. Carbon Monoxide:

Conditioned Space	Actual Read	Design Specification	Notes
Hallways / Stairwells	0	≈0 ppm	Conditioned space
Community Room		≈0 ppm	Conditioned space
Office			Carbon Monoxide level was not measured.
Apartment	0	≈0 ppm	Conditioned space

Narrative

Capital Needs Summary, Replacement Reserve Analysis - *Conventional*

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$2,111,886 in current dollars (\$42,238/unit), or \$2,690,083 (\$53,801/unit) in inflated dollars.

Two approaches to funding the property's physical needs through replacement reserves are presented in the Replacement Reserve Analysis section of the report, with accompanying graphics.

Plan #1 presents current capital funding circumstances. The development is estimated to have a replacement reserve balance of \$226,047 on December 31, 2012. Annual contributions are currently \$27,843 per year, or \$557 per unit. From OSI's experience, this is seen as an inadequate funding level for a property of this age and complexity. For planning purposes here, these contributions are shown being indexed at 3% for inflation going forward. Under this scenario, the property's needs exceed reserves in all years of the plan.

Plan #2, as one alternative, is aimed at fully meeting projected needs through Year 20. It starts with the same annual funding assumptions outlined above. Contributions are then indexed at 3%. Additionally, the plan calls for an infusion of \$1,350,000 in outside capital in Year 1 to help fund near term capital needs. This is one hypothetical option, and is included for illustrative purposes only. No assumptions are made about its viability; various alternatives might achieve similar results.

Narrative

Capital Needs Summary, Replacement Reserve Analysis - *Green*

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$2,136,303 (\$42,726/unit) in current dollars, or \$2,678,211 (\$53,564/unit) in inflated dollars.

Two approaches to funding the property's physical needs through replacement reserves are presented in the Replacement Reserve Analysis section of the report, with accompanying graphics.

Plan #1 presents current capital funding circumstances. The development is estimated to have a replacement reserve balance of \$226,047 on December 31, 2012. Annual contributions are currently \$27,843 per year, or \$557 per unit. From OSI's experience, this is seen as an inadequate funding level for a property of this age and complexity. For planning purposes here, these contributions are shown being indexed at 3% for inflation going forward. Under this scenario, the property's needs exceed reserves in all years of the plan.

Plan #2, as one alternative, is aimed at fully meeting projected needs through Year 20. It starts with the same annual funding assumptions outlined above. Contributions are then indexed at 3%. Additionally, the plan calls for an infusion of \$1,375,000 in outside capital in Year 1 to help fund the green rehabilitation scenario. This is one hypothetical option, and is included for illustrative purposes only. No assumptions are made about its viability; various alternatives might achieve similar results.

Narrative

Additional Notes:

1. The Physical Assessment of the property was conducted on April 5th, 2013. Members of the management and site staff provided information on the property's current condition, recent repairs, and near-term needs. Additional information was provided by informal interviews with residents during the dwelling unit evaluation portion of the assessment. We would like to thank site staff for their assistance.
2. OSI was represented on this assignment by Daniel Iles. Mr. Iles is a Building Performance Institute (BPI)-certified energy auditor, and LEED Green Associate accredited. Mr. Iles complied with the applicable professional standards for ethics as defined by the BPI Code of Ethics during the assessment process.
3. Regular updates of this plan are recommended to ensure careful monitoring of major building systems and to adjust the program to accommodate unanticipated circumstances surrounding the buildings, operations, and/or occupants.



The front lawn area and property sign



One of two asphalt paved parking areas



Example of cracking parking area



Pole mounted site lighting fixture



View of the dumpster enclosure



The model boiler system



The heating water circulator pumps



The domestic hot water boiler



Domestic hot water storage tanks



The development's waste compactor



Trane roof top unit



Typical Trane rooftop unit



View of the roof top exhaust fans



The central fire alarm control panel



Typical building architecture.



Partial view of the similar architecture of the addition



Spalling brick and mortar loss typical of the original building



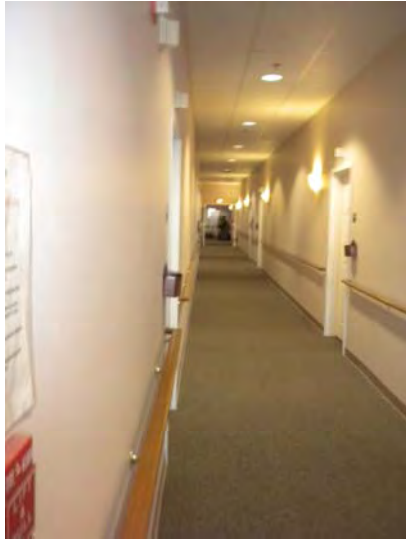
One of the double leaf egress doors



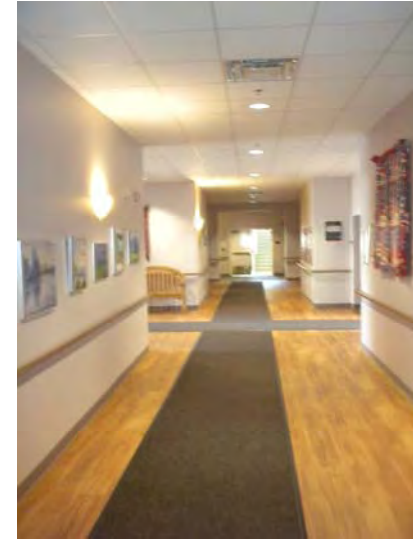
Double leaf wood doors at the Great Room



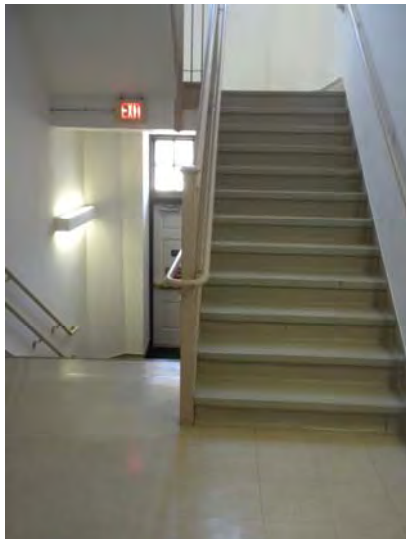
View of the painted steel fire escape



Typical hallway



The first floor hallways with recently installed faux wood (vinyl) flooring.



Typical hallway



View of the Great Room



View of the dining area



The development's laundry facility



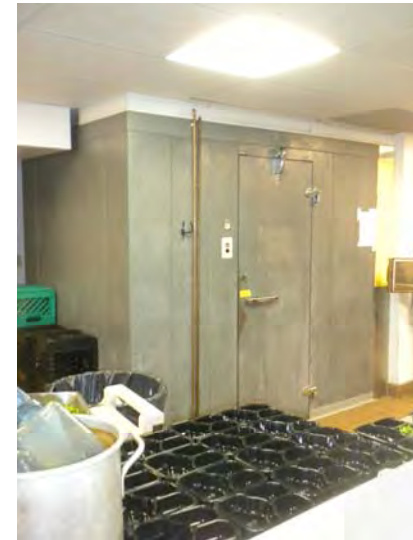
The library area



Example of the lounge area located on each floor



View of the commercial kitchen area



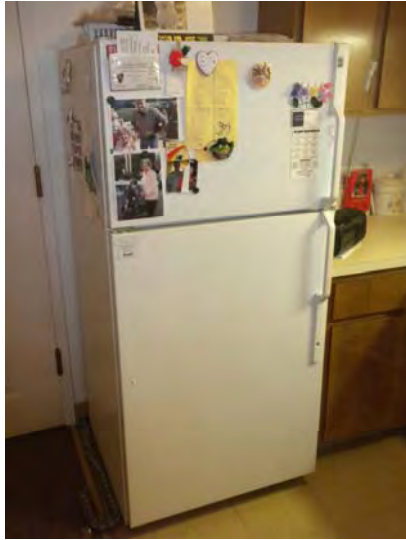
The walk in refrigerator



Typical living area



Typical kitchen cabinetry and countertops



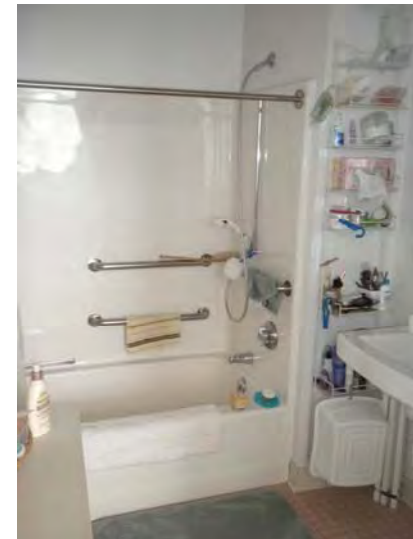
Dwelling units feature non Energy Star refrigerators



Original 30-inch electric range

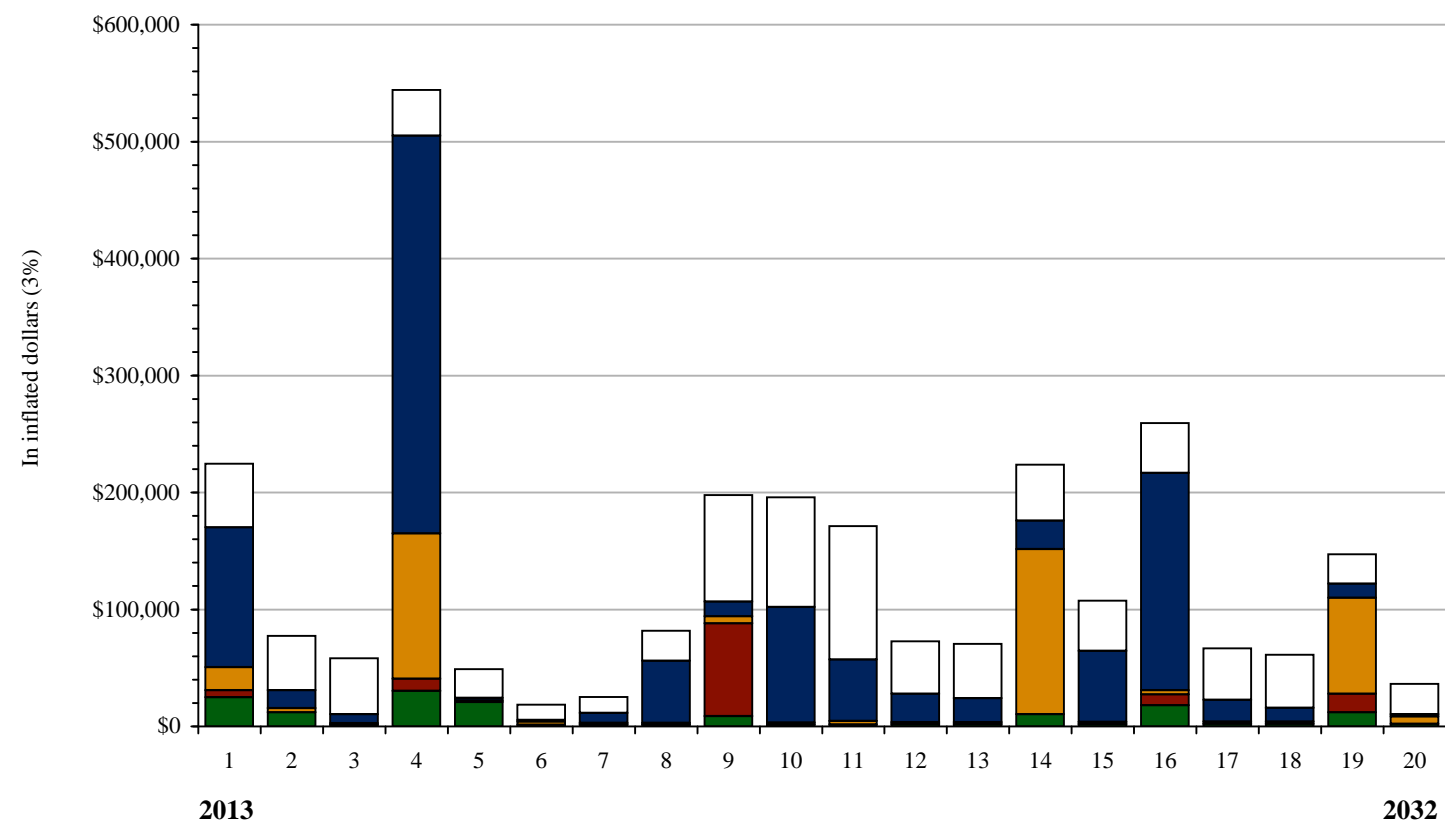


Typical bathroom layout and fixtures



Fiberglass tubs and surrounds

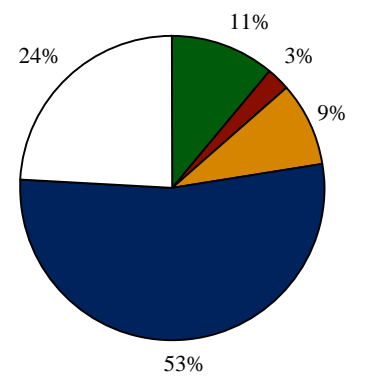
Capital Needs Summary - Conventional



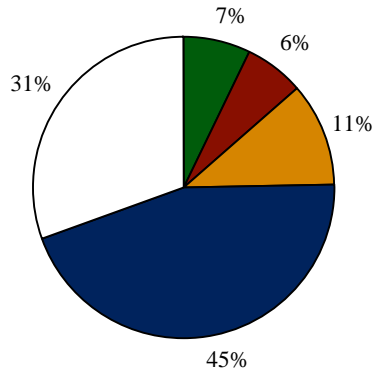
Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems & Accessibility	\$24,798 or \$496/unit	\$104,628 or \$2,093/unit	\$158,652 or \$3,173/unit
Mechanical Room	\$6,000 or \$120/unit	\$95,509 or \$1,910/unit	\$120,724 or \$2,414/unit
Building Mech. & Elec.	\$19,750 or \$395/unit	\$163,756 or \$3,275/unit	\$409,342 or \$8,187/unit
Building Architectural	\$119,582 or \$2,392/unit	\$658,777 or \$13,176/unit	\$1,071,167 or \$21,423/unit
Dwelling Units	\$54,596 or \$1,092/unit	\$450,311 or \$9,006/unit	\$930,198 or \$18,604/unit
In inflated dollars:	\$224,726 or \$4,495/unit	\$1,472,981 or \$29,460/unit	\$2,690,083 or \$53,802/unit
In current dollars:	\$224,726 or \$4,495/unit	\$1,306,387 or \$26,128/unit	\$2,111,886 or \$42,238/unit

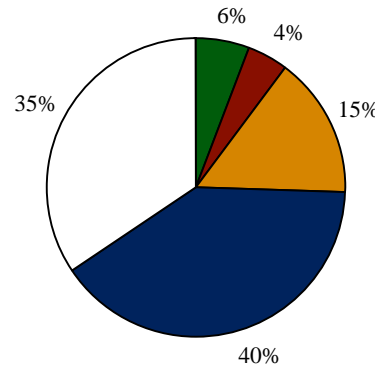
The Old Marvin



Year One Distribution



Ten Year Distribution



Twenty Year Distribution

Capital Needs Summary - *Conventional*

OSI Ref: 13267
 Property Age: 16 Years
 Financing: CHFA

Residential Buildings: 1
 Total Number of Units: 50
 Occupancy: Elderly

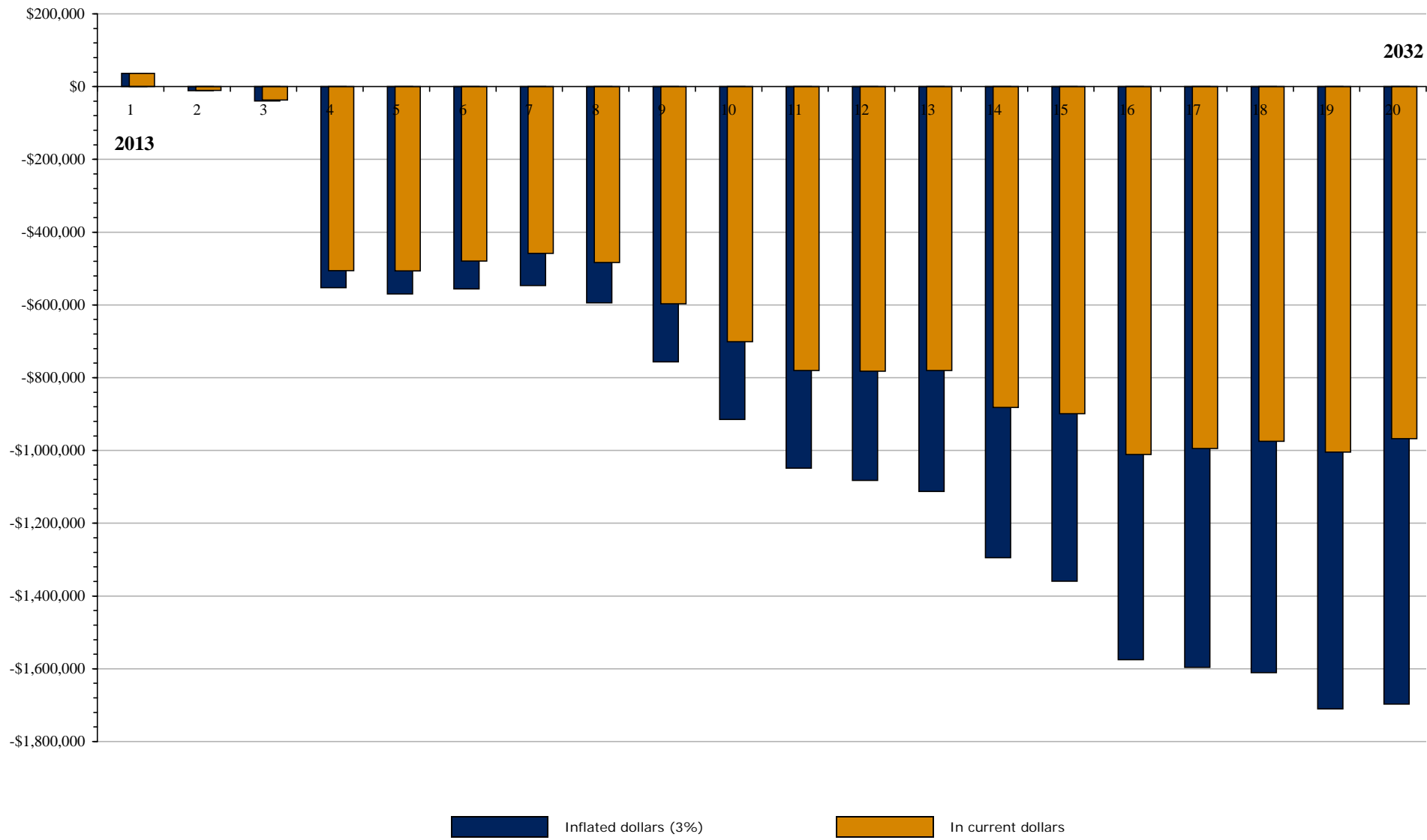
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
Site Systems & Accessibility										
Surface	\$24,798	\$11,976	\$1,366	\$30,504	\$20,800	\$1,493	\$1,537	\$1,583	\$8,891	\$1,680
Accessibility	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$24,798	\$11,976	\$1,366	\$30,504	\$20,800	\$1,493	\$1,537	\$1,583	\$8,891	\$1,680
Mechanical Room										
Boilers	\$0	\$0	\$0	\$10,184	\$0	\$0	\$0	\$0	\$45,604	\$0
Boiler Room Systems	\$6,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$33,721	\$0
Mechanical Sub-Total	\$6,000	\$0	\$0	\$10,184	\$0	\$0	\$0	\$0	\$79,325	\$0
Building Mech. & Electrical										
Mechanical	\$1,250	\$3,579	\$1,326	\$88,893	\$1,407	\$1,449	\$1,493	\$1,537	\$6,017	\$1,631
Electrical	\$8,500	\$0	\$0	\$35,514	\$0	\$1,159	\$0	\$0	\$0	\$0
Elevators	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$19,750	\$3,579	\$1,326	\$124,407	\$1,407	\$2,608	\$1,493	\$1,537	\$6,017	\$1,631
Building Architectural										
Structural and Exterior	\$52,590	\$0	\$0	\$313,935	\$0	\$0	\$0	\$38,578	\$0	\$2,349
Roof Systems	\$4,700	\$0	\$0	\$24,862	\$777	\$0	\$0	\$5,780	\$0	\$91,153
Halls, Stairs, Lobbies	\$24,248	\$15,458	\$7,755	\$1,213	\$1,250	\$1,287	\$8,438	\$8,691	\$12,532	\$5,136
Community Spaces	\$38,045	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$119,582	\$15,458	\$7,755	\$340,010	\$2,026	\$1,287	\$8,438	\$53,050	\$12,532	\$98,638
Dwelling Units										
Living Areas	\$14,378	\$14,809	\$15,254	\$15,711	\$619	\$638	\$657	\$676	\$697	\$718
Bathrooms	\$1,775	\$1,828	\$1,883	\$1,940	\$1,998	\$2,058	\$2,119	\$2,183	\$15,803	\$16,277
Kitchens	\$23,459	\$24,163	\$24,888	\$13,363	\$13,764	\$3,152	\$3,246	\$3,344	\$66,505	\$68,501
Mechanical & Electrical	\$14,983	\$5,648	\$5,817	\$8,122	\$8,366	\$7,400	\$7,622	\$19,534	\$8,086	\$8,328
Dwelling Units Sub-Total	\$54,596	\$46,448	\$47,842	\$39,136	\$24,746	\$13,247	\$13,644	\$25,737	\$91,091	\$93,824
Total Capital Costs	\$224,726	\$77,462	\$58,289	\$544,241	\$48,979	\$18,635	\$25,112	\$81,908	\$197,856	\$195,772

The Old Marvin

Costs on these pages are aggregated by category from the Capital Needs worksheets which follow. Total capital costs on these pages are carried forward to line F of the Replacement Reserve Analysis(es) that follow.

2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20	
\$1,730	\$1,782	\$1,836	\$10,307	\$1,947	\$18,022	\$2,066	\$2,128	\$11,948	\$2,258	Site Systems & Accessibility
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface Accessibility
\$1,730	\$1,782	\$1,836	\$10,307	\$1,947	\$18,022	\$2,066	\$2,128	\$11,948	\$2,258	Site Sub-Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,867	\$0	Mechanical Room
\$0	\$0	\$0	\$0	\$0	\$9,348	\$0	\$0	\$0	\$0	Boilers
										Boiler Room Systems
\$0	\$0	\$0	\$0	\$0	\$9,348	\$0	\$0	\$15,867	\$0	Mechanical Sub-Total
\$1,680	\$1,730	\$1,782	\$31,206	\$1,891	\$1,947	\$2,006	\$2,066	\$2,128	\$6,093	Building Mech. & Electrical
\$1,344	\$0	\$0	\$0	\$0	\$1,558	\$0	\$0	\$80,014	\$0	Mechanical
\$0	\$0	\$0	\$110,140	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
										Elevators
\$3,024	\$1,730	\$1,782	\$141,346	\$1,891	\$3,505	\$2,006	\$2,066	\$82,142	\$6,093	Mechanical & Electrical Sub-Total
\$17,232	\$0	\$0	\$22,607	\$51,946	\$8,693	\$0	\$0	\$0	\$0	Building Architectural
\$0	\$0	\$0	\$0	\$7,109	\$114,708	\$0	\$0	\$0	\$0	Structural and Exterior
\$17,927	\$24,415	\$20,581	\$1,630	\$1,679	\$23,128	\$18,554	\$11,681	\$12,031	\$1,947	Roof Systems
\$17,276	\$0	\$0	\$0	\$0	\$39,245	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
										Community Spaces
\$52,434	\$24,415	\$20,581	\$24,238	\$60,734	\$185,775	\$18,554	\$11,681	\$12,031	\$1,947	Building Architectural Sub-Total
\$19,323	\$19,903	\$20,500	\$24,199	\$4,008	\$4,129	\$4,252	\$4,380	\$4,511	\$4,647	Dwelling Units
\$15,757	\$16,230	\$16,717	\$17,219	\$17,735	\$18,267	\$18,815	\$19,380	\$1,745	\$1,797	Living Areas
\$70,556	\$0	\$0	\$0	\$0	\$13,554	\$13,961	\$14,380	\$11,406	\$11,748	Bathrooms
\$8,578	\$8,836	\$9,101	\$6,510	\$21,075	\$6,907	\$7,114	\$7,327	\$7,547	\$7,773	Kitchens
										Mechanical & Electrical
\$114,214	\$44,968	\$46,317	\$47,927	\$42,818	\$42,857	\$44,142	\$45,467	\$25,210	\$25,966	Dwelling Units Sub-Total
\$171,403	\$72,896	\$70,516	\$223,818	\$107,391	\$259,507	\$66,768	\$61,341	\$147,198	\$36,264	Total Capital Costs

Replacement Reserve (RR) Analysis: *Plan One - Conventional*



Current Replacement Reserve Balance: **\$226,047**
Adjusted Replacement Reserve Balance: **\$226,047**
Current annual contributions to reserve accounts: **\$27,843**

At the end of Year One, Reserve Balances are projected to be: **\$36,363**
At the end of Year 20, Reserve Balances are projected to be: **(\$1,696,784)**
Unmet needs projected in most years of the plan

Replacement Reserve (RR) Analysis: *Plan One - Conventional*

		Reserve Funding In Year 1											
		Starting Balance:		\$226,047		or \$4,521/unit		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.					
		Contributions to Reserves:		\$27,843		or \$557/unit							
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10		
(A) Reserve Balances													
Starting Replacement Reserves		\$226,047	\$36,363	(\$10,900)	(\$39,207)	(\$552,566)	(\$569,738)	(\$555,610)	(\$546,978)	(\$594,128)	(\$756,184)		
(B) Annual Funding													
Contributions Indexed at 3%		\$557	\$574	\$591	\$609	\$627	\$646	\$665	\$685	\$705	\$727		
(C) Additional Unit Contributions													
(D) Total Annual Reserve Funding		\$27,843	\$28,678	\$29,539	\$30,425	\$31,338	\$32,278	\$33,246	\$34,244	\$35,271	\$36,329		
(E) Interest on Reserves at 3%		\$7,199	\$1,521	\$443	\$456	\$470	\$484	\$499	\$514	\$529	\$545		
Total Funds Available		\$261,089	\$66,563	\$19,082	(\$8,326)	(\$520,759)	(\$536,976)	(\$521,865)	(\$512,220)	(\$558,328)	(\$719,310)		
(F) Total Capital Cost		\$224,726	\$77,462	\$58,289	\$544,241	\$48,979	\$18,635	\$25,112	\$81,908	\$197,856	\$195,772		
(G) Reserve Balances		\$36,363	(\$10,900)	(\$39,207)	(\$552,566)	(\$569,738)	(\$555,610)	(\$546,978)	(\$594,128)	(\$756,184)	(\$915,083)		
Outside Capital:													
Adjusted Reserve Balances		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		

Notes:

Depicts the continuation of the current funding scenario.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

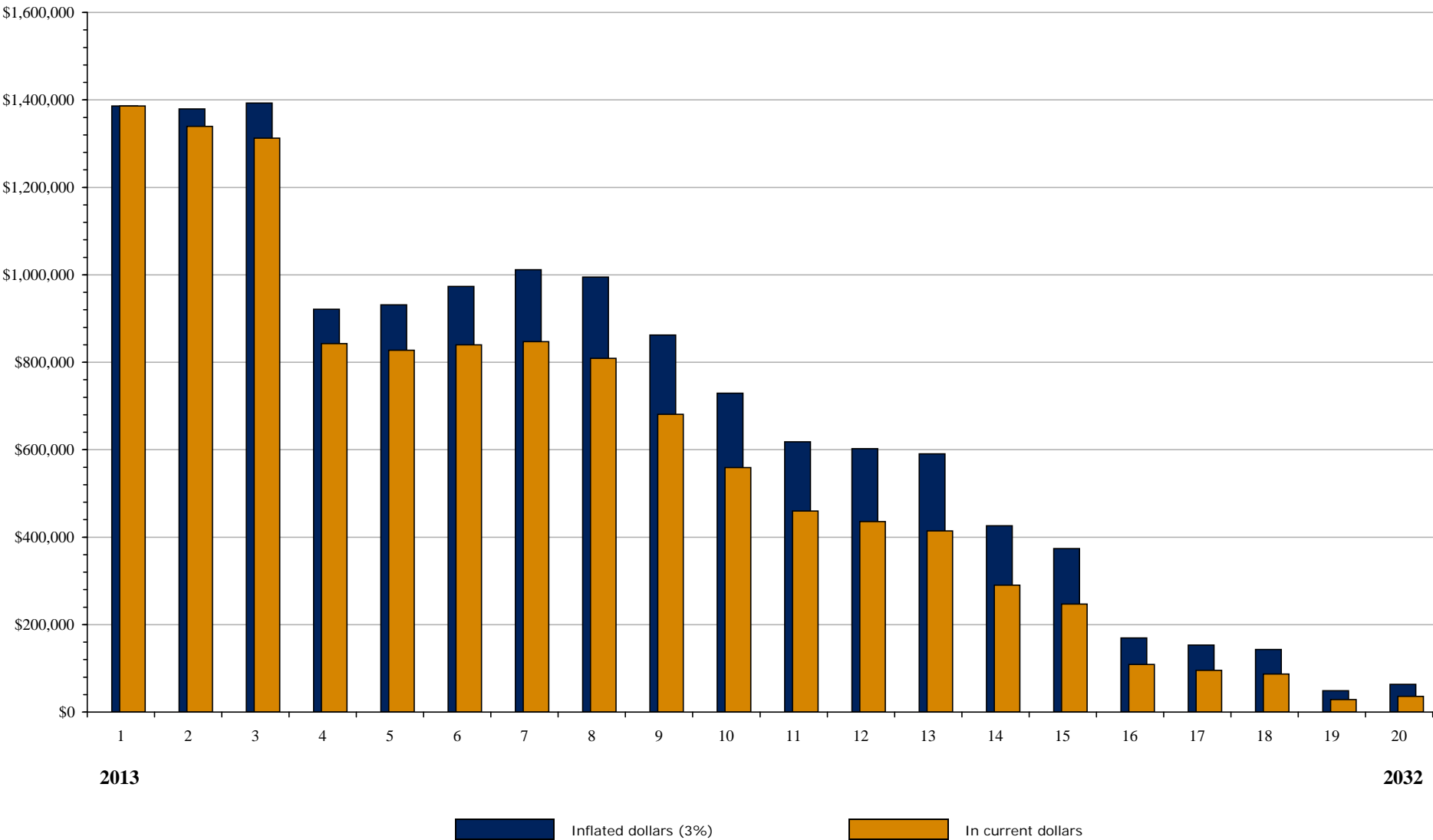
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan One - Conventional*

Reserve Funding In Year 20									
Projected replacement reserve balance is (\$1,696,784)					This is (\$33,936)per unit in inflated dollars or (\$19,353) per unit in uninflated dollars				
Projected annual funding to reserves is \$48,823					This is \$976 per unit in inflated dollars or \$557 per unit in current dollars				
2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20
									</

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*



Current Replacement Reserve Balance: **\$226,047**
Adjusted Replacement Reserve Balance: **\$226,047**
Current annual contributions to reserve accounts: **\$27,843**

At the end of Year One, Reserve Balances are projected to be: **\$1,386,363**
At the end of Year 20, Reserve Balances are projected to be: **\$63,405**
All projected capital needs are met throughout the plan

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*

		Reserve Funding In Year 1									
		Starting Balance:		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.							
		Contributions to Reserves:									
		2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances											
	Starting Replacement Reserves	\$226,047	\$1,386,363	\$1,379,600	\$1,392,681	\$921,102	\$931,564	\$973,638	\$1,011,480	\$994,674	\$862,458
(B) Annual Funding											
	Contributions Indexed at 3%	\$557	\$574	\$591	\$609	\$627	\$646	\$665	\$685	\$705	\$727
(C) Additional Unit Contributions											
(D)	Total Annual Reserve Funding	\$27,843	\$28,678	\$29,539	\$30,425	\$31,338	\$32,278	\$33,246	\$34,244	\$35,271	\$36,329
(E)	Interest on Reserves at 3%	\$7,199	\$42,021	\$41,831	\$42,237	\$28,103	\$28,431	\$29,708	\$30,858	\$30,369	\$26,419
Total Funds Available		\$261,089	\$1,457,063	\$1,450,970	\$1,465,343	\$980,543	\$992,273	\$1,036,592	\$1,076,582	\$1,060,314	\$925,206
(F)	Total Capital Cost	\$224,726	\$77,462	\$58,289	\$544,241	\$48,979	\$18,635	\$25,112	\$81,908	\$197,856	\$195,772
(G) Reserve Balances		\$36,363	\$1,379,600	\$1,392,681	\$921,102	\$931,564	\$973,638	\$1,011,480	\$994,674	\$862,458	\$729,433
	Outside Capital:	\$1,350,000									
	Adjusted Reserve Balances	\$1,386,363	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Infusion of outside capital in Year 1 of \$1,350,000 (\$27,000/unit).

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

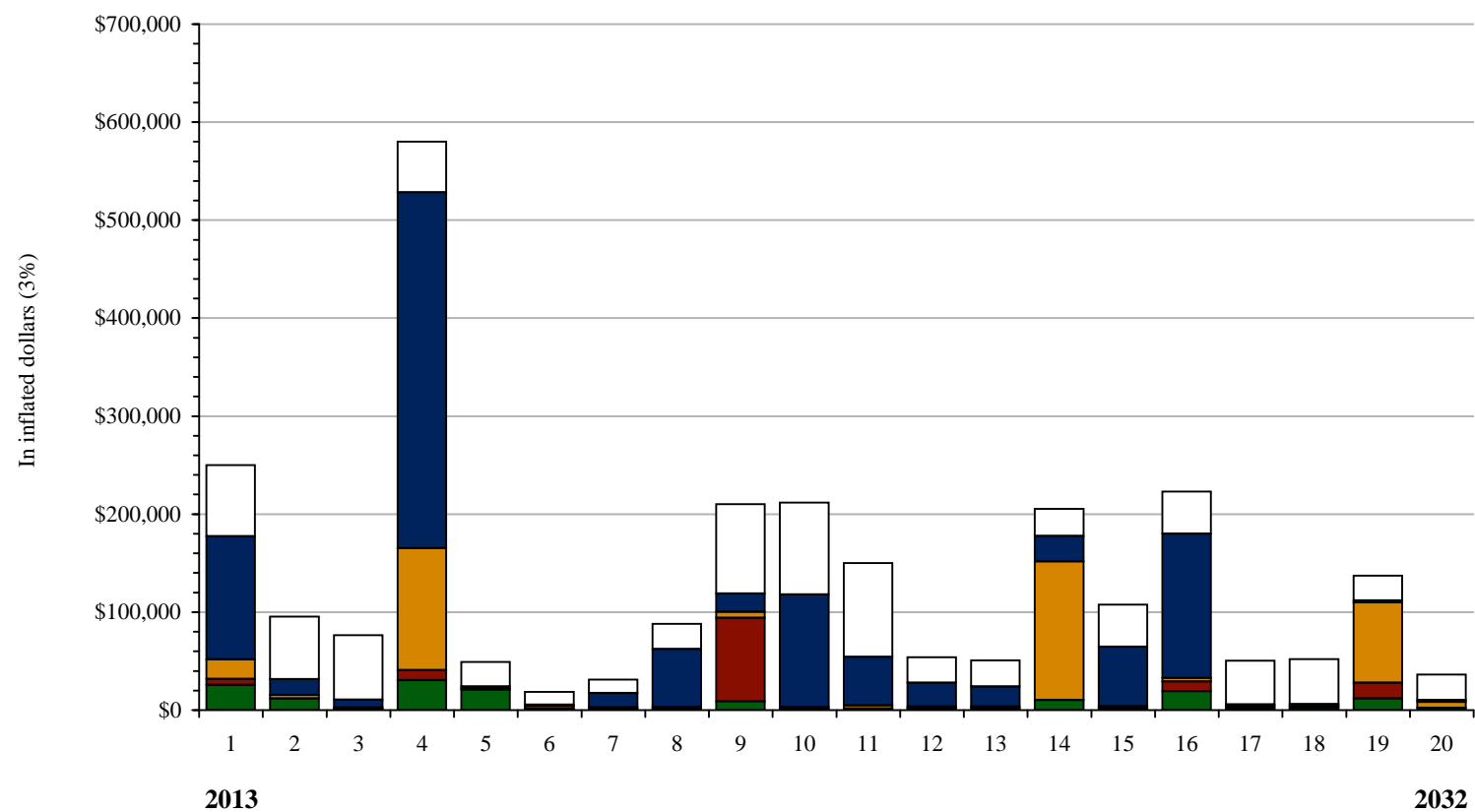
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*

Reserve Funding In Year 20											
Projected replacement reserve balance is \$63,405					This is \$1,268 per unit in inflated dollars or \$723 per unit in uninflated dollars						
Projected annual funding to reserves is \$48,823					This is \$976 per unit in inflated dollars or \$557 per unit in current dollars						
2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20		
\$729,433									\$48,654	Reserve Balances (A)	
\$617,894										Starting Replacement Reserves	
\$602,654										Annual Funding (B)	
\$590,510										Contributions Indexed at 3%	
\$425,910										Additional Unit Contributions (C)	
\$374,043											
\$169,787											
\$153,463											
\$143,436											
\$748											
\$771											
\$794											
\$818											
\$842											
\$868											
\$894											
\$920											
\$948											
\$976											
\$37,419									\$48,823	Total Annual Reserve Funding (D)	
\$38,542											
\$39,698											
\$40,889											
\$42,115											
\$43,379											
\$44,680											
\$46,021											
\$47,401											
\$22,444									\$2,192	Interest on Reserves at 3% (E)	
\$19,115											
\$18,675											
\$18,329											
\$13,409											
\$11,872											
\$5,764											
\$5,294											
\$5,014											
\$789,297									\$99,669	Total Funds Available	
\$675,550											
\$661,027											
\$649,728											
\$481,434											
\$429,294											
\$220,231											
\$204,778											
\$195,852											
\$171,403									\$36,264	Total Capital Cost (F)	
\$72,896											
\$70,516											
\$223,818											
\$107,391											
\$259,507											
\$66,768											
\$61,341											
\$147,198											
\$617,894									\$63,405	Reserve Balances (G)	
\$602,654											
\$590,510											
\$425,910											
\$374,043											
\$169,787											
\$153,463											
\$143,436											
\$48,654											
\$0									\$0		

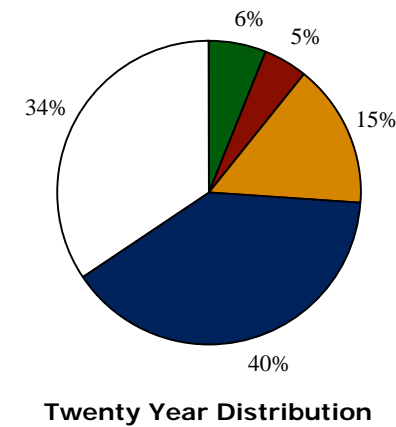
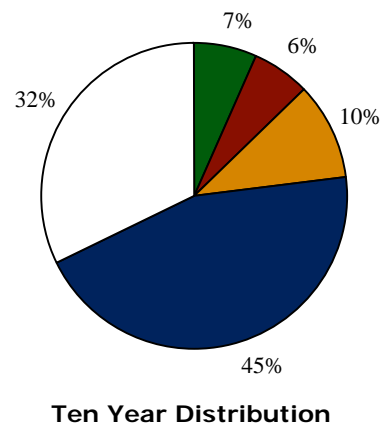
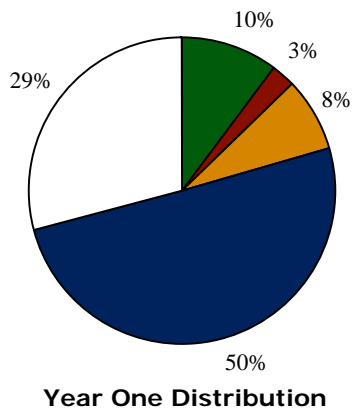
Capital Needs Summary - Green



Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems & Accessibility	\$25,569 or \$511/unit	\$105,399 or \$2,108/unit	\$160,624 or \$3,212/unit
Mechanical Room	\$6,400 or \$128/unit	\$101,859 or \$2,037/unit	\$127,696 or \$2,554/unit
Building Mech. & Elec.	\$19,750 or \$395/unit	\$163,756 or \$3,275/unit	\$409,342 or \$8,187/unit
Building Architectural	\$125,717 or \$2,514/unit	\$723,039 or \$14,461/unit	\$1,058,771 or \$21,175/unit
Dwelling Units	\$72,674 or \$1,453/unit	\$517,490 or \$10,350/unit	\$921,777 or \$18,436/unit
In inflated dollars:	\$250,109 or \$5,002/unit	\$1,611,542 or \$32,231/unit	\$2,678,211 or \$53,564/unit
In current dollars:	\$250,109 or \$5,002/unit	\$1,431,789 or \$28,636/unit	\$2,136,303 or \$42,726/unit

The Old Marvin



Capital Needs Summary - *Green*

OSI Ref: **13267**
 Property Age: **16 Years**
 Financing: **CHFA**

Residential Buildings: **1**
 Total Number of Units: **50**
 Occupancy: **Elderly**

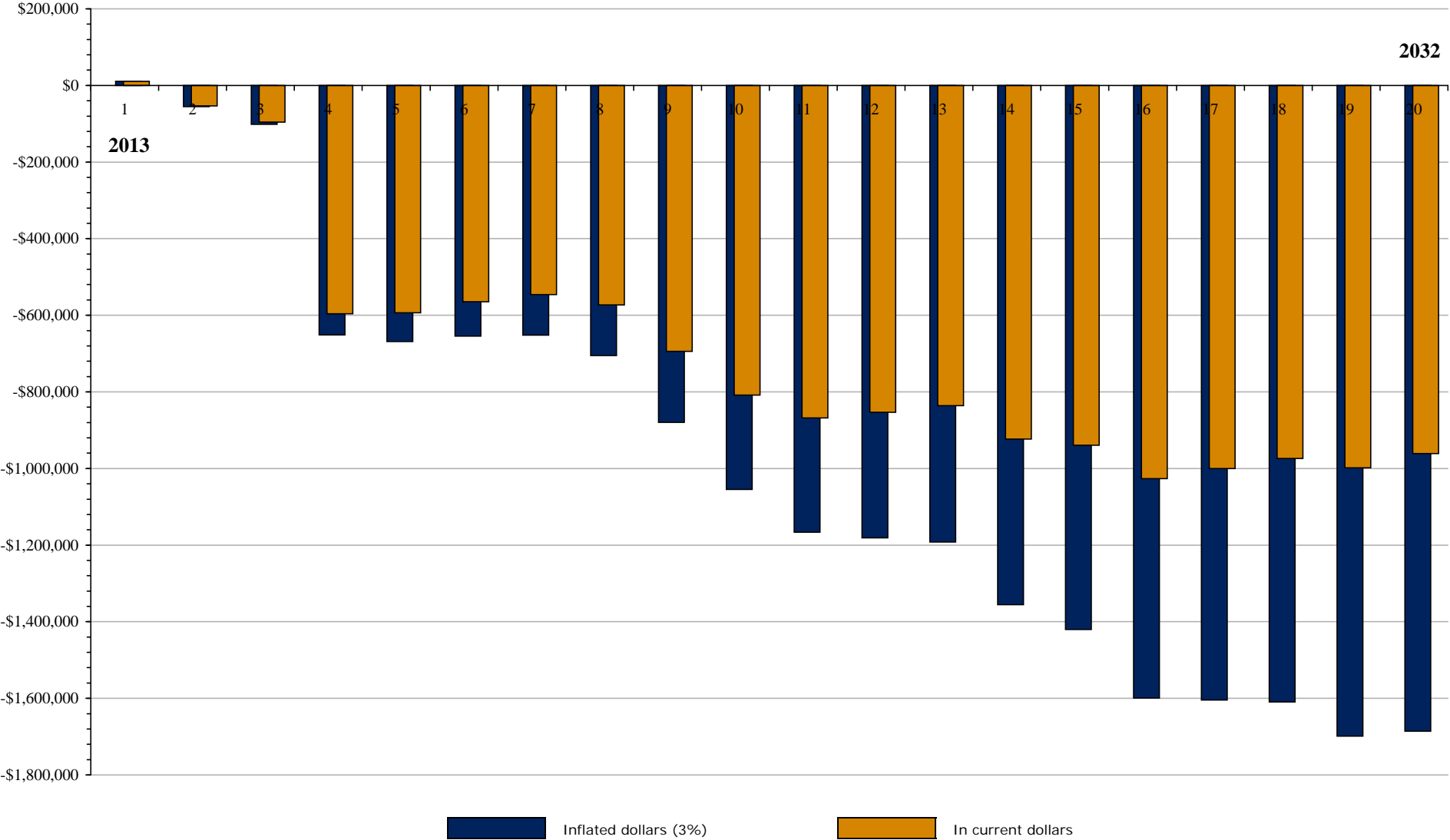
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
Site Systems & Accessibility										
Surface	\$25,569	\$11,976	\$1,366	\$30,504	\$20,800	\$1,493	\$1,537	\$1,583	\$8,891	\$1,680
Accessibility	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$25,569	\$11,976	\$1,366	\$30,504	\$20,800	\$1,493	\$1,537	\$1,583	\$8,891	\$1,680
Mechanical Room										
Boilers	\$0	\$0	\$0	\$10,184	\$0	\$0	\$0	\$0	\$49,024	\$0
Boiler Room Systems	\$6,400	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$36,251	\$0
Mechanical Sub-Total	\$6,400	\$0	\$0	\$10,184	\$0	\$0	\$0	\$0	\$85,275	\$0
Building Mech. & Electrical										
Mechanical	\$1,250	\$3,579	\$1,326	\$88,893	\$1,407	\$1,449	\$1,493	\$1,537	\$6,017	\$1,631
Electrical	\$8,500	\$0	\$0	\$35,514	\$0	\$1,159	\$0	\$0	\$0	\$0
Elevators	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$19,750	\$3,579	\$1,326	\$124,407	\$1,407	\$2,608	\$1,493	\$1,537	\$6,017	\$1,631
Building Architectural										
Structural and Exterior	\$53,008	\$0	\$0	\$337,193	\$0	\$0	\$0	\$38,578	\$0	\$2,349
Roof Systems	\$4,700	\$0	\$0	\$24,862	\$777	\$0	\$0	\$5,780	\$0	\$107,239
Halls, Stairs, Lobbies	\$25,622	\$15,921	\$7,755	\$1,213	\$1,250	\$1,287	\$14,366	\$14,797	\$18,820	\$5,136
Community Spaces	\$42,387	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$125,717	\$15,921	\$7,755	\$363,268	\$2,026	\$1,287	\$14,366	\$59,155	\$18,820	\$114,724
Dwelling Units										
Living Areas	\$25,902	\$26,679	\$27,479	\$28,303	\$619	\$638	\$657	\$676	\$697	\$718
Bathrooms	\$2,777	\$1,907	\$1,965	\$2,024	\$2,084	\$2,147	\$2,211	\$2,278	\$15,900	\$16,377
Kitchens	\$29,012	\$29,882	\$30,779	\$13,363	\$13,764	\$3,152	\$3,246	\$3,344	\$66,505	\$68,501
Mechanical & Electrical	\$14,983	\$5,648	\$5,817	\$8,122	\$8,366	\$7,400	\$7,622	\$19,534	\$8,086	\$8,328
Dwelling Units Sub-Total	\$72,674	\$64,116	\$66,039	\$51,812	\$24,833	\$13,336	\$13,736	\$25,832	\$91,188	\$93,924
Total Capital Costs	\$250,109	\$95,593	\$76,487	\$580,175	\$49,065	\$18,724	\$31,132	\$88,107	\$210,191	\$211,959

The Old Marvin

Costs on these pages are aggregated by category from the Capital Needs worksheets which follow. Total capital costs on these pages are carried forward to line F of the Replacement Reserve Analysis(es) that follow.

2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20	
\$1,730	\$1,782	\$1,836	\$10,307	\$1,947	\$19,223	\$2,066	\$2,128	\$11,948	\$2,258	Site Systems & Accessibility
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface Accessibility
\$1,730	\$1,782	\$1,836	\$10,307	\$1,947	\$19,223	\$2,066	\$2,128	\$11,948	\$2,258	Site Sub-Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,867	\$0	Mechanical Room
\$0	\$0	\$0	\$0	\$0	\$9,971	\$0	\$0	\$0	\$0	Boilers
										Boiler Room Systems
\$0	\$0	\$0	\$0	\$0	\$9,971	\$0	\$0	\$15,867	\$0	Mechanical Sub-Total
\$1,680	\$1,730	\$1,782	\$31,206	\$1,891	\$1,947	\$2,006	\$2,066	\$2,128	\$6,093	Building Mech. & Electrical
\$1,344	\$0	\$0	\$0	\$0	\$1,558	\$0	\$0	\$80,014	\$0	Mechanical
\$0	\$0	\$0	\$110,140	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
										Elevators
\$3,024	\$1,730	\$1,782	\$141,346	\$1,891	\$3,505	\$2,006	\$2,066	\$82,142	\$6,093	Mechanical & Electrical Sub-Total
\$17,232	\$0	\$0	\$24,303	\$51,946	\$9,345	\$0	\$0	\$0	\$0	Building Architectural
\$0	\$0	\$0	\$0	\$7,109	\$134,951	\$0	\$0	\$0	\$0	Structural and Exterior
\$17,927	\$24,415	\$20,581	\$1,630	\$1,679	\$1,730	\$1,782	\$1,835	\$1,890	\$1,947	Roof Systems
\$14,308	\$0	\$0	\$0	\$0	\$1,122	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
										Community Spaces
\$49,467	\$24,415	\$20,581	\$25,933	\$60,734	\$147,148	\$1,782	\$1,835	\$1,890	\$1,947	Building Architectural Sub-Total
\$739	\$761	\$784	\$3,892	\$4,008	\$4,129	\$4,252	\$4,380	\$4,511	\$4,647	Dwelling Units
\$15,861	\$16,337	\$16,827	\$17,331	\$17,851	\$18,387	\$18,939	\$19,507	\$1,876	\$1,932	Living Areas
\$70,556	\$0	\$0	\$0	\$0	\$13,866	\$14,282	\$14,710	\$11,406	\$11,748	Bathrooms
\$8,578	\$8,836	\$9,101	\$6,510	\$21,075	\$6,907	\$7,114	\$7,327	\$7,547	\$7,773	Kitchens
										Mechanical & Electrical
\$95,734	\$25,933	\$26,712	\$27,733	\$42,935	\$43,288	\$44,587	\$45,924	\$25,341	\$26,101	Dwelling Units Sub-Total
\$149,955	\$53,861	\$50,910	\$205,319	\$107,507	\$223,136	\$50,440	\$51,953	\$137,188	\$36,399	Total Capital Costs

Replacement Reserve (RR) Analysis: *Plan One - Green*



Current Replacement Reserve Balance: **\$226,047**
Adjusted Replacement Reserve Balance: **\$226,047**
Current annual contributions to reserve accounts: **\$27,843**

At the end of Year One, Reserve Balances are projected to be: **\$10,980**
At the end of Year 20, Reserve Balances are projected to be: **(\$1,685,673)**
Unmet needs projected in most years of the plan

Replacement Reserve (RR) Analysis: *Plan One - Green*

Reserve Funding In Year 1										
Starting Balance:		\$226,047 or \$4,521/unit		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.						
Contributions to Reserves:		\$27,843 or \$557/unit								
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances										
Starting Replacement Reserves	\$226,047	\$10,980	(\$55,175)	(\$101,680)	(\$650,974)	(\$668,231)	(\$654,193)	(\$651,580)	(\$704,930)	(\$879,321)
(B) Annual Funding										
Contributions Indexed at 3%	\$557	\$574	\$591	\$609	\$627	\$646	\$665	\$685	\$705	\$727
(C) Additional Unit Contributions										
(D) Total Annual Reserve Funding	\$27,843	\$28,678	\$29,539	\$30,425	\$31,338	\$32,278	\$33,246	\$34,244	\$35,271	\$36,329
(E) Interest on Reserves at 3%	\$7,199	\$760	\$443	\$456	\$470	\$484	\$499	\$514	\$529	\$545
Total Funds Available	\$261,089	\$40,418	(\$25,193)	(\$70,799)	(\$619,166)	(\$635,469)	(\$620,448)	(\$616,822)	(\$669,130)	(\$842,447)
(F) Total Capital Cost	\$250,109	\$95,593	\$76,487	\$580,175	\$49,065	\$18,724	\$31,132	\$88,107	\$210,191	\$211,959
(G) Reserve Balances	\$10,980	(\$55,175)	(\$101,680)	(\$650,974)	(\$668,231)	(\$654,193)	(\$651,580)	(\$704,930)	(\$879,321)	(\$1,054,405)
Outside Capital:										
Adjusted Reserve Balances	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

Depicts the continuation of the current funding scenario.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

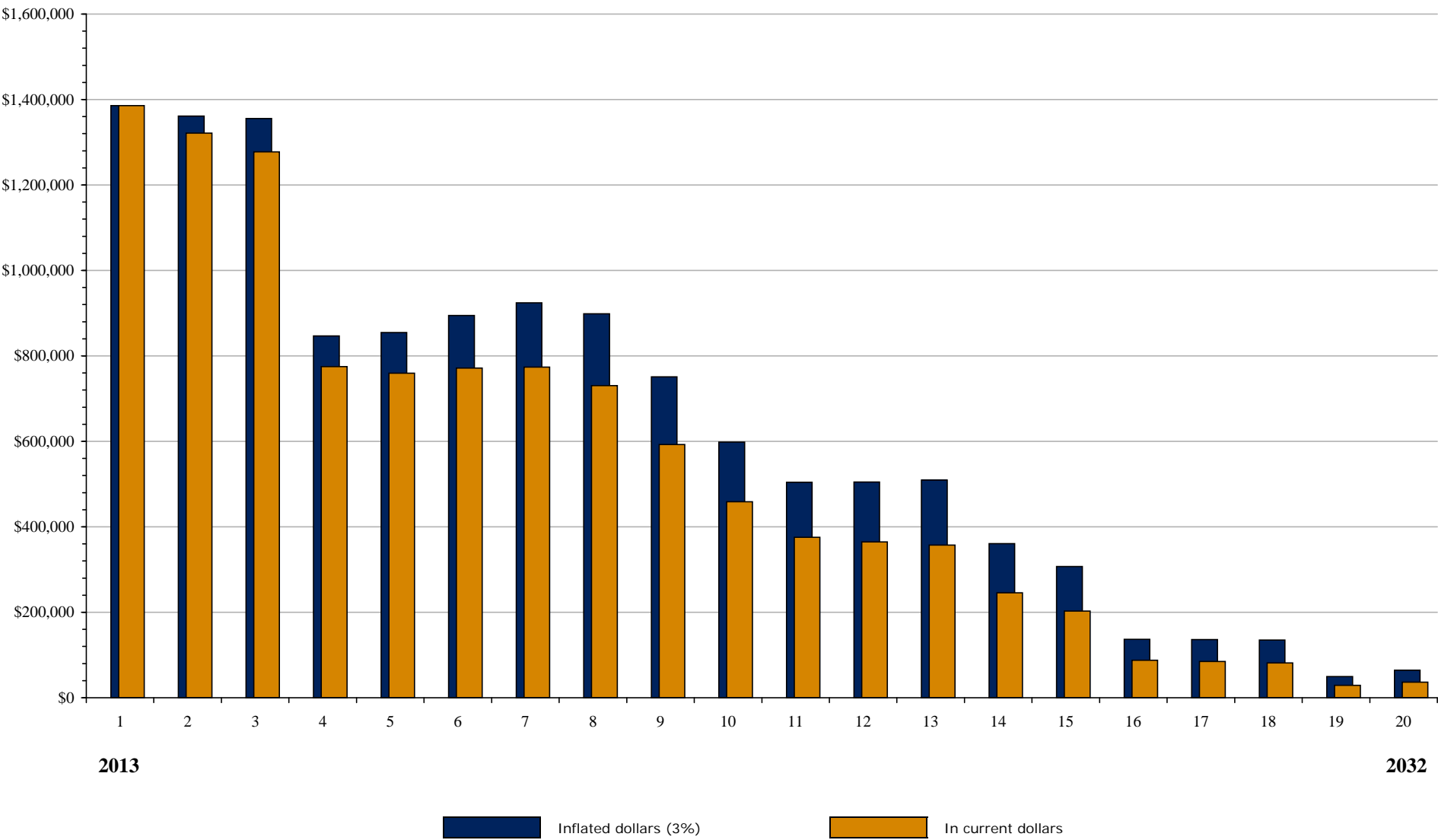
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan One - Green*

Reserve Funding In Year 20											
Projected replacement reserve balance is (\$1,685,673)					This is (\$33,713) per unit in inflated dollars or (\$19,226) per unit in uninflated dollars						
Projected annual funding to reserves is \$48,823					This is \$976 per unit in inflated dollars or \$557 per unit in current dollars						
2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20		
										Reserve Balances (A)	
(\$1,054,405)	(\$1,166,380)	(\$1,181,122)	(\$1,191,739)	(\$1,355,556)	(\$1,420,316)	(\$1,599,422)	(\$1,604,512)	(\$1,609,755)	(\$1,698,830)	Starting Replacement Reserves	
										Annual Funding (B)	
\$748	\$771	\$794	\$818	\$842	\$868	\$894	\$920	\$948	\$976	Contributions Indexed at 3%	
										Additional Unit Contributions (C)	
\$37,419	\$38,542	\$39,698	\$40,889	\$42,115	\$43,379	\$44,680	\$46,021	\$47,401	\$48,823	Total Annual Reserve Funding (D)	
\$561	\$578	\$595	\$613	\$632	\$651	\$670	\$690	\$711	\$732	Interest on Reserves at 3% (E)	
(\$1,016,425)	(\$1,127,260)	(\$1,140,828)	(\$1,150,237)	(\$1,312,809)	(\$1,376,287)	(\$1,554,072)	(\$1,557,801)	(\$1,561,642)	(\$1,649,275)	Total Funds Available	
\$149,955	\$53,861	\$50,910	\$205,319	\$107,507	\$223,136	\$50,440	\$51,953	\$137,188	\$36,399	Total Capital Cost (F)	
(\$1,166,380)	(\$1,181,122)	(\$1,191,739)	(\$1,355,556)	(\$1,420,316)	(\$1,599,422)	(\$1,604,512)	(\$1,609,755)	(\$1,698,830)	(\$1,685,673)	Reserve Balances	(G)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		

Replacement Reserve (RR) Analysis: *Plan Two - Green*



Current Replacement Reserve Balance: **\$226,047**
Adjusted Replacement Reserve Balance: **\$226,047**
Current annual contributions to reserve accounts: **\$27,843**

At the end of Year One, Reserve Balances are projected to be: **\$1,385,980**
At the end of Year 20, Reserve Balances are projected to be: **\$64,427**
All projected capital needs are met throughout the plan

Replacement Reserve (RR) Analysis: *Plan Two - Green*

		Reserve Funding In Year 1								
		Starting Balance: \$226,047 or \$4,521/unit Contributions to Reserves: \$27,843 or \$557/unit <small>Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.</small>								
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances										
Starting Replacement Reserves	\$226,047	\$1,385,980	\$1,361,075	\$1,355,402	\$846,771	\$854,916	\$894,602	\$924,053	\$898,425	\$750,987
(B) Annual Funding										
Contributions Indexed at 3%	\$557	\$574	\$591	\$609	\$627	\$646	\$665	\$685	\$705	\$727
(C) Additional Unit Contributions										
(D) Total Annual Reserve Funding	\$27,843	\$28,678	\$29,539	\$30,425	\$31,338	\$32,278	\$33,246	\$34,244	\$35,271	\$36,329
(E) Interest on Reserves at 3%	\$7,199	\$42,010	\$41,275	\$41,118	\$25,873	\$26,132	\$27,337	\$28,235	\$27,482	\$23,075
Total Funds Available	\$261,089	\$1,456,668	\$1,431,889	\$1,426,946	\$903,982	\$913,326	\$955,185	\$986,532	\$961,178	\$810,390
(F) Total Capital Cost	\$250,109	\$95,593	\$76,487	\$580,175	\$49,065	\$18,724	\$31,132	\$88,107	\$210,191	\$211,959
(G) Reserve Balances	\$10,980	\$1,361,075	\$1,355,402	\$846,771	\$854,916	\$894,602	\$924,053	\$898,425	\$750,987	\$598,432
Outside Capital:	\$1,375,000									
Adjusted Reserve Balances	\$1,385,980	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Infusion of outside capital in Year 1 of \$1,375,000 (\$27,500/unit).

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan Two - Green*

Reserve Funding In Year 20										
Projected replacement reserve balance is \$64,427					This is \$1,289 per unit in inflated dollars or \$735 per unit in uninflated dollars					
Projected annual funding to reserves is \$48,823					This is \$976 per unit in inflated dollars or \$557 per unit in current dollars					
2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
										Reserve Balances (A)
\$598,432	\$504,410	\$504,801	\$509,327	\$360,790	\$306,853	\$136,953	\$135,972	\$134,808	\$49,777	Starting Replacement Reserves
										Annual Funding (B)
\$748	\$771	\$794	\$818	\$842	\$868	\$894	\$920	\$948	\$976	Contributions Indexed at 3%
										Additional Unit Contributions (C)
\$37,419	\$38,542	\$39,698	\$40,889	\$42,115	\$43,379	\$44,680	\$46,021	\$47,401	\$48,823	Total Annual Reserve Funding (D)
\$18,514	\$15,710	\$15,739	\$15,893	\$11,455	\$9,856	\$4,779	\$4,769	\$4,755	\$2,226	Interest on Reserves at 3% (E)
\$654,365	\$558,662	\$560,238	\$566,109	\$414,360	\$360,089	\$186,412	\$186,762	\$186,965	\$100,826	Total Funds Available
\$149,955	\$53,861	\$50,910	\$205,319	\$107,507	\$223,136	\$50,440	\$51,953	\$137,188	\$36,399	Total Capital Cost (F)
\$504,410	\$504,801	\$509,327	\$360,790	\$306,853	\$136,953	\$135,972	\$134,808	\$49,777	\$64,427	Reserve Balances (G)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Projected Capital Needs Over Twenty Years

SITE SYSTEMS

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)	Notes
SURFACE									
Roadways & Parking	16,374	sf	2.10	\$34,385		16	20	4 over 2 Years	Asphalt paved parking areas - good overall cond. Future costs to resurface
Roadways & Parking (Green)	16,374	sf	5.50	\$90,057	\$55,672	16	35		Install pervious pavers
Pedestrian Walkways	4,120	sf	6.25	\$25,750		varies	20	1 over 20 Years	Concrete walkways Periodic Repair allowance
Pedestrian Walkways (Green)	4,120	sf	6.25	\$25,750	\$0	varies	20	1 over 20 Years	Specify recycled content/Portland cement
Crack-Fill and Sealcoat	16,374	sf	0.35	\$5,731		10	5	1 /9 /14 /19 in 1 Year	Cost to crack-fill, sealcoat, and restripe
Fencing	440	lf	23.50	\$10,340		16	20	2 in 1 Year	Wood shadow box fencing Costs to replace
Fencing (Green)	440	lf	23.50	\$10,340	\$0	16	20	2 in 1 Year	FSC certified wood
Dumbster Enclosure	1	ea	1050.00	\$1,050		16	20	4 in 1 Year	Wood dumpster enclosure - Fair condition Costs to replace
Dumbster Enclosure (Green)	1	ea	1050.00	\$1,050	\$0	16	20	4 in 1 Year	FSC certified wood
Site Lighting	4	ea	2570.00	\$10,280		16	15	1 /16 in 1 Year	Pole mounted lighting with mercury vapor (250watt) Costs to replace
Site Lighting (Green)	4	ea	2762.75	\$11,051	\$771	16	15	1 /16 in 1 Year	Install LED models
Ramp	1	ls	7500.00	\$7,500		16	20	1 in 1 Year	Costs to rebuild/resurface the concrete ramp and replace railings
Landscaping	1	ea				16	20		
Landscaping (Green)		ea							
ACCESSIBILITY									
Circulation	1	ls	0.00			16	10		Restripe parking spaces with compliant access aisles Included above in "Crack-fill and Sealcoat"
Circulation (Green)		ls							
Common Areas	1	ls				16	20		No issues
Common Areas (Green)		ls							
Dwelling Units	5	ea	1677.00	\$8,385		16	20	4 in 1 Year	Reposition grab bars, lower tstat controls, lower wall hung kitchen cabinery
Dwelling Units (Green)		ea							
Miscellaneous		ls							

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
SURFACE																				
Roadways & Parking	\$0	\$0	\$0	\$18,787	\$19,351	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roadways & Parking (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pedestrian Walkways	\$1,288	\$1,326	\$1,366	\$1,407	\$1,449	\$1,493	\$1,537	\$1,583	\$1,631	\$1,680	\$1,730	\$1,782	\$1,836	\$1,891	\$1,947	\$2,006	\$2,066	\$2,128	\$2,192	\$2,258
Pedestrian Walkways (Green)	\$1,288	\$1,326	\$1,366	\$1,407	\$1,449	\$1,493	\$1,537	\$1,583	\$1,631	\$1,680	\$1,730	\$1,782	\$1,836	\$1,891	\$1,947	\$2,006	\$2,066	\$2,128	\$2,192	\$2,258
Crack-Fill and Sealcoat	\$5,731	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,260	\$0	\$0	\$0	\$0	\$8,416	\$0	\$0	\$0	\$0	\$9,756	\$0
Fencing	\$0	\$10,650	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing (Green)	\$0	\$10,650	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dumbster Enclosure	\$0	\$0	\$0	\$1,147	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dumbster Enclosure (Green)	\$0	\$0	\$0	\$1,147	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Lighting	\$10,280	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,016	\$0	\$0	\$0	\$0
Site Lighting (Green)	\$11,051	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$17,217	\$0	\$0	\$0	\$0
Ramp	\$7,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landscaping	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landscaping (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ACCESSIBILITY																				
Circulation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Circulation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Common Areas	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Common Areas (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dwelling Units	\$0	\$0	\$0	\$9,163	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dwelling Units (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

MECHANICAL ROOM

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
BOILERS											
											Hydrotherm module boiler rated at 1,500 MBH
Boilers - 1	1	ea	36,000	\$36,000		16	25	9		in 1 Year	Costs to replace
Boilers - 1 (Green)	1	ea	38,700	\$38,700	\$2,700	16	20	9		in 1 Year	Install a high efficiency condensing boiler
Boilers - 2		ea									
Boilers - 2 (Green)		ea									
Boilers - 3		ea									
Boilers - 3 (Green)		ea									
Controls		ea									
Controls (Green)		ea									
Boiler Water Pumps		ea									
Boiler Water Pumps (Green)		ea									
Heating Water Pumps - 1	2	ea	4,660	\$9,320		16	15	4 19		in 1 Year	Premium efficiency pump motors Costs to replace
Heating Water Pumps - 1 (Green)		ea									
Heating Water Pumps - 2		ea									
Heating Water Pumps - 2 (Green)		ea									
Flue Exhaust		ea									
Flue Exhaust (Green)		ea									
Condensate & Feed Water		ea									
Miscellaneous		ea									
Miscellaneous (Green)		ea									
Miscellaneous		ea									
Miscellaneous (Green)		ea									

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BOILERS																				
Boilers - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$45,604	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$49,024	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers - 3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers - 3 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controls	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controls (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Water Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps - 1	\$0	\$0	\$0	\$10,184	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,867	\$0
Heating Water Pumps - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Flue Exhaust	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Flue Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Condensate & Feed Water	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

MECHANICAL ROOM--continued

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
BOILER ROOM SYSTEMS										
Boiler Room Piping/Valves	ea									
Boiler Room Piping/Valves (Green)	ea									
3-Way Valve & Controller	ea									
3-Way Valve & Controller (Green)	ea									
Heat Exchanger	ea									
Heat Exchanger (Green)	ea									
DHW Generation - 1	1 ea	26620.00	\$26,620		16	25	9	in 1 Year	A.O Smith boiler rated at 1210MBH Costs to replace	
DHW Generation - 1 (Green)	1 ea	28616.50	\$28,617	\$1,997	16	20	9	in 1 Year	Install a high efficiency condensing boiler	
DHW Generation - 2	2 ea	3000.00	\$6,000		16	15	1 16	in 1 Year	Steel domestic hot water tanks, glass lined Costs to replace	
DHW Generation - 2 (Green)	2 ea	3200.00	\$6,400	\$400	16	15	1 16	in 1 Year	Install insulated stainless steel tanks	
DHW Storage - 1	ea									
DHW Storage - 1 (Green)	ea									
DHW Storage - 2	ea									
DHW Storage - 2 (Green)	ea									
DHW Pumps - 1	ea									
DHW Pumps - 1 (Green)	ea									
DHW Pumps - 2	ea									
DHW Pumps - 2 (Green)	ea									
Miscellaneous	ea									
Miscellaneous (Green)	ea									
Miscellaneous	ea									

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BOILER ROOM SYSTEMS																				
Boiler Room Piping/Valves	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Room Piping/Valves (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3-Way Valve & Controller	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3-Way Valve & Controller (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heat Exchanger	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heat Exchanger (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$33,721	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$36,251	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 2	\$6,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,348	\$0	\$0	\$0	\$0
DHW Generation - 2 (Green)	\$6,400	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,971	\$0	\$0	\$0	\$0
DHW Storage - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING MECHANICAL AND ELECTRICAL

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)				Notes
BUILDING MECHANICAL												
Commercial Kitchen Equipment	1	Is	25000.00	\$25,000		16	20	1	over 20 Years			Allowance to replace kitchen equipment as needed
Building Fire Suppression	1	Is	2225.00	\$2,225		16	18	2	20	in 1 Year		Sprinkler system (city pressure) w/ some "dry"
Compactor	1	Is	20000.00	\$20,000		16	30	14	in 1 Year			Costs to replace air compressor
												Bag type compactor
												Costs to replace
Building HVAC Systems - 1	5	ea	13300.00	\$66,500		16	20	4	in 1 Year			Trane rooftop units sizes vary
												Costs to replace
Building HVAC Systems - 1 (Green)		ea										
												Greenheck rooftop unit
Building HVAC Systems - 2	1	ea				16	25					Costs to replace
Building HVAC Systems - 2 (Green)		ea										
Building HVAC Systems - 3		ea										
Building HVAC Systems - 3 (Green)		ea										
Building Vent. & Exhaust	16	ea	850.00	\$13,600		16	20	4	in 1 Year			Mushroom type exhaust fans - fair condition
												Costs to replace
Building Vent. & Exhaust (Green)		ea										
Building Vent. & Exhaust	1	ea	3500.00	\$3,500		16	25	9	in 1 Year			Kitchen exhaust fan - under service contract
												Costs to replace
Building Vent. & Exhaust (Green)		ea										
BUILDING ELECTRICAL												
Building Power Wiring		Is										
	1		7500.00	\$7,500		16	15	1	in 1 Year			Size estimated at 175kW
Emergency Generator	1	ea	47000.00	\$47,000		16	35	19	in 1 Year			Costs to rebuild, future replacement costs
Emergency Lights		ea										
Smoke / Fire Detection	1	Is	32500.00	\$32,500		16	20	4	in 1 Year			Wheelock fire alarm control panel
												Costs to replace
Signaling / Communication	1	Is	1000.00	\$1,000		16	5	1	6	11	16	Costs to repair/replace security cameras
BUILDING ELEVATORS												
Shafts and Doorways	1	ea				16	30					
Cabs	1	ea	10000.00	\$10,000		16	15	1	in 1 Year			Costs to refurbish cab interiors
Controller/Dispatcher	1	ea				16	30					
Machine Room Equipment	1	ea	75000.00	\$75,000		16	30	14	in 1 Year			Hydraulic package and controls
												Cost to replace

Costs projected at 3%

BUILDING MECHANICAL AND ELECTRICAL

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BUILDING MECHANICAL																				
Commercial Kitchen Equipment	\$1,250	\$1,288	\$1,326	\$1,366	\$1,407	\$1,449	\$1,493	\$1,537	\$1,583	\$1,631	\$1,680	\$1,730	\$1,782	\$1,836	\$1,891	\$1,947	\$2,006	\$2,066	\$2,128	\$2,192
Building Fire Suppression	\$0	\$2,292	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,902
Commpactor	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29,371	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 1	\$0	\$0	\$0	\$72,666	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 3 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust	\$0	\$0	\$0	\$14,861	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,434	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BUILDING ELECTRICAL																				
Building Power Wiring	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Emergency Generator	\$7,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,014	\$0
Emergency Lights	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Smoke / Fire Detection	\$0	\$0	\$0	\$35,514	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Signaling / Communication	\$1,000	\$0	\$0	\$0	\$0	\$1,159	\$0	\$0	\$0	\$0	\$1,344	\$0	\$0	\$0	\$0	\$1,558	\$0	\$0	\$0	\$0
Shafts and Doorways	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cabs	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controller/Dispatcher	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Machine Room Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$110,140	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
STRUCTURE											
Foundation	969	lf				16	50				
Framing		ls									
Slab		sf									
Miscellaneous		ea									
BUILDING EXTERIOR											
Exterior Common Doors	1	ea	2975.00	\$2,975		16	30	15	in	1 Year	Aluminum/glass slider - good condition Costs to replace
Exterior Common Doors (Green)		ea									
	3	ea	1935.50	\$5,807		16	30	14	in	1 Year	Aluminum/glass single leaf doors - fair condition
Exterior Common Doors	3	ea	3196.00	\$9,588		16	30	14	in	1 Year	Aluminum/glass double leaf doors - fair condition
	3		2080.66	\$6,242		16	30	14	in	1 Year	
Exterior Common Doors (Green)	3	ea	3435.70	\$10,307	\$1,155	16	30	14	in	1 Year	Install insulated fiberglass models
											Large solid wood doors - fair condition
Exterior Common Doors	2	ea	1410.00	\$2,820		30+	30	1	in	1 Year	Costs to replace
Exterior Common Doors (Green)		ea									
											Auto door opener
Automatic Door Opener	1	ea	1800.00	\$1,800		5	15	10	in	1 Year	Costs to replace
Storm Doors	0	ea									
	16,640	tll sf									Original section brick - spalling, mortar loss
Exterior Walls (Original Building)	3,328	sf	7.00	\$23,296		16	30	1 8 15	in	1 Year	Costs to point/repair 20% of the original building
Exterior Walls (Original Building) (Green)	3,328	sf	7.00	\$23,296	\$0	16	30	1 8 15	in	1 Year	Specify recycled content/Portland cement
	9,660	tll sf									
Exterior Walls (Addition)	725	sf	7.00	\$5,072		16	30	1 8 15	in	1 Year	Costs to point/repair 7.5% of the addition section
Exterior Walls (Addition) (Green)	725	sf	7.00	\$5,072	\$0	16	30	1 8 15	in	1 Year	Specify recycled content/Portland cement
											Wood canopies with columns - fair condition
Canopies	2	ea	1750.00	\$3,500		16	20	4	in	1 Year	Costs to replace/repair/paint
											Painted wood trim
Trim, Soffit, Fascia	1	lf	10000.00	\$10,000		16	10	1 11	in	1 Year	Costs to paint and repair
Trim, Soffit, Fascia (Green)	1	lf	10000.00	\$10,000	\$0	16	10	1 11	in	1 Year	Specify Low VOC paint
											Expansion joints - exhibit cracking
Caulking	448	lf	6.30	\$2,822		16	10	1 11	in	1 Year	Costs to cut and replace joint caulking
Fire Escape	1	ls	3000.00	\$3,000		10	7	1 8 15	in	1 Year	Costs to repair and repaint the fire escape
Fire Escape (Green)	1	ls	3000.00	\$3,000	\$0	10	7	1 8 15	in	1 Year	Specify low VOC paint

<div> <div>The Old Marvin</div> <div>BUILDING ARCHITECTURE</div> </div>																				
Costs projected at 3%																				
Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
STRUCTURE																				
Foundation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Framing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Slab	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BUILDING EXTERIOR																				
Exterior Common Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,500	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,607	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$24,303	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors	\$2,820	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Automatic Door Opener	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,349	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Storm Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls (Original Building)	\$23,296	\$0	\$0	\$0	\$0	\$0	\$0	\$28,651	\$0	\$0	\$0	\$0	\$0	\$0	\$35,237	\$0	\$0	\$0	\$0	\$0
Ext Walls (Orig. Bldg) (Green)	\$23,296	\$0	\$0	\$0	\$0	\$0	\$0	\$28,651	\$0	\$0	\$0	\$0	\$0	\$0	\$35,237	\$0	\$0	\$0	\$0	\$0
Exterior Walls (Addition)	\$5,072	\$0	\$0	\$0	\$0	\$0	\$0	\$6,237	\$0	\$0	\$0	\$0	\$0	\$0	\$7,671	\$0	\$0	\$0	\$0	\$0
Ext. Walls (Addition) (Green)	\$5,072	\$0	\$0	\$0	\$0	\$0	\$0	\$6,237	\$0	\$0	\$0	\$0	\$0	\$0	\$7,671	\$0	\$0	\$0	\$0	\$0
Canopies	\$0	\$0	\$0	\$3,825	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Trim, Soffit, Fascia	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,439	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Trim, Soffit, Fascia (Green)	\$10,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,439	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Caulking	\$2,822	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,793	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fire Escape	\$3,000	\$0	\$0	\$0	\$0	\$0	\$0	\$3,690	\$0	\$0	\$0	\$0	\$0	\$0	\$4,538	\$0	\$0	\$0	\$0	\$0
Fire Escape (Green)	\$3,000	\$0	\$0	\$0	\$0	\$0	\$0	\$3,690	\$0	\$0	\$0	\$0	\$0	\$0	\$4,538	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
BUILDING EXTERIORS (cont.)											
Windows	98	ea	1282.50	\$125,685		16	30	4		in 1 Year	Aluminum/Double pane large double hung w/ fixed sections Costs to replace
Windows (Green)	98	ea	1378.69	\$135,111	\$9,426	16	30	4		in 1 Year	Install fiberglass framed, double pane with argon fill
Windows	194	ea	815.00	\$158,110		16	30	4		in 1 Year	Aluminum/Double pane large double hung w/ fixed sections Costs to replace
Windows (Green)	194	ea	876.13	\$169,968	\$11,858	16	30	4		in 1 Year	Install fiberglass framed, double pane with argon fill
Window Glazing		ea									
Window Glazing (Green)		ea									
Window Lintels		ea									
Unit Balconies		ea									
Unit Balconies (Green)		ea									
Unit Patios		ea									
Unit Patios (Green)		ea									
Building Mounted Lighting	12	ea	465.00	\$5,580		16	15	1 16		in 1 Year	Globe and HID wallpacks Costs to replace
Building Mounted Lighting (Green)	12	ea	499.88	\$5,999	\$419	16	15	1 16		in 1 Year	Costs to install LED models
ROOF SYSTEMS											
Structure	22,569	sf				16	50				Flat and pitched sections Monitor
Roof Covering - 1	8,662	sf	8.50	\$73,627		4	20	16		in 1 Year	Rubber membrane flat roof section Future replacement costs
Roof Covering - 1 (Green)	8,662	sf	10.00	\$86,620	\$12,993	4	20	16		in 1 Year	Install white surface w/ additional XPS insulation
Roof Covering - 2	8,219	sf	8.50	\$69,862		10	20	10		in 1 Year	Rubber membrane flat roof section Future replacement costs
Roof Covering - 2 (Green)	8,219	sf	10.00	\$82,190	\$12,329	10	20	10		in 1 Year	Install white surface w/ additional XPS insulation
Roof Covering - 3	5,688	sf	4.00	\$22,752		16	20	4		in 1 Year	Pitch roof section with composite asphalt shingles Costs to replace
Roof Doors	2	ea	345.00	\$690		20+	25	5		in 1 Year	Metal glass doors - rust noted Costs to replace
Soffit	969	ls	4.85	\$4,700		10	7	1 8 15		in 1 Year	Decorative wood bracketed soffit - Costs to paint/repair

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BUILDING EXTERIORS (cont.)																				
Windows	\$0	\$0	\$0	\$137,339	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows (Green)	\$0	\$0	\$0	\$147,640	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows	\$0	\$0	\$0	\$172,771	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows (Green)	\$0	\$0	\$0	\$185,729	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Glazing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Glazing (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Lintels	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Balconies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Balconies (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Patios	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Patios (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Mounted Lighting	\$5,580	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,693	\$0	\$0	\$0	\$0
Bldg. Mounted Lighting (Green)	\$5,999	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,345	\$0	\$0	\$0	\$0
ROOF SYSTEMS																				
Structure	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$114,708	\$0	\$0	\$0	\$0
Roof Covering - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$134,951	\$0	\$0	\$0	\$0
Roof Covering - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$91,153	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$107,239	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 3	\$0	\$0	\$0	\$24,862	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Doors	\$0	\$0	\$0	\$0	\$777	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Soffit	\$4,700	\$0	\$0	\$0	\$0	\$0	\$0	\$5,780	\$0	\$0	\$0	\$0	\$0	\$0	\$7,109	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
CORRIDORS / LOBBY / VESTIBULES											
Walls	30,000	sf	0.62	\$18,600		16	10	1	11	over 3 Years	Painted walls - condition vary Costs to paint
Walls (Green)	30,000	sf	0.62	\$18,600	\$0	16	10	1	11	over 3 Years	Specify low VOC products
Floors	5,957	sf	3.00	\$17,870		3	10	7	17	over 3 Years	Carpet covered corridors, lounges, vestibules Costs to replace
Floors (Green)	5,957	sf	5.50	\$32,762	\$14,892	3	25	7		over 3 Years	Install linoleum flooring
Floors	1,798	sf	5.00	\$8,990		16	15	1	16	over 2 Years	VCT covered corridors, lounges, vestibules Costs to replace
Floors (Green)	1,798	sf	5.50	\$9,889	\$899	16	25	1		over 2 Years	Install linoleum flooring
Floors	2,202	ea				2	25				New Faux wood vinyl flooring Operating
Floors (Green)		ea									
Ceilings	9,957	ea	2.23	\$22,204		16	20	1		over 20 Years	Suspended acoustic ceiling tiles Costs to replace as needed
Ceilings (Green)		ea									
Lounge Furniture	1	ls	14250.00	\$14,250		3	15	12		over 2 Years	Couches, lounge chairs - good overall condition Costs to replace
Hallway Interior Lighting	1	ls				16	20			in 1 Year	Various fluorescent lamped fixtures Operating
Hallway Interior Lighting (Green)	1	ls	26805.00	\$26,805	\$26,805					Years	EWCM #7-9 Costs to install LED lamps and occupancy sensors
STAIRS											
Stair Walls and Ceilings	10,332	sf	0.62	\$6,406		16	10	1	11	over 2 Years	Painted walls and ceilings Costs to paint and repair
Stair Walls and Ceilings (Green)	10,332	sf	0.62	\$6,406	\$0	16	10	1	11	over 2 Years	Specify low VOC products
Stair Floors	1,848	sf	5.00	\$9,240		16	15	1	16	in 1 Year	VCT covered stairwell landings Costs to replace
Stair Floors (Green)	1,848	sf	5.50	\$10,164	\$924	16	25	1		in 1 Year	Install linoleum flooring
Stair Interior Lighting		ea									
Stair Interior Lighting (Green)		ea									
Stair Treads	180	ea	47.10	\$8,478		16	25	9		over 3 Years	Rubber stair treads Costs to replace rubber stair treads
Stair Railings		ea									

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
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CORRIDORS / LOBBY / VESTIBULES

Walls	\$6,200	\$6,386	\$6,578	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,332	\$8,582	\$8,840	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls (Green)	\$6,200	\$6,386	\$6,578	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,332	\$8,582	\$8,840	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$7,113	\$7,326	\$7,546	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,559	\$9,846	\$10,141	\$0
Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$13,040	\$13,431	\$13,834	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floors	\$4,495	\$4,630	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,003	\$7,213	\$0	\$0	\$0
Floors (Green)	\$4,945	\$5,093	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ceilings	\$1,110	\$1,143	\$1,178	\$1,213	\$1,250	\$1,287	\$1,326	\$1,365	\$1,406	\$1,449	\$1,492	\$1,537	\$1,583	\$1,630	\$1,679	\$1,730	\$1,782	\$1,835	\$1,890	\$1,947
Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lounge Furniture	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,863	\$10,159	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Interior Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Interior Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

STAIRS

Stair Walls and Ceilings	\$3,203	\$3,299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,304	\$4,434	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Walls and Ceilings (Green)	\$3,203	\$3,299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,304	\$4,434	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Floors	\$9,240	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$14,396	\$0	\$0	\$0	\$0
Stair Floors (Green)	\$10,164	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Interior Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Interior Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Treads	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,580	\$3,687	\$3,798	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Railings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes	
LOBBIES / MAIL FACILITIES										
Lobby Walls & Ceilings	512	sf	0.62	\$317	16	10	1	11	Painted walls and ceiling Costs to paint and repair	
Lobby Walls & Ceilings (Green)	512	sf	0.62	\$317	\$0	16	10	1	11	Specify low VOC products
Lobby Floors	128	sf			16	35			Ceramic tile flooring Operating	
Lobby Floors (Green)		sf								
COMMUNITY ROOMS / OFFICE										
Walls and Ceilings	11,160	sf	0.62	\$6,919	16	10	1	11	Painted walls and ceiling Costs to paint and repair	
Walls and Ceilings (Green)	11,160	sf	0.62	\$6,919	\$0	16	10	1	11	Specify low VOC products
Floor Covering	4,904	sf	5.00	\$24,520	16	15	1	16	VCT in Art, Activity, Great Room and Nurses Office	
Floor Covering	736	sf	3.00	\$2,208	16	10	1	11	Carpet in Office and Library	
Floor Covering (Green)	4,904	sf	5.50	\$26,972	16	25	1		in 1 Year	
Floor Covering (Green)	736	sf	5.50	\$4,048	\$4,292	16	25	1	in 1 Year	Install linoleum flooring
Com Rm Kitchen Cabinets		ea								
Com Rm Kitchen Cabinets (Green)		ea								
Appliances	1	ea	670.00	\$670	16	15	1	16	in 1 Year	Non- Energy Star Office refrigerator
Appliances (Green)	1	ea	720.25	\$720	\$50	16	15	1	16	Install an Energy Star Model
PUBLIC LAUNDRY / RESTROOMS / COMMERCIAL KITCHEN										
Walls and Ceilings	5,500	sf	0.62	\$3,410	10	10	1	11	Painted walls & ceilings Costs to paint and repair	
Walls and Ceilings (Green)	5,500	sf	0.62	\$3,410	\$0	10	10	1	11	Specify low VOC paint
Floor Covering	2,092	sf			16	35			Ceramic tile flooring Operating	
Floor Covering (Green)		sf								
Laundry Equipment	2	ea			16	12			Non Energy Star and washers - Leased Dryers	
Laundry Equipment (Green)	2	ea			16	12			Install Energy Star washers Dryers	
Restroom Fixtures / Accessories	2	ea			16	20			Toilets and wall mounted sinks Operating	
Miscellaneous		ea								
Miscellaneous (Green)		ea								

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
LOBBIES / MAIL FACILITIES																				
Lobby Walls & Ceilings	\$317	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$427	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Walls & Ceilings (Green)	\$317	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$427	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
COMMUNITY ROOMS / OFFICE																				
Walls and Ceilings	\$6,919	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$6,919	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,299	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$26,728	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,967	\$0	\$0	\$0	\$0	\$38,201	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$31,020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Com Rm Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Com Rm Kit, Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Appliances	\$670	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,044	\$0	\$0	\$0	\$0
Appliances (Green)	\$720	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,122	\$0	\$0	\$0	\$0
PUBLIC LAUNDRY / RESTROOMS / COMMERCIAL KITCHEN																				
Walls and Ceilings	\$3,410	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,583	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$3,410	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,583	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Restroom Fixtures / Accessories	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

DWELLING UNITS

Replacement Items	Quantity	Cost / Unit	Total Cost	Total	AGE	EUL	Replacement Schedule		Notes
		2013.00	in 2013 \$	Premium	(Years)	(Years)	(Year of action AND duration of project)		
LIVING AREA FINISHES									
Unit Hallway Doors	50 ea	420.00	\$21,000		16	30	14	over 10 Years	Metal unit doors in metal frames
									Future replacement costs
Unit Interior Doors	100 ea	110.00	\$11,000		16	25	1	over 20 Years	Hollow core wood doors
									Costs to replace interior doors as needed
Unit Closet Doors	0 ea								
Unit Walls and Ceilings	107,538 sf				16	5			
Unit Walls and Ceilings (Green)	sf								
Living Area Floors	18,438 sf	3.00	\$55,313		16	10	1 11	over 4 Years	Carpeting
									Costs to replace
Living Area Floors (Green)	18,438 sf	5.50	\$101,406	\$46,094	16	25	1	over 4 Years	Install linoleum flooring
Living Area Floors	sf								
Living Area Floors (Green)	sf								
BATHROOMS									
Bathroom Floors	2,700 sf				16	30			Ceramic tile floors
									Operating
Bathroom Floors (Green)	sf								
Bathtub and Shower	50 ea	1720.00	\$86,000		16	25	9	over 10 Years	Fiberglass tubs and surrounds
	50 ea	18.50	\$925		16	20	1	in 1 Year	Costs to replace
Bathtub and Shower (Green)	50 ea	1720.00	\$86,000	\$0	16	25	9	over 10 Years	Replace fiberglass tubs
									Install low flow 1.7 gpm showerheads
Bathroom Vanity	ea								
Bathroom Vanity (Green)	ea								
Bathroom Sinks	50 ea	420.00	\$21,000		16	25	9	over 10 Years	Wall hung sinks
									Costs to replace
Bathroom Toilets	50 ea	410.00	\$20,500		16	20	1	over 20 Years	1.6 gallon models
									Costs to replace
Bathroom Toilets (Green)	50 ea	440.75	\$22,038	\$1,538	16	20	1	over 20 Years	Costs to install 1.28
Ventilation & Exhaust	50 ea	150.00	\$7,500		16	20	1	over 10 Years	Costs to replace the exhaust fans
Ventilation & Exhaust (Green)	ea								
Accessories	50 ea				16	10			

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
LIVING AREA FINISHES																				
Unit Hallway Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,084	\$3,176	\$3,272	\$3,370	\$3,471	\$3,575	\$3,682
Unit Interior Doors	\$550	\$567	\$583	\$601	\$619	\$638	\$657	\$676	\$697	\$718	\$739	\$761	\$784	\$808	\$832	\$857	\$883	\$909	\$936	\$964
Unit Closet Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Walls and Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors	\$13,828	\$14,243	\$14,670	\$15,110	\$0	\$0	\$0	\$0	\$0	\$0	\$18,584	\$19,141	\$19,716	\$20,307	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors (Green)	\$25,352	\$26,112	\$26,895	\$27,702	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BATHROOMS																				
Bathroom Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathtub and Shower	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,894	\$11,221	\$11,558	\$11,904	\$12,262	\$12,629	\$13,008	\$13,399	\$13,800	\$14,214	\$0	\$0
Bathtub and Shower (Green)	\$925	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,894	\$11,221	\$11,558	\$11,904	\$12,262	\$12,629	\$13,008	\$13,399	\$13,800	\$14,214	\$0	\$0
Bathroom Vanity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Vanity (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Sinks	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,660	\$2,740	\$2,822	\$2,907	\$2,994	\$3,084	\$3,176	\$3,272	\$3,370	\$3,471	\$0	\$0
Bathroom Toilets	\$1,025	\$1,056	\$1,087	\$1,120	\$1,154	\$1,188	\$1,224	\$1,261	\$1,298	\$1,337	\$1,378	\$1,419	\$1,461	\$1,505	\$1,550	\$1,597	\$1,645	\$1,694	\$1,745	\$1,797
Bathroom Toilets (Green)	\$1,102	\$1,135	\$1,169	\$1,204	\$1,240	\$1,277	\$1,316	\$1,355	\$1,396	\$1,438	\$1,481	\$1,525	\$1,571	\$1,618	\$1,667	\$1,717	\$1,768	\$1,821	\$1,876	\$1,932
Ventilation & Exhaust	\$750	\$773	\$796	\$820	\$844	\$869	\$896	\$922	\$950	\$979	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ventilation & Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Accessories	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

DWELLING UNITS--continued

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
KITCHENS											
Kitchen Floors	1,200	sf	5.00	6,000		16	15	1	16	over 3 Years	VCT flooring Costs to replace
Kitchen Floors (Green)	1,200	sf	5.50	6,600	\$600	16	15	1	16	over 3 Years	Install linoleum flooring
Kitchen Cabinets	50	ea	3150.00	157,500		16	25	9		over 3 Years	Plywood cabinetry - good to fair condition Costs to replace
Kitchen Cabinets (Green)	50	ea	3386.25	169,313	\$11,813	16	25				Install FSC certified cabinetry
Kitchen Cabinets		ea									
Kitchen Cabinets (Green)		ea									
Kitchen Countertops	50	ea	553.84	27,692		16	10	1		over 3 Years	Laminated particleboard countertops Costs to replace countertops
Kitchen Countertops (Green)	50	ea	875.00	43,750	\$16,058	16	25	1		over 3 Years	Costs to install recycled content solid surface mat.
Range	50	ea	435.00	21,750		16	20	1		over 8 Years	30-inch range electric range Costs to replace
Range (Green)		ea									
Range		ea									
Range (Green)		ea									
Refrigerator	50	ea	670.00	33,500		16	15	1	16	over 5 Years	Frost-free refrigerators Costs to replace
Refrigerator (Green)	50	ea	720.25	36,013	\$2,513	16	15				Consider installing Energy Star refrigerators
Refrigerator		ea									
Refrigerator (Green)		ea									
Dishwasher		ea									
Dishwasher (Green)		ea									
Rangehood and Vent	50	ea	281.00	14,050		16	20	1		over 5 Years	Ducted rangehood Costs to replace
Disposals		ea									
Miscellaneous		ea									
Miscellaneous (Green)		ea									

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
KITCHENS																				
Kitchen Floors	\$2,000	\$2,060	\$2,122	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,116	\$3,209	\$3,306	\$0	\$0
Kitchen Floors (Green)	\$2,200	\$2,266	\$2,334	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,428	\$3,530	\$3,636	\$0	\$0
Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$66,505	\$68,501	\$70,556	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Countertops	\$9,231	\$9,508	\$9,793	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Countertops (Green)	\$14,583	\$15,021	\$15,471	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range	\$2,719	\$2,800	\$2,884	\$2,971	\$3,060	\$3,152	\$3,246	\$3,344	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator	\$6,700	\$6,901	\$7,108	\$7,321	\$7,541	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,438	\$10,752	\$11,074	\$11,406	\$11,748
Refrigerator (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dishwasher	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dishwasher (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rangehood and Vent	\$2,810	\$2,894	\$2,981	\$3,071	\$3,163	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Disposals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

DWELLING UNITS--continued

Replacement Items	Quantity		Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
IN-UNIT MECHANICAL											
Unit Warm Air Furnaces		ea									
Unit Warm Air Furnaces (Green)		ea									
Unit Thermostats	50	ea	105.00	\$5,250		16	20	1	over 5 Years		Wall mounted mercury dial thermostats Costs to replace
Unit Thermostats (Green)		ea									
Unit Air Conditioning		If									
Unit Air Conditioning (Green)		If									
Unit Radiation		ea									
Unit Radiation (Green)		ea									
Unit Domestic Hot Water		ea									
Unit Domestic Hot Water (Green)		ea									
Hydronic Baseboard Radiators	1,250	If	27.50	\$34,375		16	20	1	over 20 Years		Baseboard Costs to replace damage radiators covers
Hydronic Baseboard Radiators (Green)		If									
IN-UNIT ELECTRICAL											
Unit Electrical Panel	50	ea				16	50				Siemens circuit breakers Monitor
Unit Wiring		ea									
Unit Security Call System	100	ea	195.00	\$19,500		16	20	4	over 10 Years		Emergency pull chains in bedrooms and bathrooms Costs to replace
Unit Smoke/Fire Detection	100	ea	190.00	\$19,000		varies	7	1 8 15	over 7 Years		Smoke detectors in bedrooms and living areas Costs to replace as needed.
Carbon Monoxide Detectors	50	If	190.00	\$9,500		Add	7	1 8 15	in 1 Year		Costs to add Carbon Monoxide Detectors
Carbon Monoxide Detectors (Green)		If									
Unit Lighting		ea									
Unit Lighting (Green)		ea									
Miscellaneous		ea									

<div> <div>The Old Marvin</div> <div>DWELLING UNITS--continued</div> </div>																				
<div> <div>Costs projected at 3%</div> </div>																				
Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
IN-UNIT MECHANICAL																				
Unit Warm Air Furnaces	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Warm Air Furnaces (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Thermostats	\$1,050	\$1,082	\$1,114	\$1,147	\$1,182	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Thermostats (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Air Conditioning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Air Conditioning (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Radiation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Radiation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Domestic Hot Water	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit DHW (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hydronic Beseboard Radiators	\$1,719	\$1,770	\$1,823	\$1,878	\$1,934	\$1,993	\$2,052	\$2,114	\$2,177	\$2,243	\$2,310	\$2,379	\$2,451	\$2,524	\$2,600	\$2,678	\$2,758	\$2,841	\$2,926	\$3,014
Hyd. Baseboard Rads (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
IN-UNIT ELECTRICAL																				
Unit Electrical Panel	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Wiring	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Security Call System	\$0	\$0	\$0	\$2,131	\$2,195	\$2,261	\$2,328	\$2,398	\$2,470	\$2,544	\$2,621	\$2,699	\$2,780	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Smoke/Fire Detection	\$2,714	\$2,796	\$2,880	\$2,966	\$3,055	\$3,147	\$3,241	\$3,338	\$3,438	\$3,542	\$3,648	\$3,757	\$3,870	\$3,986	\$4,106	\$4,229	\$4,356	\$4,486	\$4,621	\$4,760
Carbon Monoxide Detectors	\$9,500	\$0	\$0	\$0	\$0	\$0	\$0	\$11,684	\$0	\$0	\$0	\$0	\$0	\$0	\$14,370	\$0	\$0	\$0	\$0	\$0
Carbon Monoxide Detectors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

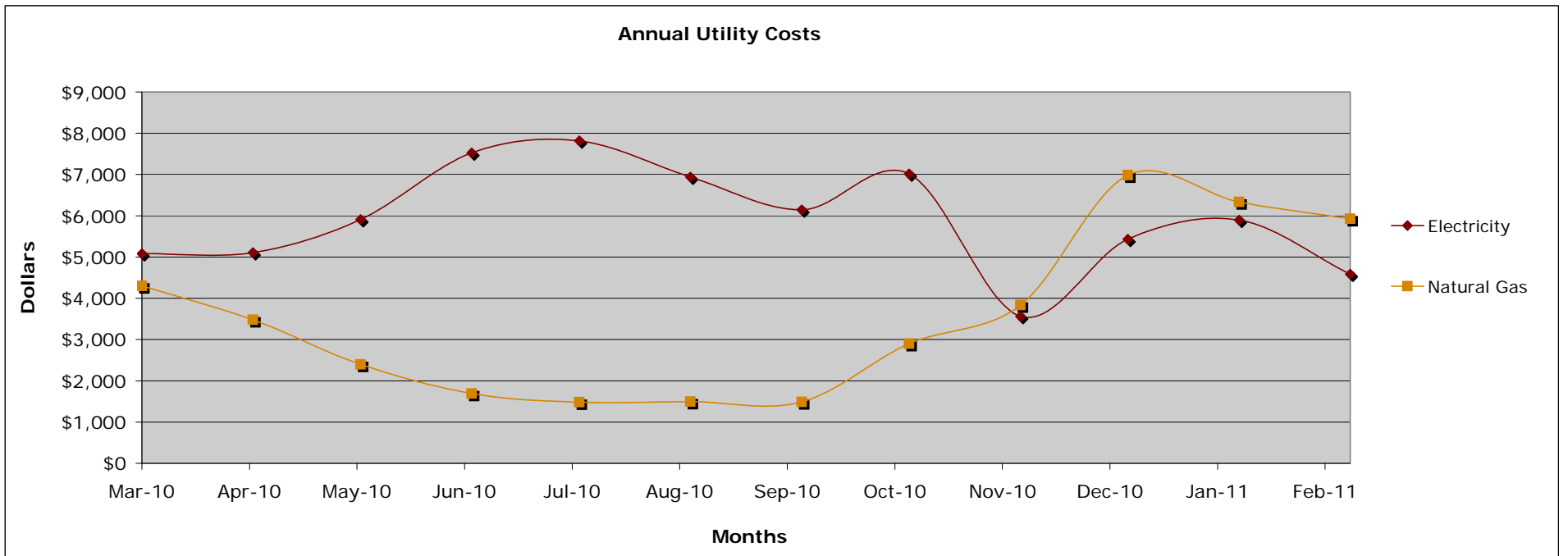
Energy Analysis

Utility Usage

The Old Marvin

The energy analysis portion of this GCNA examines utility bills for the most recent 12 months to summarize at electricity, natural gas, and water/sewer use. The following table and charts show the utility information by utility source, and by mon

	ELECTRICITY		NATURAL GAS		WATER / SEWER				OIL		TOTAL
	kWh	\$	Therms	\$	Gallons	Water \$	Sewer \$	Total \$	Gallons	\$	
Feb-11	23,343	\$4,588	6,605	\$5,929							\$10,517
Jan-11	30,991	\$5,899	7,619	\$6,333							\$12,232
Dec-10	28,463	\$5,433	7,291	\$6,984							\$12,416
Nov-10	17,031	\$3,562	4,188	\$3,834							\$7,396
Oct-10	37,083	\$7,012	3,011	\$2,900							\$9,912
Sep-10	32,419	\$6,143	666	\$1,485							\$7,629
Aug-10	36,856	\$6,939	655	\$1,494							\$8,432
Jul-10	42,223	\$7,819	625	\$1,481							\$9,300
Jun-10	42,301	\$7,526	911	\$1,694							\$9,219
May-10	32,073	\$5,906	2,068	\$2,397							\$8,303
Apr-10	27,808	\$5,105	2,744	\$3,476							\$8,581
Mar-10	28,608	\$5,083	4,506	\$4,300							\$9,383
Total	379,199	\$71,015	40,888	\$42,306							\$113,321
<i>Unit Cost</i>		<i>\$0.187</i>		<i>\$1.0347</i>							



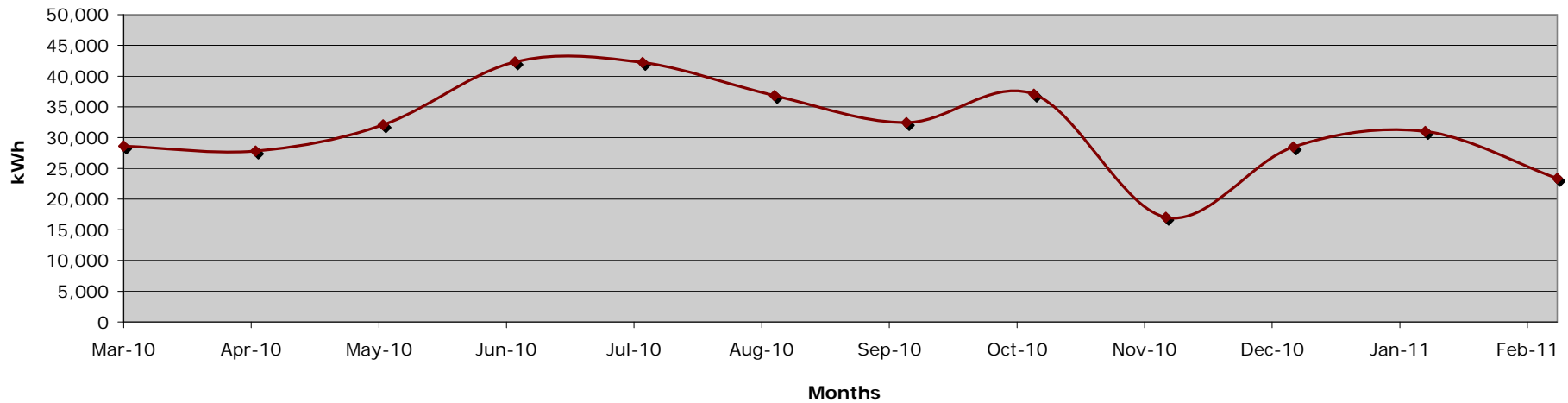
Energy Analysis

Utility Usage, By Type

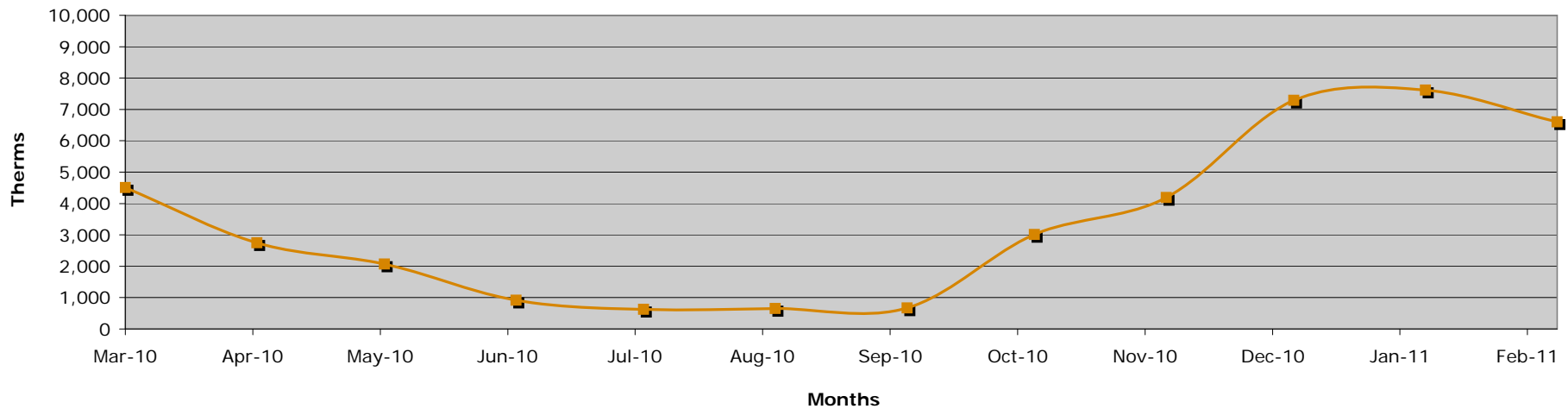
The Old Marvin

Below are graphic presentations of annual usage by utility type for the property.

Electricity



Natural Gas

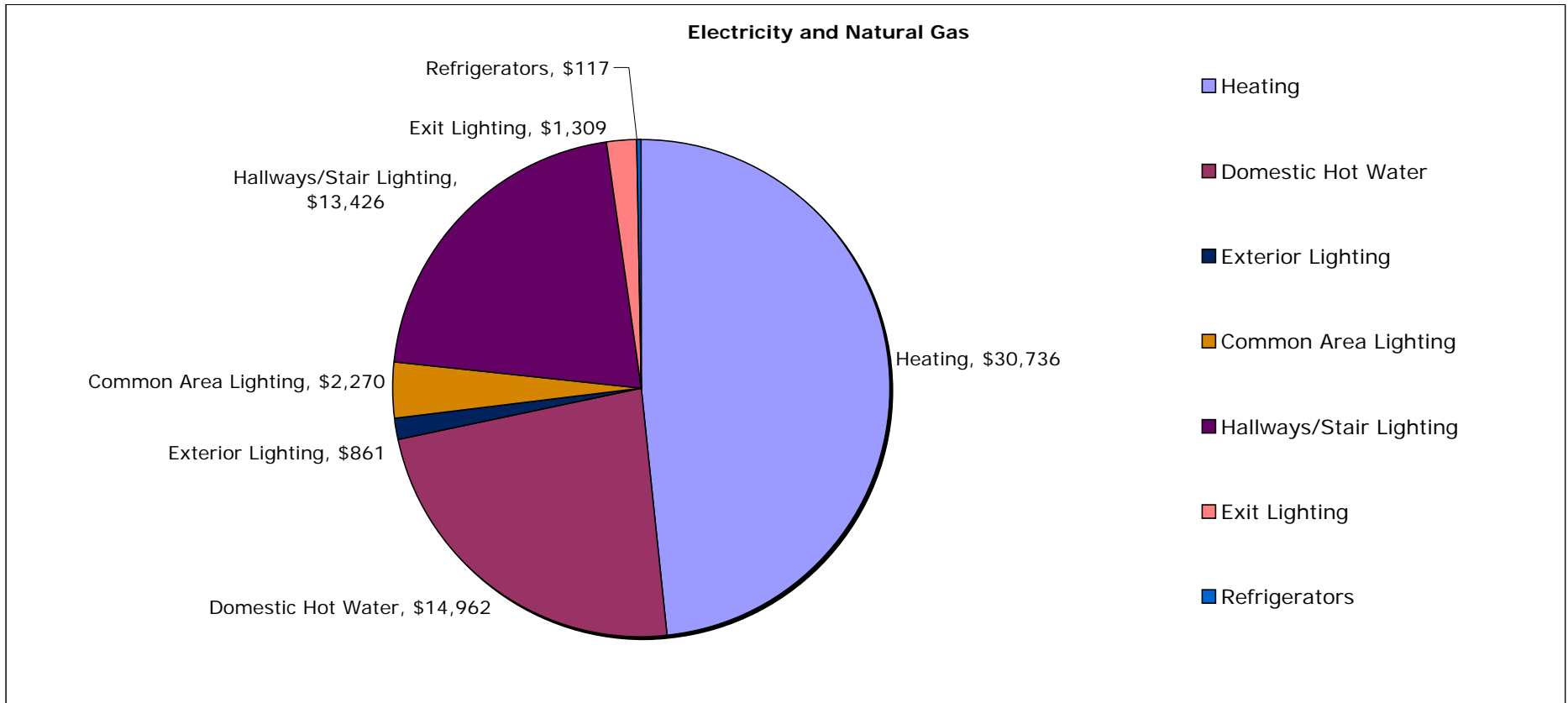


Energy Analysis

Disaggregated End Uses

The Old Marvin

Natural gas is used for space heating and domestic hot water generation. Electricity is used for all other services and appliances. The following chart illustrates the disaggregated costs based on the end uses. Please note: the estimated end uses are base



End Use	Utility	Annual Cost	Annual Usage (kWh)	Annual Usage (therms)	Annual Usage (btu)
Heating	Natural Gas	30736.01558		29,706	2,970,576,652
Domestic Hot Water	Natural Gas	14962.3017		14,461	1,446,077,614
Exterior Lighting	Electricity	\$861	4,599		15,691,786
Common Area Lighting	Electricity	\$2,270	12,123		41,365,295
Hallways/Stair Lighting	Electricity	\$13,426	71,692		244,612,619
Exit Lighting	Electricity	\$1,309	6,991		23,851,595
Refrigerators	Electricity	\$117	624		2,129,089

Energy Analysis

Notes

The Old Marvin

Below are notes regarding the property metering schedule, general billing information, and specific usage details by utility type.

General

The property is master metered for natural gas, water and sewer, and common area electricity (hallways, office, community spaces). The dwelling units are individually metered for electricity consumption.

Natural Gas

Natural gas shows a normal consumption pattern, with spikes during the heating season since the property utilizes natural gas for heating purposes.

Electricity

Electricity is generally higher in the winter months, presumably to a higher demand for lighting caused by daylight savings time. A few of the summer months, particularly July, are showing high usage for electricity. It is assumed that these summer spikes are associated with increased cooling loads.

Water and Sewer

Water and sewer bills were not provided. For savings calculations the national average water/sewer rate was used (\$0.01).

Energy Assumptions Table

Below are the energy assumptions by category that were used as inputs for the TREAT model for the property.

These energy assumptions are based on the following:

1. The physical inspection of the property
2. Diagnostic testing conducted during the inspection
3. The historic utility billing information
4. The building blueprints/plans
5. Information provided by site management and maintenance staff

General

Property Type (Family, Elderly, Commercial): **Family**
 Resident Population Persons: **53**

Space Types

Units, Common Areas Square Footage: **23,562** Conditioned: **Yes**

Utility Metering

Common Spaces	Utility Type:	Electricity	Individual, Master:	Master
Whole Building	Utility Type:	Natural Gas	Individual, Master:	Master
Whole Building	Utility Type:	Water/Sewer	Individual, Master:	Master
Dwelling Units	Utility Type:	Electricity	Individual, Master:	Individual

Infiltration

Infiltration Condition Tight, Leaky: **Very Leaky**
 Infiltration Rate ACH: **1.5**

Architectural

Wall Insulation	Type:	Fiberglass	R-Value:	R-9
Roof Insulation	Type:	Fiberglass/XPS	R-Value:	R-15
Exterior Doors 1	Type:	Flush Metal	R-Value:	< R-5
Exterior Doors 2	Type:	Wood/Glass	R-Value:	< R-5
Windows 1	Type:	Aluminum	U-Factor:	0.87

Heating and Cooling

Temperature Control:

Occupied Heating Temp	Degrees F:	72
Occupied Cooling Temp	Degrees F:	N/A
Unoccupied ¹ Heating Temp	Degrees F:	N/A
Unoccupied ¹ Heating Time	Hours / Day:	0

Boilers / DHW Generation:

Boiler 1	Type:	Natural Gas	Capacity:	1500 MBH	Efficiency:	85%
Domestic Hot Water 1	Type:	Natural Gas	Capacity:	1210 MBH	Efficiency:	85%

¹Unoccupied temps/times based on opportunity for savings based on programmable thermostats

Water & Sewer

Domestic Hot Water:

DHW Daily Usage	Gallons/Resident:	36
DHW Delivery Temp	Degrees F:	120

Domestic Cold Water:

Showerheads	Gallons / Minute:	2
Toilets	Gallons / Flush:	1.6
Irrigation	Gallons / Year:	None

Lighting Loads

Hallway	Type:	Fluorescent	Wattage:	26-56	Hours per Day:	24
Exit Lighting	Type:	Fluorescent	Wattage:	21	Hours per Day:	24
Community / Office	Type:	Fluorescent	Wattage:	26-50	Hours per Day:	4-8
Exterior	Type:	Mercury Vapor	Wattage:	50	Hours per Day:	12

Appliances, Miscellaneous Loads

Range	Energy Star (Y/N):	No	Usage per Year:	
Refrigerator	Energy Star (Y/N):	No	Usage per Year:	624 kWh

Simple Payback Analysis

EWCM #1 Convert Lighting - Exterior

Replacement Costs

A. Total cost to convert interior fluorescent lighting to LED lamps: \$17,050.00

Utility Cost

Electricity: \$0.19
Natural Gas: \$1.03

Existing Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	Wallpacks	150	12	12	365	7,884	\$1,476.48
Type 2:	Site Lighting	150	4	12	365	2,628	\$492.16
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						10,512	\$1,968.64

Proposed Green Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	LED Wallpacks	34	12	12	365	1,787	\$334.67
Type 2:	LED Site Lighting	34	4	12	365	596	\$111.56
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						2,383	\$446.23

Annual Electric Savings

27,737,103 BTUs
8,129.28 kWh
Savings = 8,129.28 x \$0.19 = \$1,522.42/yr

Annual Natural Gas Savings¹

0 BTUs
therms
Savings = 0.00 x \$1.03 = \$0.00/yr

Annual Net Cost Savings

\$1,522.42 + \$0.00 = \$1,522.42

5. Simple Payback

\$17,050.00 / \$1,522.42 = 11.20 yrs

Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced lighting load (wattage); therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #2 Replace Boiler

Description:

One standard efficiency atmospherically vented boiler provide heat for The Old Marivin. The boiler consists of five modules and weaheer controls. The boiler has a total rated input capacity of 1500 MBH each. This worksheet evaluates the potential benefit of installing high efficiency condensing boilers equipped with weather controls and return water sensors.

Replacement Costs

	Type	Cost
A. Proposed Conventional:	In-kind Replacement	\$36,000.00
B. Proposed Green:	Condensing Boiler w/ Weather Controls	\$38,700.00
C. Incremental Cost Between Proposed Conventional and Proposed Green:		\$2,700.00

Boiler Efficiencies

A. Existing Efficiency:	85%
B. Conventional Efficiency:	85%
C. Green Efficiency:	93%

Annual Utility Cost

	Existing	Conventional	Green
	2,970,576.652 btus	2,970,576.652 btus	2,431,302.112 btus
	29705.77 therms	29705.77 therms	24313.02 therms
Utility Cost	\$1.03 /therm	\$1.03 /therm	\$1.03 /therm
Heating Cost	\$30,729.11	\$30,729.11	\$25,150.59

Annual Savings: Existing to Conventional

Savings = \$30,729.11 - \$30,729.11 = \$0.00 /yr

Annual Savings: Conventional to Green

Savings = \$30,729.11 - \$25,150.59 = \$5,578.52 /yr

Annual Savings: Existing to Green

Savings = \$0.00 + \$5,578.52 = \$5,578.52 /yr

Simple Payback: Conventional

\$36,000.00 / \$0.00 = N/A yrs

Simple Payback: Green

\$38,700.00 / \$5,578.52 = 6.9 yrs

Incremental Payback: Conventional to Green

\$2,700.00 / \$5,578.52 = 0.5 yrs

Simple Payback Analysis

EWCM #3 Replace DHW Tank

Description:

The facility is served by a dedicated DHW boiler equipped with two 500 gallon storage tanks. The boiler has a rated input capacity of 1,210 MBH. This worksheet explored the potential benefit of replacing the exiting boiler with a comparable sized high efficiency condensing model with stainless steel, insulated storage tanks.

Replacement Costs

	Type	Cost
A. Proposed Conventional:	In-kind Replacement	\$32,620.00
B. Proposed Green:	Condensing Model (eff. 93%)	\$35,017.00
C. Incremental Cost Between Proposed Conventional and Proposed Green:		\$2,397.00

Boiler Efficiencies

A. Existing Efficiency:	85%
B. Conventional Efficiency:	85%
C. Green Efficiency:	93%

Annual Utility Cost

	Existing	Conventional	Green
	1,446,077.614 btus	1,446,077.614 btus	1,340,524.527 btus
	14460.78 therms	14460.78 therms	13405.25 therms
Utility Cost	\$1.03 /therm	\$1.03 /therm	\$1.03 /therm
Heating Cost	\$14,958.94	\$14,958.94	\$13,867.05

Annual Savings: Existing to Conventional

Savings = \$14,958.94 - \$14,958.94 = \$0.00 /yr

Annual Savings: Conventional to Green

Savings = \$14,958.94 - \$13,867.05 = \$1,091.89 /yr

Annual Savings: Existing to Green

Savings = \$0.00 + \$1,091.89 = \$1,091.89 /yr

Simple Payback: Conventional

\$32,620.00 / \$0.00 = N/A yrs

Simple Payback: Green

\$35,017.00 / \$1,091.89 = 32.1 yrs

Incremental Payback: Conventional to Green

\$2,397.00 / \$1,091.89 = 2.2 yrs

Simple Payback Analysis

EWCM #4 Replace Exterior Glass Doors

Replacement Costs		
	Type	Cost
A. Proposed Conventional	Glass/metal doors	\$15,395.00
B. Proposed Green	Insulated models w/ low-e & double glazing	\$16,549.63
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$1,154.63

Utility Costs		
A. Cost of electricity:		\$0.19 (\$/kWh)
B. Cost of natural gas:		\$1.03 (\$/therm)

U-Factor ¹		
A. Existing:		1.27
B. Conventional:		1.27
C. Green:		0.35

Annual Savings: Existing to Conventional					
Electric Savings =	\$0.19	x	0.00	=	0 BTUs 0 kWh \$0.00 /yr
Natural Gas Savings =	\$1.03	x	0.00	=	0 BTUs 0 therms \$0.00 /yr
Net Savings =				=	\$0.00 /yr

Annual Savings: Conventional to Green					
Electric Savings =	\$0.19	x	0.00	=	0 BTUs 0 kWh \$0.00 /yr
Natural Gas Savings =	\$1.03	x	108.00	=	10,800,000 BTUs 108.00 therms \$111.72 /yr
Net Savings =				=	\$111.72 /yr

Annual Savings: Existing to Green					
	\$0.00	+	\$111.72	=	\$111.72 /yr

Simple Payback: Conventional					
	\$15,395.00	/	\$0.00	=	N/A yrs
Simple Payback: Green					
	\$16,549.63	/	\$111.72	=	148.1 yrs
Incremental Payback: Conventional to Green					
	\$1,154.63	/	\$111.72	=	10.3 yrs

Additional Notes/Comments:
 1 The U-factors were derived from the 2001 ASHRAE Fundamentals Handbook, based on the specifications in the plan

Simple Payback Analysis

EWCM #5 Replace Windows

Replacement Costs		
	Type	Cost
A. Proposed Conventional	In-Kind Replacement	\$283,795.00
B. Proposed Green	Insulated Fiberglass Models w/ Argon	\$305,079.00
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$21,284.00

Utility Costs		
A. Cost of electricity:		\$0.19 (\$/kWh)
B. Cost of natural gas:		\$1.03 (\$/therm)

U-Factor ¹		
A. Existing:		.87-.69
B. Conventional:		.87-.69
C. Green:		.67-.48

Annual Savings: Existing to Conventional				
Electric Savings =	\$0.19	x	0.00	=
				0 BTUs
				0.00 kWh
				\$0.00 /yr
Natural Gas Savings =	\$1.03	x	0.00	=
				0 BTUs
				0.00 therms
				\$0.00 /yr
Net Savings =				\$0.00 /yr

Annual Savings: Conventional to Green				
Electric Savings =	\$0.19	x	0.00	=
				0 BTUs
				0.00 kWh
				\$0.00 /yr
Natural Gas Savings =	\$1.03	x	2291.00	=
				229,100,000 BTUs
				2291.00 therms
				\$2,369.92 /yr
Net Savings =				\$2,369.92 /yr

Annual Savings: Existing to Green				
	\$0.00	+	\$2,369.92	=
				\$2,369.92 /yr

Simple Payback: Conventional				
	\$283,795.00	/	\$0.00	=
				N/A yrs
Simple Payback: Green				
	\$305,079.00	/	\$2,369.92	=
				128.7 yrs
Incremental Payback: Conventional to Green				
	\$21,284.00	/	\$2,369.92	=
				9.0 yrs

Additional Notes/Comments:
 1 The U-factors were derived from the 2001 ASHRAE Fundamentals Handbook, based on the specifications in the plan

Simple Payback Analysis

EWCM #6 Replace Roof and Add Roof Insulation

Replacement Costs		Type	Cost
A. Proposed Conventional:		Maintain Existing (Approx. R-15)	\$ 143,489.00
B. Proposed Green:		Increase Overall Roof Insulation (Approx R30)	\$ 168,810.00
C. Incremental Cost Between Proposed Conventional and Proposed Green:			\$ 25,321.00

Existing Conditions			
A. Roof area:		16,881	sf
B. Type of existing roof structure:		Flat	
C. Utility Cost:	Gas	\$1.03	/therm
D. Existing Heating Efficiency:		85%	

R-Value		
A. Existing:		< 15
B. Conventional:		< 15
C. Proposed Green:		> 30

Annual Cooling Savings:		
		0 BTUs
		0.00 kWh
Savings =	\$0.19 x 0.00 =	\$0.00/yr

Annual Heating Savings:		
		16,700,000 BTUs
		167.00 therms
Savings =	\$1.03 x 167.00 =	\$172.75/yr

Annual Net Savings:		
		16,700,000 BTUs
Savings =	\$0.00 x \$172.75 =	\$172.75/yr

Simple Payback: Green			
\$168,810.00	/	\$172.75	= 977.2 yrs
Incremental Payback: Conventional to Green			
\$25,321.00	/	\$172.75	= 146.6 yrs

Simple Payback Analysis

EWCM #7 Convert Lighting - Hallways/Lobby/Stairs

Replacement Costs

A. Total cost to convert interior fluorescent lighting to LED lamps: \$15,480.000

Utility Cost

Electricity: \$0.19
Natural Gas: \$1.03

Existing Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	Hallway Recessed CFL	26	99	24	365	22,548	\$4,222.73
Type 2:	Hallway Wall T12 Fluorescent	45	42	24	365	16,556	\$3,100.61
Type 3:	Stairwell T12 Fluorescent	55	24	24	365	11,563	\$2,165.50
Type 4:	Great Room	80	30	24	365	21,024	\$3,937.28
Type 5:						0	\$0.00
Total:						71,692	\$13,426.13

Proposed Green Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	Hallway LED	5	99	24	365	4,336	\$812.06
Type 2:	Hallway Wall LED	8	42	24	365	2,943	\$551.22
Type 3:	Stairwell T12 LED	15	24	24	365	3,154	\$590.59
Type 4:	Great Room LED	30	30	24	365	7,884	\$1,476.48
Type 5:						0	\$0.00
Total:						18,317	\$3,430.36

Annual Electric Savings

182,114,408 BTUs
53,374.68 kWh
Savings = 53,374.68 x \$0.19 = \$9,995.77/yr

Annual Natural Gas Savings¹

-36,900,000 BTUs
-369.00 therms
Savings = -369.00 x \$1.03 = -\$381.71/yr

Annual Net Cost Savings

\$9,995.77 + -\$381.71 = \$9,614.06

5. Simple Payback

\$15,480.00 / \$9,614.06 = 1.61 yrs

Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced lighting load (wattage); therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #8 Convert Lighting - Common Area

Replacement Costs

A. Total cost to convert fluorescent lamps to LED lamps and add controls:

\$9,235.00

Utility Cost

Electricity: \$0.19
Natural Gas: \$1.03

Existing Types / Usage

Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1: Support Room T8	68	35	0.5	250	298	\$55.71
Type 2: Common Area	90	13	10.0	365	4,271	\$799.76
Type 3: Community T12 U-Lamps	90	23	10.0	365	7,556	\$1,414.96
Type 4:					0	\$0.00
Type 5:					0	\$0.00
Total:				12,124	\$2,270.43	

Proposed Green Types / Usage

Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1: Support Room T8	30	35	0.4	250	105	\$19.66
Type 2: Common Area	30	13	9.0	365	1,281	\$239.93
Type 3: Community T12 U-Lamps	30	23	9.0	365	2,267	\$424.49
Type 4:					0	\$0.00
Type 5:					0	\$0.00
Total:				3,653	\$684.08	

Annual Electric Savings

28,902,028 BTUs

8,470.70 kWh

Savings = 8,470.70 x \$0.19 = \$1,586.35/yr

Annual Natural Gas Savings¹

-1,229,400 BTUs

-34.00 therms

Savings = -34.00 x \$1.03 = -\$35.17/yr

Annual Net Cost Savings

\$1,586.35 + -\$35.17 = \$1,551.18

5. Simple Payback

\$9,235.00 / \$1,551.18 = 5.95 yrs

Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced lighting load (wattage); therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #9 Convert Exit Lighting

Replacement Costs

A. Total cost to convert fluorescent fixtures to LED:

\$2,090.00

Utility Cost

Electricity: \$0.19
Natural Gas: \$1.03

Existing Types / Usage

Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1: Existing Exit Lighting	21	38	24	365	6,990	\$1,309.15
Type 2:					0	\$0.00
Total:					6,990	\$1,309.15

Proposed Green Types / Usage

Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1: LED Fixtures	4	38	24	365	1,332	\$249.36
Type 2:					0	\$0.00
Total:					1,332	\$249.36

Annual Electric Savings

19,308,372 BTUs
5658.96 kWh
Savings = 5,658.96 x \$0.19 = \$1,059.78/yr

Annual Natural Gas Savings¹

-7,500,000 BTUs
-75.00 therms
Savings = -75.00 x \$1.03 = -\$77.58/yr

Annual Net Cost Savings

\$1,059.78 + -\$77.58 = \$982.20

5. Simple Payback

\$2,090.00 / \$982.20 = 2.13 yrs

Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced lighting load (wattage); therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #10 Replace Refrigerators - Common Area

Replacement Costs

A. Proposed Conventional	\$670.00
B. Proposed Green	\$720.25
C. Incremental Cost Between Proposed Conventional and Proposed Green	\$50.25

Electricity:	\$0.19
Natural Gas:	\$1.03

Existing Conditions

A. Existing refrigerator type	Frost-free
B. Number of refrigerators	1
C. Average annual energy use per refrigerator	624 kWh / Year
D. Total annual energy use	624.00 kWh / Year
E. Total annual operational cost	\$116.86 \$ / Year

Proposed Conventional Conditions

A. Proposed standard refrigerator type	Frost-free
B. Number of refrigerators	1
C. Average annual energy use per refrigerator	624 kWh / Year
D. Total annual energy use	624.00 kWh / Year
E. Total annual operational cost	\$116.86 \$ / Year

Proposed Green Conditions

A. Proposed green refrigerator type	Energy Star
B. Number of refrigerators	1
C. Average annual energy use per refrigerator	496 kWh / Year
D. Total annual energy use	496.00 kWh / Year
E. Total annual operational cost	\$92.89 \$ / Year

Annual Savings: Existing to Proposed Conventional

Electricity:	\$0.19	x	0.00	=	\$0.00	\$ / Year
Natural Gas ¹ :	\$1.03	x	0.00	=	\$0.00	\$ / Year
Total:				=	\$0.00	\$ / Year

Annual Savings: Proposed Conventional to Proposed Green

Electricity:	\$0.19	x	128.00	=	\$23.97	\$ / Year
Natural Gas ¹ :	\$1.03	x	-9.00	=	-\$9.31	\$ / Year
Total:				=	\$14.66	\$ / Year

Annual Savings: Existing to Proposed Green

Electricity:	\$0.19	x	128.00	=	\$23.97	\$ / Year
Natural Gas ¹ :	\$1.03	x	-9.00	=	-\$9.31	\$ / Year
Total:				=	\$14.66	\$ / Year

Simple Payback: Conventional

1B	\$670.00	/	10	\$0.00	=	N/A	yrs
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Simple Payback: Green

\$720.25	/	\$14.66	=	49.13	yrs
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Incremental Payback: Proposed Conventional to Proposed Green

\$50.25	/	\$14.66	=	3.43	yrs
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Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced refrigerator wattage; therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #11 Replace Washing Machines - Common Area

1. Replacement Costs

- A. Proposed Conventional
B. Proposed Green
C. Incremental Cost Between Proposed Conventional and Proposed Green

Leased
Leased
Leased

2. Existing Conditions

- A. Total number of inefficient washing machines
B. Estimated number of total annual cycles/washer¹

2
780

3. Annual Energy and Water Use Existing Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	158.00	x	\$1.03	=	\$163.44
Electric (kWh):	374	x	\$0.19	=	\$70.04
Water/Sewer (gal):	53,944.00	x	\$0.0000	=	\$0.00
					3
					\$233.48

4. Annual Energy and Water Use Proposed Conventional Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	158.00	x	\$1.03	=	\$163.44
Electric (kWh):	374.00	x	\$0.19	=	\$70.04
Water/Sewer (gal):	53944.00	x	\$0.0000	=	\$0.00
					4
					\$233.48

5. Annual Energy and Water Use Proposed Green Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	82.00	x	\$1.03	=	\$84.82
Electric (kWh):	126.00	x	\$0.19	=	\$23.60
Water/Sewer (gal):	22,828.00	x	\$0.0000	=	\$0.00
					5
					\$108.42

6. Annual Savings: Existing to Proposed Conventional

3		4		6	
\$233.48	-	\$233.48	=	\$0.00	/yr

7. Annual Savings: Proposed Conventional to Proposed Green

4		5		7	
\$233.48	-	\$108.42	=	\$125.06	/yr

8. Annual Natural Gas Savings²

Cost/therm		therms			
\$1.03	x	76.00	=	\$78.62	/yr

9. Simple Payback: Existing to Proposed Green

Leased / (\$0.00 + \$203.68) = #VALUE! yrs

Incremental Payback: Proposed Conventional to Proposed Green

Leased / \$203.68 = #VALUE! yrs

Additional Notes/Comments:

¹ This worksheet assumes that on average, residents use the washing machines 1-2 times bi-weekly (≈1560 loads per year, or 780 loads per machine)

Costs are not carried for washing machine replacement, since the laundry equipment is maintained under the terms of a leasing agreement; the efficacy of this measure depends on the availability of Energy Star rated equipment from the lessor.

Simple Payback Analysis

EWCM #12 Replace Showerheads - Dwelling Units

Installation Costs

Costs to install low-flow (1.7 gpm) showerheads: \$925.00

Utility Costs

Water & Sewer: \$0.0100
Natural Gas: \$1.03

Existing Conditions

A. Number of showerheads 50
B. Number of showers per day per showerhead 1.0
C. Average number of minutes per shower 14.00
D. Showerhead flowrate 2.50

Proposed Green Conditions

A. Number of showerheads 50
B. Number of showers per day per showerhead 1.0
C. Average number of minutes per shower 14.00
D. Showerhead flowrate 1.70

Annual Usage: Existing

Water & Sewer

365 x 50 x 1 x 14 x 2.50
Total Domestic Cold Water Usage: 638,750 gal / Year

Natural Gas

Total Domestic Hot Water Usage¹: 511,000 gal / Year
511000.00 x 65 x 8.335 = 276,847,025 btus / Year²
276847025.00 / 100,000 = 2768.47 therms / Year

Annual Usage: Proposed Green

Water & Sewer

365 x 50 x 1 x 14 x 1.70
Total Domestic Cold Water Usage = 434,350 gal / Year

Natural Gas

Total Domestic Hot Water Usage¹: 347,480 gal / Year
347480.00 x 65 x 8.335 = 188,255,977 btus / Year²
188255977.00 / 100,000 = 1882.56 therms / Year

Annual Savings: Existing to Proposed Green

Water & Sewer: 638,750.00 - 434,350.00 = 204,400.00 gal / Year
\$0.0100 x 204,400.00 = \$2,044.00 \$ / Year
Natural Gas: 2,768.47 - 1,882.56 = 885.91 therms / Year
\$1.03 x 885.91 = \$916.43 \$ / Year

Simple Payback: Green

\$925.00 / (\$2,044.00 + \$916.43) = 0.31 yrs

Simple Payback Analysis

EWCM #13 Replace Toilets - Dwelling Units

Replacement Costs

A. Proposed Conventional	\$20,500.00
B. Proposed Green	\$22,038.00
C. Incremental Cost Between Proposed Conventional and Proposed Green	\$1,538.00

Existing Conditions

A. Total number of existing toilets	50	
B. Average gallons per flush:	1.6	
C. Estimated total number of flushes per day:	5.0	
D. Estimated total daily usage per toilet:	8	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0100	(\$/gal)

Proposed Conditions: Conventional Models

A. Total number of toilets	50	
B. Average gallons per flush:	1.6	
C. Estimated total number of flushes per day	5.0	
D. Estimated total daily usage per toilet:	8	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0100	(\$/gal)

Proposed Conditions: Green Models

A. Total number of toilets	50	
B. Average gallons per flush:	1.28	
C. Estimated total number of flushes per day	5.0	
D. Estimated total daily usage per toilet:	6	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0100	(\$/gal)

Annual Water Use: Existing Models

$$50 \times 8 \times 365 = 146,000 \text{ gal/yr}$$

Annual Water Use: Proposed Conventional Models

$$50 \times 8 \times 365 = 146,000 \text{ gal/yr}$$

Annual Water Use: Proposed Green Models

$$50 \times 6 \times 365 = 116,800 \text{ gal/yr}$$

Annual Savings: Existing to Proposed Conventional Models

$$146,000 - 146,000 \times \$0.01 = \$0.00 \text{ \$/yr}$$

Annual Savings: Proposed Conventional to Proposed Green Models

$$146,000 - 116,800 \times \$0.01 = \$292.00 \text{ \$/yr}$$

Annual Savings: Existing to Proposed Green Models

$$\$0.00 + \$292.00 = \$292.00 \text{ \$/yr}$$

Simple Payback: Conventional

$$\frac{\$20,500.00}{\$0.00} = \text{N/A} \text{ yrs}$$

Simple Payback: Green

$$\frac{\$22,038.00}{\$292.00} = 75.47 \text{ yrs}$$

Incremental Payback: Proposed Conventional to Proposed Green Models

$$\frac{\$1,538.00}{\$292.00} = 5.27 \text{ yrs}$$

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 1 Convert Lighting - Exterior

Mercury Vapor Lamps	vs.	LED Fixtures
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	20
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Conventional Product: Mercury Vapor Lamps									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Replace Exterior Fixtures	4	ea	\$2,570.00	\$10,280	20	1	1.0	\$10,280	\$10,280
Install/Replace	Wallpacks	12	ea	\$465.00	\$5,580	15	1	1.3	\$7,750	\$6,809
Utility Cost	Electricity	10,512	kWh	\$0.19	\$1,969	1	1	20.0	\$52,898	\$26,045
Total Life Cycle Cost									\$70,929	\$43,134
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$70,929	\$43,134

Green Product: LED Fixtures									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Replace Exterior Fixtures	4	ea	\$2,762.75	\$11,051	20	1	1.0	\$11,051	\$11,051
Install/Replace	Wallpacks	12	ea	\$499.88	\$5,999	15	1	1.3	\$8,332	\$7,320
Utility Cost	Electricity	2,383	kWh	\$0.19	\$446	1	1	20.0	\$11,992	\$5,904
Total Life Cycle Cost									\$31,374	\$24,275
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$31,374	\$24,275

ECONOMIC RETURN ANALYSIS		PRODUCT RECOMMENDATION	
Green NPV	\$18,859	Recommendation based on Economic Return Analysis	
Green IRR	n/a	Green Product:	LED Fixtures
		Override with Green Product?	No
		Final Product Choice	
		Green Product:	LED Fixtures

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 1 Convert Lighting - Exterior

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: LED Fixtures

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Replace Exterior Fixtures	4	ea	\$2,762.75	\$11,051	20	1	1.0	\$11,051	\$11,051
Install/Replace	Wallpacks	12	ea	\$499.88	\$5,999	15	1	1.3	\$8,332	\$7,320
Utility Cost	Electricity	2,383	kWh	\$0.19	\$446	1	1	20.0	\$11,992	\$5,904
Total Life Cycle Cost									\$31,374	\$24,275
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$31,374	\$24,275

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 2 Replace Boilers

Standard Efficiency Model (85%)	vs.	Condensing Boilers w/ Weather controls (93%)
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	25
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Conventional Product: Standard Efficiency Model (85%)									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Standard Eff.	1	ea	\$36,000.00	\$36,000	25	1	1.0	\$36,000	\$36,000
Utility Cost	Natural Gas	29,706	therms	\$1.03	\$30,729	1	1	25.0	\$1,120,360	\$460,821
Total Life Cycle Cost									\$1,156,360	\$496,821

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$1,156,360	\$496,821

Green Product: Condensing Boilers w/ Weather controls (93%)									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Condensing model	1	ea	\$38,700.00	\$38,700	20	1	1.3	\$49,595	\$44,392
Utility Cost	Natural Gas	24,313	therms	\$1.03	\$25,151	1	1	25.0	\$916,971	\$377,164
Total Life Cycle Cost									\$966,566	\$421,556

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$966,566	\$421,556

ECONOMIC RETURN ANALYSIS

Green NPV	\$75,265
Green IRR	n/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis	
Green Product:	Condensing Boilers w/ Weather controls (93%)
Override with Green Product?	No
Final Product Choice	
Green Product:	Condensing Boilers w/ Weather controls (93%)

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 2 Replace Boilers

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

4

Replacement Year

5

Final Product Choice

Green Product: Condensing Boilers w/ Weather controls (93%)

Immediate Replacement

Immediate Replacement				Year	1				Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Condensing model	1	ea	\$38,700.00	\$38,700	20	1	1.3	\$49,595	\$44,392
Utility Cost	Natural Gas	24,313	therms	\$1.03	\$25,151	1	1	25.0	\$916,971	\$377,164
Total Life Cycle Cost									\$966,566	\$421,556
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$966,566	\$421,556

Replacement at End of Remaining Useful Life

Replacement at End of Remaining Useful Life				Year	5					
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Condensing model	1	ea	\$38,700.00	\$38,700	20	5	1.1	\$47,491	\$32,636
Utility Cost	Natural Gas	24,313	therms	\$1.03	\$25,151	1	5	21.0	\$811,751	\$283,335
<i>Expenses for Current Product Through Useful Life</i>										
Utility Cost	Natural Gas	29,706	therms	\$1.03	\$30,729	1	1	4.0	\$128,559	\$114,641
Total Life Cycle Cost									\$987,800	\$430,612

ECONOMIC RETURN ANALYSIS

Timing NPV	\$9,056
Timing IRR	19.05%

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:**
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 3 Replace DHW Tanks

In- Kind Replacement

(Conventional Product)

vs.

High Efficiency Condensing Boiler

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term25

Conventional Product: In- Kind Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	In-Kind Repleacement	1	ea	\$26,620.00	\$26,620	25	1	1.0	\$26,620	\$26,620
Install/Replace	Tank Replacement	2	ea	\$3,000.00	\$6,000	15	1	1.7	\$11,282	\$8,306
Utility Cost	Natural Gas	14,461	therms	\$1.03	\$14,959	1	1	25.0	\$545,389	\$224,327
Total Life Cycle Cost									\$583,291	\$259,252
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$583,291	\$259,252

Green Product: High Efficiency Condensing Boiler									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	Condensing Boiler	1	ea	\$28,616.50	\$28,617	20	1	1.3	\$36,672	\$32,825
Install/Replace	Insulated Tank	2	ea	\$3,200.00	\$6,400	15	1	1.7	\$12,034	\$8,859
Utility Cost	Natural Gas	13,405	therms	\$1.03	\$13,867	1	1	25.0	\$505,582	\$207,954
Total Life Cycle Cost									\$554,289	\$249,638
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$554,289	\$249,638

ECONOMIC RETURN ANALYSIS

Green NPV\$9,614

Green IRR89.2%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product:High Efficiency Condensing Boiler

Override with Green Product?No

Final Product Choice

Green Product:High Efficiency Condensing Boiler

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 3 Replace DHW Tanks

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

9

Replacement Year

10

Final Product Choice

Green Product:

High Efficiency Condensing Boiler

Immediate Replacement

				Year	1						Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted		
Install/Replace	Condensing Boiler	1	ea	\$28,616.50	\$28,617	20	1	1.3	\$36,672	\$32,825		
Install/Replace	Insulated Tank	2	ea	\$3,200.00	\$6,400	15	1	1.7	\$12,034	\$8,859		
Utility Cost	Natural Gas	13,405	therms	\$1.03	\$13,867	1	1	25.0	\$505,582	\$207,954		
Total Life Cycle Cost										\$554,289	\$249,638	

Energy Savings

Net Life Cycle Cost after Energy Savings										\$554,289	\$249,638	

Replacement at End of Remaining Useful Life

				Year	10							
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted		
Install/Replace	Condensing Boiler	1	ea	\$28,616.50	\$28,617	20	10	0.8	\$25,704	\$16,844		
Install/Replace	Insulated Tank	2	ea	\$3,200.00	\$6,400	15	10	1.1	\$9,218	\$4,314		
Utility Cost	Natural Gas	13,405	therms	\$1.03	\$13,867	1	10	16.0	\$364,705	\$103,931		

Expenses for Current Product Through Useful Life

Utility Cost	Natural Gas	14,461	therms	\$1.03	\$14,959	1	1	9.0	\$151,969	\$112,213		
Total Life Cycle Cost										\$551,595	\$237,301	

Energy Savings

Net Life Cycle Cost after Energy Savings										\$551,595	\$237,301	

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$12,337)
Timing IRR	(1.42%)

TIMING RECOMMENDATION

Replacement Year: 10

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 4 Replace Exterior Glass Doors

In-Kind Replacement	vs.	Insulated Fiberglass w/ Double Glazing
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	30
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Conventional Product: In-Kind Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	In-kind Replacement	1	Is	\$15,395.00	\$15,395	30	1	1.0	\$15,395	\$15,395
Total Life Cycle Cost									\$15,395	\$15,395

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$15,395	\$15,395

Green Product: Insulated Fiberglass w/ Double Glazing									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	High Eff. Replacemet	1	ea	\$16,549.63	\$16,550	30	1	1.0	\$16,550	\$16,550
Total Life Cycle Cost									\$16,550	\$16,550

Energy Savings										
Utility Cost	Heating/Cooling Savings	1	Is	\$111.72	(\$112)	1	1	30.0	(\$5,315)	(\$1,831)
Net Life Cycle Cost after Energy Savings									\$11,234	\$14,719

ECONOMIC RETURN ANALYSIS

Green NPV	\$676
Green IRR	13.3%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis	
Green Product:	Insulated Fiberglass w/ Double Glazing
Override with Green Product?	No
Final Product Choice	
Green Product:	Insulated Fiberglass w/ Double Glazing

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 4 Replace Exterior Glass Doors

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

14
15

Final Product Choice

Green Product: Insulated Fiberglass w/ Double Glazing

Immediate Replacement

				Year	1				Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	High Eff. Replacemet	1	ea	\$16,549.63	\$16,550	30	1	1.0	\$16,550	\$16,550
Total Life Cycle Cost									\$16,550	\$16,550

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$111.72	(\$112)	1	1	30.0	(\$5,315)	(\$1,831)
Net Life Cycle Cost after Energy Savings									\$11,234	\$14,719

Replacement at End of Remaining Useful Life

				Year	15					
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	High Eff. Replacemet	1	ea	\$16,549.63	\$16,550	30	15	0.5	\$6,833	\$6,569

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$6,833	\$6,569

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$111.72	(\$112)	1	15	16.0	(\$3,406)	(\$661)
Net Life Cycle Cost after Energy Savings									\$3,426	\$5,909

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$8,810)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 15

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM):

5

Replace Windows

In-Kind Replacement

vs.

Insulated Fiberglass w/ Argon & Low-E

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

30

Conventional Product:

In-Kind Replacement

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	In-Kind Replacement	98	ea	1282.50	\$125,685	30	1	1.0	\$125,685	\$125,685
Install/Replace	In-Kind Replacement	194	ea	\$815.00	\$158,110	30	1	1.0	\$158,110	\$158,110

Total Life Cycle Cost

\$283,795

\$283,795

Energy Savings

Net Life Cycle Cost after Energy Savings									\$283,795	\$283,795

Green Product:

Insulated Fiberglass w/ Argon & Low-E

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Fiberglass framed Models	98	ea	1378.69	\$135,111	30	1	1.0	\$135,111	\$135,111
Install/Replace	Fiberglass framed Models	194	ea	\$876.13	\$169,968	30	1	1.0	\$169,968	\$169,968

Total Life Cycle Cost

\$305,080

\$305,080

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$2,369.92	(\$2,370)	1	1	30.0	(\$112,750)	(\$38,842)
Net Life Cycle Cost after Energy Savings									\$192,330	\$266,237

ECONOMIC RETURN ANALYSIS

Green NPV	\$17,558
Green IRR	15.4%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Insulated Fiberglass w/ Argon & Low-E

Override with Green Product?

No

Final Product Choice

Green Product: Insulated Fiberglass w/ Argon & Low-E

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 5 Replace Windows

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

13

Replacement Year

14

Final Product Choice

Green Product:

Insulated Fiberglass w/ Argon & Low-E

Immediate Replacement

Immediate Replacement				Year	1				Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Fiberglass framed Models	98	ea	\$1,378.69	\$135,111	30	1	1.0	\$135,111	\$135,111
Install/Replace	Fiberglass framed Models	194	ea	\$876.13	\$169,968	30	1	1.0	\$169,968	\$169,968
Total Life Cycle Cost									\$305,080	\$305,080

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$2,369.92	(\$2,370)	1	1	30.0	(\$112,750)	(\$38,842)
Net Life Cycle Cost after Energy Savings									\$192,330	\$266,237

Replacement at End of Remaining Useful Life

Replacement at End of Remaining Useful Life				Year	14					
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Fiberglass framed Models	98	ea	\$1,378.69	\$135,111	30	14	0.6	\$60,443	\$58,149
Install/Replace	Fiberglass framed Models	194	ea	\$876.13	\$169,968	30	14	0.6	\$76,036	\$73,150

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$136,479	\$131,299

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$2,369.92	(\$2,370)	1	14	17.0	(\$75,737)	(\$15,294)
Net Life Cycle Cost after Energy Savings									\$60,742	\$116,005

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$150,232)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	14
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM):

6

Add Roof Insulation

Maintain Existing (Approx. R-15)

vs.

Increase Overall Roof Insulation (Approx. R-30)

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

20

Conventional Product:

Maintain Existing (Approx. R-15)

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Replace roof	8,662	sf	\$8.50	\$73,627	20	1	1.0	\$73,627	\$73,627
Install/Replace	Replace roof	8,219	sf	\$8.50	\$69,862	20	1	1.0	\$69,862	\$69,862

Total Life Cycle Cost

\$143,489

\$143,489

Energy Savings

Net Life Cycle Cost after Energy Savings									\$143,489	\$143,489

Green Product:

Increase Overall Roof Insulation (Approx. R-30)

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Replace Roof & Add Insulation	8,662	sf	\$10.00	\$86,620	20	1	1.0	\$86,620	\$86,620
Install/Replace	Replace Roof & Add Insulation	8,219	sf	\$10.00	\$82,190	20	1	1.0	\$82,190	\$82,190

Total Life Cycle Cost

\$168,810

\$168,810

Energy Savings

Utility Cost	Heating/Cooling Savings	1	ls	\$167.00	(\$167)	1	1	20.0	(\$4,487)	(\$2,209)
Net Life Cycle Cost after Energy Savings									\$164,323	\$166,601

ECONOMIC RETURN ANALYSIS

Green NPV	(\$23,112)
Green IRR	(12.9%)

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Maintain Existing (Approx. R-15)

Override with Green Product?

No

Final Product Choice

Conventional Product: Maintain Existing (Approx. R-15)

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 6 Add Roof Insulation

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product	9	Final Product Choice	
Replacement Year	10	Conventional Product:	Maintain Existing (Approx. R-15)

Immediate Replacement				Year	1				Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Replace roof	8,662	sf	\$8.50	\$73,627	20	1	1.0	\$73,627	\$73,627
Install/Replace	Replace roof	8,219	sf	\$8.50	\$69,862	20	1	1.0	\$69,862	\$69,862
Total Life Cycle Cost									\$143,489	\$143,489
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$143,489	\$143,489

Replacement at End of Remaining Useful Life				Year	10						
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted	
Install/Replace	Replace roof	8,662	sf	\$8.50	\$73,627	20	10	0.6	\$37,969	\$34,595	
Install/Replace	Replace roof	8,219	sf	\$8.50	\$69,862	20	10	0.6	\$36,027	\$32,826	

Expenses for Current Product Through Useful Life												
Total Life Cycle Cost										\$73,996	\$67,421	
Energy Savings												
Net Life Cycle Cost after Energy Savings										\$73,996	\$67,421	

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$76,067)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	10
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- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 7 Convert Lighting Halls/Stairs/Lobby

Maintain Existing	vs.	Install LED Lamps
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	15
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Conventional Product: Maintain Existing									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Hallway CFLs	198	ea	\$7.00	\$1,386	6	1	2.5	\$3,969	\$2,857
Install/Replace	T12 Fluorescents	66	ea	\$8.50	\$561	6	1	2.5	\$1,606	\$1,156
Install/Replace	T12 U-lamp	30	ea	\$12.00	\$360	6	1	2.5	\$1,031	\$742
Utility Cost	Electricity	71,692	kWh	\$0.19	\$13,426	1	1	15.0	\$249,712	\$147,573
Total Life Cycle Cost									\$256,318	\$152,328
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$256,318	\$152,328

Green Product: Install LED Lamps									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Hallway Bi-pin LED	198	ea	\$60.00	\$11,880	15	1	1.0	\$11,880	\$11,880
Install/Replace	T12 LED	66	ea	\$40.00	\$2,640	15	1	1.0	\$2,640	\$2,640
Install/Replace	T12 U-lamp	30	ea	\$30.00	\$900	15	1	1.0	\$900	\$900
Utility Cost	Electricity	18,317	kWh	\$0.19	\$3,430	1	1	15.0	\$63,800	\$37,704
Total Life Cycle Cost									\$79,220	\$53,124
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$79,220	\$53,124

ECONOMIC RETURN ANALYSIS		PRODUCT RECOMMENDATION	
Green NPV	\$99,204	Recommendation based on Economic Return Analysis	
Green IRR	333.3%	Green Product:	Install LED Lamps
		Override with Green Product?	No
		Final Product Choice	
		Green Product:	Install LED Lamps

Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 7 Convert Lighting Halls/Stairs/Lobby

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Install LED Lamps

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Hallway Bi-pin LED	198	ea	\$60.00	\$11,880	15	1	1.0	\$11,880	\$11,880
Install/Replace	T12 LED	66	ea	\$40.00	\$2,640	15	1	1.0	\$2,640	\$2,640
Install/Replace	T12 U-lamp	30	ea	\$30.00	\$900	15	1	1.0	\$900	\$900
Utility Cost	Electricity	18,317	kWh	\$0.19	\$3,430	1	1	15.0	\$63,800	\$37,704
Total Life Cycle Cost									\$79,220	\$53,124
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$79,220	\$53,124

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 8 Convert Lighting - Common Area

Maintain Existing

(Conventional Product)

vs.

Install LED Lamps and Occ. Sensors

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term15

Conventional Product: Maintain Existing									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	T8 Lamps	35	ea	\$16.00	\$560	9	1	1.7	\$1,008	\$829
Install/Replace	T12 Lamps	36	ea	\$16.00	\$576	6	1	2.5	\$1,649	\$1,187
Utility Cost	Electricity	12,124	kWh	\$0.19	\$2,271	1	1	15.0	\$42,229	\$24,956
Total Life Cycle Cost									\$44,887	\$26,973
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$44,887	\$26,973

Green Product: Install LED Lamps and Occ. Sensors									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	T8 Lamps	35	ea	\$120.00	\$4,200	15	1	1.0	\$4,200	\$4,200
Install/Replace	T12 Lamps	36	ea	\$120.00	\$4,320	15	1	1.0	\$4,320	\$4,320
Install/Replace	Occ. Sensors	13	ea	\$55.00	\$715	15	1	1.0	\$715	\$715
Utility Cost	Electricity	3,653	kWh	\$0.19	\$684	1	1	15.0	\$12,724	\$7,519
Utility Cost	Natural Gas	34	therms	\$1.03	\$35	1	1	15.0	\$654	\$387
Total Life Cycle Cost									\$22,613	\$17,141
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$22,613	\$17,141

ECONOMIC RETURN ANALYSIS

Green NPV\$9,832

Green IRR27.1%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product:

Install LED Lamps and Occ. Sensors

Override with Green Product?No

Final Product Choice

Green Product:

Install LED Lamps and Occ. Sensors

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 8 Convert Lighting - Common Area

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Install LED Lamps and Occ. Sensors

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	T8 Lamps	35	ea	\$120.00	\$4,200	15	1	1.0	\$4,200	\$4,200
Install/Replace	T12 Lamps	36	ea	\$120.00	\$4,320	15	1	1.0	\$4,320	\$4,320
Install/Replace	Occ. Sensors	13	ea	\$55.00	\$715	15	1	1.0	\$715	\$715
Utility Cost	Electricity	3,653	kWh	\$0.19	\$684	1	1	15.0	\$12,724	\$7,519
Utility Cost	Natural Gas	34	therms	\$1.03	\$35	1	1	15.0	\$654	\$387
Total Life Cycle Cost									\$22,613	\$17,141
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$22,613	\$17,141

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 9 Convert Exit Lighting

Maintain Existing
(Conventional Product)

vs.

Install LED Fixtures
(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term20

Conventional Product: Maintain Existing									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Maintain	38	ea	\$0.00		20	1	1.0		
Utility Cost	Electricity	6,990	kWh	\$0.19	\$1,309	1	1	20.0	\$35,175	\$17,319
Total Life Cycle Cost									\$35,175	\$17,319
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$35,175	\$17,319

Green Product: Install LED Fixtures									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	LED fixtures	38	ea	\$55.00	\$2,090	20	1	1.0	\$2,090	\$2,090
Utility Cost	Electricity	1,332	kWh	\$0.19	\$249	1	1	20.0	\$6,703	\$3,300
Total Life Cycle Cost									\$8,793	\$5,390
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$8,793	\$5,390

ECONOMIC RETURN ANALYSIS

PRODUCT RECOMMENDATION

Green NPV\$11,929

Green IRR108.9%

Recommendation based on Economic Return Analysis

Green Product:Install LED Fixtures

Override with Green Product?No

Final Product Choice

Green Product:Install LED Fixtures

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 9 Convert Exit Lighting

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Install LED Fixtures

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LED fixtures	38	ea	\$55.00	\$2,090	20	1	1.0	\$2,090	\$2,090
Utility Cost	Electricity	1,332	kWh	\$0.19	\$249	1	1	20.0	\$6,703	\$3,300
Total Life Cycle Cost									\$8,793	\$5,390
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$8,793	\$5,390

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 10 Replace Refrigerator

In-Kind Replacement

(Conventional Product)

vs.

Energy Star Replacement

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term15

Conventional Product: In-Kind Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	In-Kind Replacement	1	ea	\$670.00	\$670	15	1	1.0	\$670	\$670
Utility Cost	Electricity	624	kWh	\$0.19	\$117	1	1	15.0	\$2,173	\$1,284
Total Life Cycle Cost									\$2,843	\$1,954
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$2,843	\$1,954

Green Product: Energy Star Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	In-Kind Replacement	1	ea	\$720.25	\$720	15	1	1.0	\$720	\$720
Utility Cost	Electricity	496	kWh	\$0.19	\$93	1	1	15.0	\$1,728	\$1,021
	Natural Gas	9	therms	\$1.03	\$9	1	1	15.0	\$173	\$102
Total Life Cycle Cost									\$2,621	\$1,844
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$2,621	\$1,844

ECONOMIC RETURN ANALYSIS

Green NPV\$111

Green IRR45.1%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product:

Energy Star Replacement

Override with Green Product?No

Final Product Choice

Green Product:

Energy Star Replacement

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 10 Replace Refrigerator

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Energy Star Replacement

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	In-Kind Replacement	1	ea	\$720.25	\$720	15	1	1.0	\$720	\$720
Utility Cost	Electricity	496	kWh	\$0.19	\$93	1	1	15.0	\$1,728	\$1,021
	Natural Gas	9	therms	\$1.03	\$9	1	1	15.0	\$173	\$102
Total Life Cycle Cost									\$2,621	\$1,844
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$2,621	\$1,844

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 11 Washing Machine

Non Energy Star Washers	vs.	Energy Star Washers
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	12
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Conventional Product: Non Energy Star Washers									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	In-kind Replacement	2	ea			12	1	1.0		
Utility Cost	Natural Gas	158	therms	\$1.03	\$163	1	1	12.0	\$2,320	\$1,532
Utility Cost	Electric	374	kWh	\$0.19	\$70	1	1	12.0	\$994	\$656
Utility Cost	Water/Sewer	53,944	gal	\$0.01	\$539	1	1	12.0	\$7,656	\$5,055
Total Life Cycle Cost									\$10,969	\$7,243

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$10,969	\$7,243

Green Product: Energy Star Washers									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Energy Star Models	2	ea			12	1	1.0		
Utility Cost	Natural Gas	82	therms	\$1.03	\$85	1	1	12.0	\$1,204	\$795
Utility Cost	Electric	126	kWh	\$0.19	\$24	1	1	12.0	\$335	\$221
Utility Cost	Water/Sewer	22,828	gal	\$0.01	\$228	1	1	12.0	\$3,240	\$2,139
Total Life Cycle Cost									\$4,778	\$3,155

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$4,778	\$3,155

ECONOMIC RETURN ANALYSIS	PRODUCT RECOMMENDATION
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Green NPV	\$4,088
Green IRR	n/a

Recommendation based on Economic Return Analysis	
Green Product:	Energy Star Washers
Override with Green Product?	No
Final Product Choice	
Green Product:	Energy Star Washers

Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 11 Washing Machine

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

Final Product Choice
Green Product: Energy Star Washers

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Energy Star Models	2	ea			12	1	1.0		
Utility Cost	Natural Gas	82	therms	\$1.03	\$85	1	1	12.0	\$1,204	\$795
Utility Cost	Electric	126	kWh	\$0.19	\$24	1	1	12.0	\$335	\$221
Utility Cost	Water/Sewer	22,828	gal	\$0.01	\$228	1	1	12.0	\$3,240	\$2,139
Total Life Cycle Cost									\$4,778	\$3,155
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$4,778	\$3,155

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	1
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- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 12 Replace Showerheads

Maintain Existing	vs.	Install Low Flow 1.7gpm Models
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	20
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Conventional Product: Maintain Existing									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Maintain	Maintain	50	ea	\$0.00		20	1	1.0		
Utility Cost	Water/Sewer	638,750	gal	\$0.01	\$6,388	1	1	20.0	\$171,635	\$84,507
Utility Cost	Natural Gas	2,768	therms	\$1.03	\$2,864	1	1	20.0	\$76,952	\$37,889
Total Life Cycle Cost									\$248,587	\$122,396

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$248,587	\$122,396

Green Product: Install Low Flow 1.7gpm Models									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Low Flow 1.7gpm	50	ea	\$18.50	\$925	20	1	1.0	\$925	\$925
Utility Cost	Water/Sewer	347,480	gal	\$0.01	\$3,475	1	1	20.0	\$93,369	\$45,972
Utility Cost	Natural Gas	1,883	therms	\$1.03	\$1,947	1	1	20.0	\$52,328	\$25,764
Total Life Cycle Cost									\$146,622	\$72,661

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$146,622	\$72,661

ECONOMIC RETURN ANALYSIS	PRODUCT RECOMMENDATION
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Green NPV	\$49,735
Green IRR	n/a

Recommendation based on Economic Return Analysis	
Green Product:	Install Low Flow 1.7gpm Models
Override with Green Product?	No
Final Product Choice	
Green Product:	Install Low Flow 1.7gpm Models

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 12 Replace Showerheads

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Install Low Flow 1.7gpm Models

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Low Flow 1.7gpm	50	ea	\$18.50	\$925	20	1	1.0	\$925	\$925
Utility Cost	Water/Sewer	347,480	gal	\$0.01	\$3,475	1	1	20.0	\$93,369	\$45,972
Utility Cost	Natural Gas	1,883	therms	\$1.03	\$1,947	1	1	20.0	\$52,328	\$25,764
Total Life Cycle Cost									\$146,622	\$72,661
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$146,622	\$72,661

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 13 Replace Toilets - Dwelling Units

In-Kind Replacement (1.6gpf)	vs.	High Efficiency Replacement (1.28gpf)
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	25
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Conventional Product: In-Kind Replacement (1.6gpf)									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	In-Kind Replacement	50	ea	\$410.00	\$20,500	25	1	1.0	\$20,500	\$20,500
Utility Cost	Water/Sewer	146,000	gal	\$0.01	\$1,460	1	1	25.0	\$53,231	\$21,895
Total Life Cycle Cost									\$73,731	\$42,395

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$73,731	\$42,395

Green Product: High Efficiency Replacement (1.28gpf)									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	High Efficiency 1.28gpf	50	ea	\$440.75	\$22,038	25	1	1.0	\$22,038	\$22,038
Utility Cost	Water/Sewer	116,800	gal	\$0.01	\$1,168	1	1	25.0	\$42,584	\$17,516
Total Life Cycle Cost									\$64,622	\$39,553

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$64,622	\$39,553

ECONOMIC RETURN ANALYSIS	PRODUCT RECOMMENDATION
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Green NPV	\$2,841
Green IRR	27.0%

Recommendation based on Economic Return Analysis	
Green Product:	High Efficiency Replacement (1.28gpf)
Override with Green Product?	No
Final Product Choice	
Green Product:	High Efficiency Replacement (1.28gpf)

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 13 Replace Toilets - Dwelling Units

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice

Green Product: High Efficiency Replacement (1.28gpf)

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	High Efficiency 1.28gpf	50	ea	\$440.75	\$22,038	25	1	1.0	\$22,038	\$22,038
Utility Cost	Water/Sewer	116,800	gal	\$0.01	\$1,168	1	1	25.0	\$42,584	\$17,516
Total Life Cycle Cost									\$64,622	\$39,553
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$64,622	\$39,553

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:**
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM): # 1 Pervious Pavers

In-Kind Replacement

(Conventional Product)

vs.

Pervious Pavers

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term35

Conventional Product: In-Kind Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	Asphalt Material	16,374	sf	\$2.10	\$34,385	20	1	1.8	\$73,005	\$45,994
Total Life Cycle Cost									\$73,005	\$45,994
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$73,005	\$45,994

Green Product: Pervious Pavers									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	Pervious Pavers	16,374	sf	\$5.50	\$90,057	35	1	1.0	\$90,057	\$90,057
Total Life Cycle Cost									\$90,057	\$90,057
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$90,057	\$90,057

ECONOMIC RETURN ANALYSIS

Green NPV(\$44,063)

Green IRRn/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product:In-Kind Replacement

Override with Green Product?No

Final Product Choice

Conventional Product:In-Kind Replacement

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM): # 1 Pervious Pavers

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product	3	Final Product Choice	
Replacement Year	4	Conventional Product:	In-Kind Replacement

Immediate Replacement				Year	1					Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted	
Install/Replace	Asphalt Material	16,374	sf	\$2.10	\$34,385	20	1	1.8	\$73,005	\$45,994	
Total Life Cycle Cost										\$73,005	\$45,994
Energy Savings											
Net Life Cycle Cost after Energy Savings										\$73,005	\$45,994

Replacement at End of Remaining Useful Life				Year	4						
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted	
Install/Replace	Asphalt Material	16,374	sf	\$2.10	\$34,385	20	4	1.6	\$67,861	\$38,641	
Total Life Cycle Cost										\$67,861	\$38,641
Expenses for Current Product Through Useful Life											
Total Life Cycle Cost										\$67,861	\$38,641
Energy Savings											
Net Life Cycle Cost after Energy Savings										\$67,861	\$38,641

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$7,354)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	4
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- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

2

Replace Vinyl - Common Areas

Vinyl Flooring

vs.

Linoleum Flooring

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

30

Conventional Product:

Vinyl Flooring

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Corridors	1,798	sf	\$5.00	\$8,990	15	1	2.0	\$22,996	\$13,405
Install/Replace	Stairwells	1,848	sf	\$5.00	\$9,240	15	1	2.0	\$23,636	\$13,778
Install/Replace	Art/Activity/Great Room	4,904	sf	\$5.00	\$24,520	15	1	2.0	\$62,721	\$36,563
Install/Replace										

Total Life Cycle Cost

\$109,353

\$63,746

Energy Savings

Net Life Cycle Cost after Energy Savings									\$109,353	\$63,746

Green Product:

Linoleum Flooring

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Common Areas	1,798	sf	\$5.50	\$9,889	30	1	1.0	\$9,889	\$9,889
Install/Replace	Stairwells	1,848	sf	\$5.50	\$10,164	30	1	1.0	\$10,164	\$10,164
Install/Replace	Art/Activity/Great Room	4,904	sf	\$5.50	\$26,972	30	1	1.0	\$26,972	\$26,972

Total Life Cycle Cost

\$47,025

\$47,025

Energy Savings

Net Life Cycle Cost after Energy Savings									\$47,025	\$47,025

ECONOMIC RETURN ANALYSIS

Green NPV	\$16,721
Green IRR	20.1%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product:	Linoleum Flooring
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Override with Green Product?

No

Final Product Choice

Green Product:	Linoleum Flooring
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM): # 2 Replace Vinyl - Common Areas

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Linoleum Flooring

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Common Areas	1,798	sf	\$5.50	\$9,889	30	1	1.0	\$9,889	\$9,889
Install/Replace	Stairwells	1,848	sf	\$5.50	\$10,164	30	1	1.0	\$10,164	\$10,164
Install/Replace	Art/Activity/Great Room	4,904	sf	\$5.50	\$26,972	30	1	1.0	\$26,972	\$26,972
Total Life Cycle Cost									\$47,025	\$47,025
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$47,025	\$47,025

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

3

Replace Carpet - Common Areas

Carpet Flooring

vs.

Linoleum Flooring

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term25

Conventional Product: Carpet Flooring									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Common Areas	5,957	sf	\$3.00	\$17,871	10	1	2.5	\$56,001	\$33,056
Install/Replace	Office / Library	736	sf	\$3.00	\$2,208	10	1	2.5	\$6,919	\$4,084
Install/Replace										
Total Life Cycle Cost									\$62,920	\$37,140
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$62,920	\$37,140

Green Product: Linoleum Flooring									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
<i>Life Cycle Costs</i>										
Install/Replace	Common Area	5,957	sf	\$5.50	\$32,764	25	1	1.0	\$32,764	\$32,764
Install/Replace	Office / Library	736	sf	\$5.50	\$4,048	25	1	1.0	\$4,048	\$4,048
Total Life Cycle Cost									\$36,812	\$36,812
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$36,812	\$36,812

ECONOMIC RETURN ANALYSIS

Green NPV

\$329

Green IRR

8.2%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product:

Linoleum Flooring

Override with Green Product?

No

Final Product Choice

Green Product:

Linoleum Flooring

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.

2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM): # 3 Replace Carpet - Common Areas

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Linoleum Flooring

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Common Area	5,957	sf	\$5.50	\$32,764	25	1	1.0	\$32,764	\$32,764
Install/Replace	Office / Library	736	sf	\$5.50	\$4,048	25	1	1.0	\$4,048	\$4,048
Total Life Cycle Cost									\$36,812	\$36,812
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$36,812	\$36,812

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM): # 4 Replace Carpeting

Carpeting	vs.	Linoleum Flooring
(Conventional Product)		(Green Product)

STEP ONE: PRODUCT COMPARISON	Calculated Life Cycle Term	25
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Conventional Product: Carpeting									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Dwelling Unit Carpeting	18438	sf	\$3.00	\$55,314	10	1	2.5	\$173,334	\$102,315
Total Life Cycle Cost									\$173,334	\$102,315

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$173,334	\$102,315

Green Product: Linoleum Flooring									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Install Linoleum	18,438	sf	\$5.50	\$101,409	25	1	1.0	\$101,409	\$101,409
Total Life Cycle Cost									\$101,409	\$101,409

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$101,409	\$101,409

ECONOMIC RETURN ANALYSIS	PRODUCT RECOMMENDATION
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Green NPV	\$906
Green IRR	8.2%

Recommendation based on Economic Return Analysis	
Green Product:	Linoleum Flooring
Override with Green Product?	No
Final Product Choice	
Green Product:	Linoleum Flooring

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM): # 4 Replace Carpeting

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Linoleum Flooring

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Install Linoleum	18,438	sf	\$5.50	\$101,409	25	1	1.0	\$101,409	\$101,409
Total Life Cycle Cost									\$101,409	\$101,409
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$101,409	\$101,409

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

5

Replace Vinyl - Dwelling Units

Vinyl Replacement

vs.

Linoleum Replacement

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 25

Conventional Product: Vinyl Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs

Install/Replace	Kitchen Floors	1,200	sf	\$5.00	\$6,000	15	1	1.7	\$11,282	\$8,306
Total Life Cycle Cost									\$11,282	\$8,306

Energy Savings

Net Life Cycle Cost after Energy Savings									\$11,282	\$8,306

Green Product: Linoleum Replacement									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs

Install/Replace	Kitchen Floors	1,200	sf	\$5.50	\$6,600	25	1	1.0	\$6,600	\$6,600
Total Life Cycle Cost									\$6,600	\$6,600

Energy Savings

Net Life Cycle Cost after Energy Savings									\$6,600	\$6,600

ECONOMIC RETURN ANALYSIS

Green NPV	\$1,706
Green IRR	19.3%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis	
Green Product:	Linoleum Replacement
Override with Green Product?	No
Final Product Choice	
Green Product:	Linoleum Replacement

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM): # 5 Replace Vinyl - Dwelling Units

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Green Product: Linoleum Replacement

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Kitchen Floors	1,200	sf	\$5.50	\$6,600	25	1	1.0	\$6,600	\$6,600
Total Life Cycle Cost									\$6,600	\$6,600
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$6,600	\$6,600

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

- Notes:
- 1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 - 2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

6

Replace Kitchen Cabinets - DU

In-Kind Replacements

vs.

Solid Wood/Stone Replacement

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

25

Conventional Product:

In-Kind Replacements

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	LPB Cabinets	50	ea	\$3,150.00	\$157,500	25	1	1.0	\$157,500	\$157,500

Total Life Cycle Cost

\$157,500

\$157,500

Energy Savings

Net Life Cycle Cost after Energy Savings									\$157,500	\$157,500

Green Product:

Solid Wood/Stone Replacement

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Solid FSC Wood	50	ea	\$3,386.25	\$169,313	25	1	1.0	\$169,313	\$169,313

Total Life Cycle Cost

\$169,313

\$169,313

Energy Savings

Net Life Cycle Cost after Energy Savings									\$169,313	\$169,313

ECONOMIC RETURN ANALYSIS

Green NPV	(\$11,813)
Green IRR	n/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product:	In-Kind Replacements
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Override with Green Product?

No

Final Product Choice

Conventional Product:	In-Kind Replacements
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

6

Replace Kitchen Cabinets - DU

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

2

Replacement Year

3

Final Product Choice

Conventional Product:

In-Kind Replacements

Immediate Replacement

				Year	1					Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted	
Install/Replace	LPB Cabinets	50	ea	\$3,150.00	\$157,500	25	1	1.0	\$157,500	\$157,500	
Total Life Cycle Cost									\$157,500	\$157,500	
<i>Energy Savings</i>											
Net Life Cycle Cost after Energy Savings									\$157,500	\$157,500	

Replacement at End of Remaining Useful Life

				Year	3						
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted	
Install/Replace	LPB Cabinets	50	ea	\$3,150.00	\$157,500	25	3	0.9	\$141,479	\$139,215	
Total Life Cycle Cost									\$141,479	\$139,215	
<i>Expenses for Current Product Through Useful Life</i>											
Total Life Cycle Cost									\$141,479	\$139,215	
<i>Energy Savings</i>											
Net Life Cycle Cost after Energy Savings									\$141,479	\$139,215	

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$18,285)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	3
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

7

Replace Kitchen Countertops - DU

In-Kind Replacements

vs.

Recycled Content Solid Countertops

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 30

Conventional Product: In-Kind Replacements									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	LPB Cabinets	50	ea	\$553.84	\$27,692	20	1	1.5	\$45,078	\$34,921
Total Life Cycle Cost									\$45,078	\$34,921

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$45,078	\$34,921

Green Product: Recycled Content Solid Countertops									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted

Life Cycle Costs										
Install/Replace	Solid FSC Wood	50	ea	\$875.00	\$43,750	30	1	1.0	\$43,750	\$43,750
Total Life Cycle Cost									\$43,750	\$43,750

Energy Savings										
Net Life Cycle Cost after Energy Savings									\$43,750	\$43,750

ECONOMIC RETURN ANALYSIS

Green NPV	(\$8,829)
Green IRR	(2.1%)

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis	
Conventional Product:	In-Kind Replacements
Override with Green Product?	No
Final Product Choice	
Conventional Product:	In-Kind Replacements

- Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
 2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

7

Replace Kitchen Countertops - DU

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product 0

Final Product Choice
Conventional Product: In-Kind Replacements

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LPB Cabinets	50	ea	\$553.84	\$27,692	20	1	1.5	\$45,078	\$34,921
Total Life Cycle Cost									\$45,078	\$34,921
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$45,078	\$34,921

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	1
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Notes:
1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Statement of Delivery

ON-SITE INSIGHT, Inc. (and/or its representatives) hereby certifies that, this Green Capital Needs Assessment (the “GCNA” or the “Report”) is delivered subject to the following terms and conditions:

1. This report and analysis are based upon observations for the visible and apparent condition of the building and its major components on the date of the fieldwork. Although care has been taken in the performance of this assessment, ON-SITE INSIGHT, Inc (and/or its representatives) makes no representations regarding latent or concealed defects that may exist and no warranty or guarantee is expressed or implied. This report is made only in the best exercise of our ability and judgment.
2. We have undertaken no formal evaluations of environmental concerns, including but not limited to asbestos containing materials (ACMs), lead based paint, chlorofluorocarbons (CFCs), polychlorinated biphenyls (PCBs), and mildew/mold.
3. Conclusions in this report are based on estimates of the age and normal working life of various items of equipment and/or statistical comparisons. Actual conditions can alter the useful life of any item. When an item needs immediate replacement depends on many factors, including previous use/misuse, irregularity of servicing, faulty manufacturer, unfavorable conditions, Acts of God and unforeseen circumstances. Certain components that may be working when we made our inspection might deteriorate or break in the future without notice.
4. To prepare this report, we used historic data on capital activities and costs, blueprints (when available), and current prices for capital actions. We have not independently verified this information, have assumed that it is reliable, but assume no responsibility for its accuracy.
5. Unless otherwise noted in the report, we assume that all building components meet code requirements in force when the property was built.
6. If accessibility issues are referenced in the report, the site elements, common areas, and dwelling units at the development were examined for compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS), and for Massachusetts properties, the Massachusetts Architectural Accessibility Board (AAB). The methodology employed in undertaking this examination is adapted from a Technical Assistance Guide (TAG-88-11) titled “Supplemental Information About the Section 504 Transition Plan Requirements” published by the Coordination and Review section of the U.S. Department of Justice Civil Rights Division, and the AAB Rules and Regulations, 521 CMR effective July 10, 1987. The Guide also incorporates the requirements of UFAS, published, April 1, 1988 by the General Services Administration, the Department of Defense, the Department of Housing and Urban Development, and the U.S. Postal Service. Changes in legislation and/or regulations may make some observations moot.

7. Response Actions and estimated costs of responses were developed by ON-SITE INSIGHT, Inc. If additional structural work is necessary, costs for some Response Actions may exceed estimates. Whenever the Response Action is to remove, reposition, or modify walls, a competent structural engineer should be retained before any work is done, because such investigation may disclose that a Response Action is either more costly than estimated, or is not possible.
8. Conclusions reached in this report assume current and continuing responsible ownership and competent property management.
9. Regular updates of this plan are recommended to ensure careful monitoring of major building systems and to adjust the program to accommodate unanticipated circumstances surrounding the buildings, operations, and/or occupants.

Signed,



Signature

Daniel Iles
Name

Associate
Title

January 27, 2012
Date