



# Flandrau State Park - Contact Station (B40402)

Energy Auditor:

#### Chris Droske, CEM | Energy Advisor Franklin Energy Services, LLC

2303 Wycliff St., Suite 2E | St. Paul, MN 55114

612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone

#### Date of Assessment:

5/11/2015

Consultant's Report

#### **Executive Summary**



The Minnesota Department of Natural Resources requested that Franklin Energy perform an energy assessment to identify energy-related opportunities that show potential for improvement and investment options. This is the first step toward developing a long-term energy plan for **Flandrau State Park**. Chris Droske of Franklin Energy services visited **Flandrau State Park** on May 11th, 2015 and met with Tracy Beckman.

Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Programmble thermostats with aggressive setback schedule
- R30-35 Attic Insulation
- Energy conscious to turn off lights in unoccupied areas

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace T8 fluorescent troffers with LED troffers
- Replace F13 pin based CFL cans with LED cans

Key strategic opportunities include:

• Implement PC power management

#### Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

	Energy Conservation Opportunity	Estimated Demand Savings (kW/yr)	Estimated Energy Savings (kWh/yr)	Estimated Thermal Savings (Therm/yr)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
Pay	vback 2 – 10+ year	rs (low/no c	ost opportu	nities)				
1	Replace pin based CFL cans with LED retrofits		526	0	\$68	\$240	3.5	\$0
Pay	/back 2 – 10+ year	rs (capital co	ost opportur	ities)				
2	Replace T12 and T8 fluorescent troffers with LED troffers	0.9	3,038	0	\$395	\$1,650	4.2	\$0
Tot	al	0.9	3,563	0	\$463	\$1,890	4.1	\$0

<sup>1</sup> Estimated capital cost includes estimated equipment and labor costs unless otherwise noted. Capital Cost is defined as the total equipment and labor cost for the project. Incremental Cost refers to the additional cost associated with the increased capital cost for replacing standard equipment with higher efficiency equipment. <sup>2</sup> Simple Payback includes incentive unless estimated value is not given.

## Energy Conservation Opportunity Analysis

#### **Opportunity 1: Replace pin based CFL cans with LED retrofits**

The exterior security lights contain (2) halogen lamps. You may want to consider replacing these lamps with LEDs. LED's will last up to 20x longer than your halogen lamps, while using 75% less energy. LED lamps also thrive in cold environments, so their rated life will likely be achieved as this fixture is located outside. Your local utility may incentive this replacement, so please speak to them to find available rebates.

#### **Opportunity 2: Replace T12 and T8 fluorescent troffers with LED troffers**

The contact station primarily consists of T8 troffers containing T8 lamps. T8 fluorescent lighting is being replaced with LED lighting. LED's offer a better light quality, and last up to 5 longer before needing replacement. Retrofitting troffers costs roughly \$100 per troffer, while a replacement costs roughly \$150. The wattage reduction would be about 40% per fixture. Incentives may be available through your local utility.

#### **Opportunity 3: Implement PC power management**

Despite the fact that most personal computers (PCs) have the capability to shift into a low-power state after a specified period of inactivity, only a small fraction of those PCs actually do so. A number of software products have been developed in recent years with the common goal of simplifying the implementation of power-management policies across large numbers of networked PCs. The amount of energy savings these products can provide depends upon the power draw of the particular computers and monitors in use, how the PCs are being used, and the aggressiveness of the power-management settings that are implemented. The simplest form of power-management is utilizing software built in to each user's PC. This disadvantage to this approach arises in the difficulty of monitoring and enforcing individual usage. Purchasing a power-management software package allows for much greater control of a network's power-management structure from a central IT department. Software packages range in price from \$0-\$25 per licence.





# Flandrau State Park - Beach House (B40046)

Energy Auditor:

Date of Assessment:

Chris Droske, CEM | Energy Advisor Franklin Energy Services, LLC 2303 Wycliff St., Suite 2E | St. Paul, MN 55114

612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone 5/11/2015

#### **Executive Summary**



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Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting in restrooms
- Occupancy sensors in restrooms
- Most lights are routinely turned off when unoccupied

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace incandescent lamps with equivalent LEDs
- Install occupancy sensors

#### Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

Par	Energy Conservation Opportunity Jack less than 2 y	Estimated Demand Savings (kW/yr) ears (low/n	Estimated Energy Savings (kWh/yr)	Estimated Thermal Savings (Therm/yr)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
	,							
1	Replace incandescent lamps with equivalent LEDs	2.2	4,902	0	\$637	\$860	1.3	\$0
Pay	yback 2 – 10+ year	rs (low/no c	ost opportu	nities)				
	Install							• • • •
2	occupancy	0.0	408	0	\$45	\$150	3.3	\$0
	sensors					1 mail of the		
Tot	tal	2.2	5,310	0	\$682	\$1,010	1.5	\$0

<sup>1</sup> Estimated capital cost includes estimated equipment and labor costs unless otherwise noted. Capital Cost is defined as the total equipment and labor cost for the project. Incremental Cost refers to the additional cost associated with the increased capital cost for replacing standard equipment with higher efficiency equipment. <sup>2</sup> Simple Payback includes incentive unless estimated value is not given.

## Energy Conservation Opportunity Analysis

#### **Opportunity 1: Replace incandescent lamps with equivalent LEDs**

Incandescent lamps are used throughout the beach house. You may want to consider replacing these lamps with LED's, especially if they are left on for extended periods of time. LED lamps use 75% less energy than incandescent and last up to 20x longer before needed replacement. Estimated savings were based upon replacing (43) incandescent lamps with (43) LEDs.



#### **Opportunity 2: Install occupancy sensors**

You may want to install Occupancy Sensors to automatically turn lights off in areas such as restrooms, storage rooms, or other rooms where lights could get left on. Occupancy sensors limit the amount of time the lights in each room are left on while unoccupied. Sensors can be purchased fairly inexpensively, for roughly \$20-\$100 each depending on type and style. The savings for installing these sensors varies greatly depending on the quantity of fixtures controlled as well as the amount of human traffic through the room. The typical payback for a break room and restroom installation is under two years. The most beneficial locations would be the kitchen and general hallways



#### **Opportunity 3: Upgrade to Energy Star Refrigerator**

The refrigerator in the beach house is over 25 years old and drastic improvements to the refrigeration cycle have been made in the last 25 years. In fact, a modern energy star refrigerator is over 7x more efficient than a model prior to 1992. Consider upgrading your refrigerator for improved energy performance and reliability.





# Flandrau State Park - Dining Hall (B40045)

Energy Auditor:

#### Chris Droske, CEM | Energy Advisor Franklin Energy Services, LLC

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612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone Date of Assessment:

5/11/2015

#### **Executive Summary**



The Minnesota Department of Natural Resources requested that Franklin Energy perform an energy assessment to identify energy-related opportunities that show potential for improvement and investment options. This is the first step toward developing a long-term energy plan for **Flandrau State Park**. Chris Droske of Franklin Energy services visited **Flandrau State Park** on May 11th, 2015 and met with Tracy Beckman.

Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Captive air exhaust hood
- Turn off/unplug kitchen equipment when not used

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace 32W T8 lamps with 25W T8 lamps
- Install occupancy sensors
- Install electronically commutated motors inside walk-in

#### Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

Раз	Energy Conservation Opportunity vback 2 – 10+ year	Estimated Demand Savings (kW/yr) s (low/no c	Estimated Energy Savings (kWh/yr) ost opportu	Estimated Thermal Savings (Therm/yr) nities)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
1	Install electronically commutated motors inside walk-in	0.1	1,047	0	\$136	\$300	2.2	\$0
2	Replace 32W T8 lamps with 25W T8 lamps	0.6	1,147	0	\$149	\$340	2.3	\$0
3	Install occupancy sensors	0.0	181	0	\$20	\$100	5.0	\$0
Tot	tal	0.7	2,376	0	\$305	\$740	2.4	\$0

<sup>1</sup> Estimated capital cost includes estimated equipment and labor costs unless otherwise noted. Capital Cost is defined as the total equipment and labor cost for the project. Incremental Cost refers to the additional cost associated with the increased capital cost for replacing standard equipment with higher efficiency equipment.

<sup>2</sup> Simple Payback includes incentive unless estimated value is not given.

## **Energy Conservation Opportunity Analysis**

#### **Opportunity 1: Install electronically commutated motors inside walk-in**

Standard fan motors commonly used in refrigeration equipment are major energy wasters. They run inefficiently and generate excess heat, causing the refrigeration system to work harder and use more energy. An Electrically Commutated Motor (ECM) is a DC motor designed for evaporators in walk in coolers and freezers. The DC motor runs up to 40% more efficiently than a shaded pole motor and generates less heat resulting in refrigeration savings. Overall, ECMs typically save up to 65% more than your current system. ECMs do however, cost about twice as much as a regular shaded pole motor, but often require less maintenance and replacement. Often larger electrical consumers are on a demand based rate so the ECM's save on both the consumption and demand charges.



#### **Opportunity 2: Replace 32W T8 lamps with 25W T8 lamps**

The shop consists of 32W T8 fixtures containing 32W lamps. You may want to consider replacing these lamps with 25W T8 lamps if the ballast allows. While the brightness reduction is minimal, the energy savings is noticeable. Be sure to test in a few fixtures to confirm ballast compatibility before replacing all of them. Lamps cost \$3-5 a piece and pay for themselves in just a few years.

#### **Opportunity 3: Install occupancy sensors**

You may want to install Occupancy Sensors to automatically turn lights off in areas such as restrooms, storage rooms, or other rooms where lights could get left on. Occupancy sensors limit the amount of time the lights in each room are left on while unoccupied. Sensors can be purchased fairly inexpensively, for roughly \$20-\$100 each depending on type and style. The savings for installing these sensors varies greatly depending on the quantity of fixtures controlled as well as the amount of human traffic through the room. The typical payback for a break room and restroom installation is under two years. The most beneficial locations would be in the kitchen area.





# Flandrau State Park - Men's Group Sanitation (B40043)

**Energy Auditor:** 

#### Chris Droske, CEM | Energy Advisor

Franklin Energy Services, LLC 2303 Wycliff St., Suite 2E | St. Paul, MN 55114

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5/11/2015

#### **Executive Summary**



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Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Lighting on occupancy sensors

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace 32W T8 lamps with 25W T8 lamps
- Replace 2.5 gpm showerheads with 1.5 gpm showerheads

#### Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

removements for the state of th	Energy Conservation Opportunity	Estimated Demand Savings (kW/yr)	Estimated Energy Savings (kWh/yr)	Estimated Thermal Savings (Therm/yr)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
Pay	/back less than 2 y	ears (low/n	io cost oppo	rtunities)				
1	Replace 2.5 gpm showerheads with 1.5 gpm showerheads	0.0	0	105	\$161	\$80	0.5	\$0
Pay	/back 2 – 10+ year	rs (low/no c	ost opportu	nities)				
2	Replace 32W T8 lamps with 25W T8 lamps	0.2	337	0	\$44	\$100	2.3	\$0
To	tal	0.2	337	105	\$204	\$180	0.9	\$0

<sup>1</sup> Estimated capital cost includes estimated equipment and labor costs unless otherwise noted. Capital Cost is defined as the total equipment and labor cost for the project. Incremental Cost refers to the additional cost associated with the increased capital cost for replacing standard equipment with higher efficiency equipment. <sup>2</sup> Simple Payback includes incentive unless estimated value is not given.

## Energy Conservation Opportunity Analysis

#### **Opportunity 1:** Replace 2.5 gpm showerheads with 1.5 gpm showerheads

The shower stalls have 2.5 gallon per minute showerheads. Consider replacing these showerheads with 1.5 gpm showerheads to conserve water, and the energy required to heat it.

#### **Opportunity 2: Replace 32W T8 lamps with 25W T8 lamps**

The sanitation building consists of 32W T8 fixtures containing 32W lamps. You may want to consider replacing these lamps with 25W T8 lamps if the ballast allows. While the brightness reduction is minimal, the energy savings is noticeable. Be sure to test in a few fixtures to confirm ballast compatibility before replacing all of them. Lamps cost \$3-5 a piece and pay for themselves in just a few years.





# Flandrau State Park - Campground Sanitation (B40465)

**Energy Auditor:** 

#### Chris Droske, CEM | Energy Advisor

Franklin Energy Services, LLC 2303 Wycliff St., Suite 2E | St. Paul, MN 55114

612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone Date of Assessment:

5/11/2015

#### **Executive Summary**



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Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Lighting on occupancy sensors
- Variable speed exhaust ventilation

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace 32W T8 lamps with 25W T8 lamps
- Slow down variable speed exhaust
- Replace 2.5 gpm showerheads with 1.5 gpm showerheads

Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

	Energy Conservation Opportunity	Estimated Demand Savings (kW/yr)	Estimated Energy Savings (kWh/yr)	Estimated Thermal Savings (Therm/yr)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
Pay	/back less than 2 y	ears (low/n	io cost oppo	rtunities)				
1	Slow down variable speed exhaust	0.0	632	0	\$82	, <b>\$</b> 0	0.0	\$0
2	Replace 2.5 gpm showerheads with 1.5 gpm showerheads	0.0	0	95	\$145	\$120	0.8	\$0
Pay	yback 2 – 10+ year	rs (low/no c	ost opportu	nities)				
3	Replace 32W T8 lamps with 25W T8 lamps	0.3	540	0	\$70	\$160	2.3	\$0
Tot	tal	0.3	1,172	95	\$297	\$280	0.9	\$0

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## Energy Conservation Opportunity Analysis

#### **Opportunity 1: Slow down variable speed exhaust**

The exhaust fan in the sanitation building is on variable speed control, but at the time of the audit was running at full capacity. Estimated savings were based upon dialing this usage back simply to maintain negative pressure to draw effluents out of the space. Know that a 10% reduction in fan speed is equal to roughly a 25% energy savings. By scaling the fan down, even just a little bit, a substantial amount of energy can be saved.

#### **Opportunity 2: Replace 2.5 gpm showerheads with 1.5 gpm showerheads**

The shower stalls have 2.5 gallon per minute showerheads. Consider replacing these showerheads with 1.5 gpm showerheads to conserve water, and the energy required to heat it.

#### **Opportunity 3: Replace 32W T8 lamps with 25W T8 lamps**

The sanitation building consists of 32W T8 fixtures containing 32W lamps. You may want to consider replacing these lamps with 25W T8 lamps if the ballast allows. While the brightness reduction is minimal, the energy savings is noticeable. Be sure to test in a few fixtures to confirm ballast compatibility before replacing all of them. Lamps cost \$3-5 a piece and pay for themselves in just a few years.





## Flandrau State Park - Shop (B40051)

Energy Auditor:

Chris Droske, CEM | Energy Advisor Franklin Energy Services, LLC 2303 Wycliff St., Suite 2E | St. Paul, MN 55114

612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone Date of Assessment:

5/11/2015

#### **Executive Summary**



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Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Foam injection into wall cracks and cavities
- Most lights are routinely turned off when unoccupied

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace 32W T8 lamps with 25W T8 lamps
- Install occupancy sensors
- Replace incandescent lamps with equivalent LEDs in attic

#### Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

Раз	Energy Conservation Opportunity thack less than 2 y	Estimated Demand Savings (kW/yr) years (low/r	Estimated Energy Savings (kWh/yr)	Estimated Thermal Savings (Therm/yr)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
~ ~ y	buch ress than 2 y		lo cost oppo					
the set of second se	Replace 30 gallon water heater with lower input model and smaller capacity	0.0	3,000	0	\$390	\$500	1.3	\$0
0	Install	0.0	1 2 6 2	0	¢1.40	#050	10	φQ
2	sensors	0.0	1,262	U	\$140	\$250	1.8	<b>⊅</b> U
Pay	vback 2 – 10+ year	rs (low/no c	ost opportu	nities)				
3	Replace incandescent lamps with equivalent LEDs in attic		836	0	\$109	\$220	2.0	\$0
4	Replace 32W T8 lamps with 25W T8 lamps	0.5	1,252	0	\$163	\$380	2.3	\$0
To	tal	0.5	6,350	0	\$802	\$1,350	1.7	\$0

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3

## **Energy Conservation Opportunity Analysis**

#### **Opportunity 1: Replace 30 gallon water heater with lower input model and smaller capacity**

The water heater inside the shop is a 30 gallon water heater used for bathrooms and the kitchen faucet. The existing water heater has reached end of life and contains (2) 4,500 watt elements and has a 30 gallon capacity. You may want to consider a point of use water heater as a replacement more on the magnitude of a 1,500 watt or 2,000 watt element with a 15-20 gallon tank. There would be less energy to heat the water and less total water being stored.





#### **Opportunity 2: Install occupancy sensors**

You may want to install Occupancy Sensors to automatically turn lights off in areas such as restrooms, storage rooms, or other rooms where lights could get left on. Occupancy sensors limit the amount of time the lights in each room are left on while unoccupied. Sensors can be purchased fairly inexpensively, for roughly \$20-\$100 each depending on type and style. The savings for installing these sensors varies greatly depending on the quantity of fixtures controlled as well as the amount of human traffic through the room. The typical payback for a break room and restroom installation is under two years. The most beneficial locations would be the attic storage areas as well as the general shop area.



#### **Opportunity 3: Replace incandescent lamps with equivalent LEDs in attic**

Incandescent lamps are used in the upstairs attic storage area. You may want to consider replacing these lamps with LED's, especially if they are left on for extended periods of time. LED lamps use 75% less energy than incandescent and last up to 20x longer before needed replacement. Estimated savings were based upon replacing (11) incandescent lamps with (11) LEDs.



#### **Opportunity 4: Replace 32W T8 lamps with 25W T8 lamps**

The shop consists of 32W T8 fixtures containing 32W lamps. You may want to consider replacing these lamps with 25W T8 lamps if the ballast allows. While the brightness reduction is minimal, the energy savings is noticeable. Be sure to test in a few fixtures to confirm ballast compatibility before replacing all of them. Lamps cost \$3-5 a piece and pay for themselves in just a few years.

#### **Opportunity 5: Upgrade to Energy Star Refrigerator**

The refrigerator in the shop is over 25 years old and drastic improvements to the refrigeration cycle have been made in the last 25 years. In fact, a modern energy star refrigerator is over 7x more efficient than a model prior to 1992. Consider upgrading your refrigerator for improved energy performance and reliability.





# Flandrau State Park - Women's Group Sanitation (B40044)

Energy Auditor:

#### Chris Droske, CEM | Energy Advisor

Date of Assessment:

Franklin Energy Services, LLC 2303 Wycliff St., Suite 2E | St. Paul, MN 55114 5/11/2015

612.284.3663 Ext. 2115 Phone 651.917.4073 Fax 715.630.8774 Cell Phone

#### **Executive Summary**



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Flandrau State Park has already implemented a number of energy saving measures, such as:

- Fluorescent lighting throughout the facility
- Lighting on occupancy sensors

The following energy savings opportunities are the measures you may want to consider first, based on the recent walk-through of your facility. Corresponding savings values can be found in the following Energy Conservation Opportunities table.

- Replace 32W T8 lamps with 25W T8 lamps
- Replace 2.5 gpm showerheads with 1.5 gpm showerheads

Additional opportunities to consider can be found later in the report.

## **Energy Conservation Opportunities**

Please refer to the Conservation Opportunity Analysis section following this table for a detailed description.

Pay	Energy Conservation Opportunity /back less than 2 y	Estimated Demand Savings (kW/yr) zears (low/n	Estimated · Energy Savings (kWh/yr) o cost oppo	Estimated Thermal Savings (Therm/yr) rtunities)	Estimated Annual Cost Savings (\$)	Estimated Capital Cost (\$) <sup>1</sup>	Simple Payback (Years) <sup>2</sup>	Estimated Utility Incentives (\$)
1	Replace 2.5 gpm showerheads with 1.5 gpm showerheads	0.0	0	105	\$161	\$80	0.5	\$0
Pay	/back 2 – 10+ year	rs (low/no c	ost opportu	nities)				
2	Replace 32W T8 lamps with 25W T8 lamps	0.2	337	0	\$44	\$100	2.3	\$0
Tot	tal	0.2	337	105	\$204	\$180	0.9	\$0

<sup>1</sup> Estimated capital cost includes estimated equipment and labor costs unless otherwise noted. Capital Cost is defined as the total equipment and labor cost for the project. Incremental Cost refers to the additional cost associated with the increased capital cost for replacing standard equipment with higher efficiency equipment. <sup>2</sup> Simple Payback includes incentive unless estimated value is not given.

### **Energy Conservation Opportunity Analysis**

#### **Opportunity 1: Replace 2.5 gpm showerheads with 1.5 gpm showerheads**

The shower stalls have 2.5 gallon per minute showerheads. Consider replacing these showerheads with 1.5 gpm showerheads to conserve water, and the energy required to heat it.

#### **Opportunity 2: Replace 32W T8 lamps with 25W T8 lamps**

The sanitation building consists of 32W T8 fixtures containing 32W lamps. You may want to consider replacing these lamps with 25W T8 lamps if the ballast allows. While the brightness reduction is minimal, the energy savings is noticeable. Be sure to test in a few fixtures to confirm ballast compatibility before replacing all of them. Lamps cost \$3-5 a piece and pay for themselves in just a few years.

#### **AIR LEAKAGE TEST RESULTS**



Date of Test: 2/5/2013 Technician: Alan Christenson

Test Performed For: Minnesota DNR 500 Lafayette Road St. Paul, MN 55155 Phone: 651-259-5968 Test File: Bldg # 8H379 Flandrau State Park Residence Project Number:

**Test Results** 

1. Measured Leakage: 128 sq. in. (2465 CFM @ 50 Pa)

This leakage area represents the cumulative size of all holes and cracks in the exterior of your house through which unconditioned outside air enters your home and conditioned air escapes.

2. Est. Annual Air Change Rate: 0.43 air changes/hour (32.5 CFM/person) \*

3. Est. Cost of Air Leakage \$969 per year (heating and cooling) \*

#### **Ventilation Guideline**

ASHRAE Standard 62.2-2010 recommends minimum ventilation requirements for residential buildings to maintain acceptable indoor air quality. Based on the results of this airtightness test, Standard 62.2-2010 recommends that a whole building mechanical ventilation rate of **33 CFM** be continuously provided in this building. \*\*

#### Additional Information

If some of the house leakage is located in the forced air duct system, both the leakage rate and energy costs will tend to be higher than reported above. Duct leaks result in much greater air leakage because they are subjected to much higher pressures than typical house leaks. Duct leaks can also seriously degrade indoor air quality.

Many factors contribute to indoor air quality including ventilation rates, sources and locations of pollutants, proper operation of combustion appliances and occupant behavior. Additional testing is needed to fully evaluate the air quality in your house.

\* The estimated annual air change rate is based on ASHRAE Standard 136-93 and assumes no mechanical ventilation. Actual air change rates and costs may differ from these estimates by a factor of 2 or more.

\*\* ASHRAE Standard 62.2-2010 also contains requirements for local kitchen and bathroom mechanical exhaust systems. These local exhaust systems may be incorporated into a whole building ventilation strategy. Consult Standard 62.2-2010 for more information on ventilation strategies and specific requirements and exceptions contained in the Standard.

#### **BUILDING LEAKAGE TEST**



Da	Date of Test: 2/5/2013		Т	Test File: Bldg # 8H379 Flandrau State Park Residence				
Cu	stomer:	Minnesota DNR 500 Lafayette Road St. Paul, MN 55155	F	Project Number:				
	Phone: 651-259		E	Building A	ng Address: Flandrau State Park Reside 1300 Summit New Ulm, MN 56073		e Park Residence 56073	
Те	st Result	:S						
1. Airflow at 50 Pascals: 2465 CFM50   (50 Pa = 0.2 w.c.) 8.15 ACH50   1.0866 CFM5 0.9008 CFM5		2465 CFM50(+ 8.15 ACH50 1.0866 CFM50/ 0.9008 CFM50/	( +/- 1.0 %) 0/ft2 floor area 0/ft2 surface area					
2.	2. Leakage Areas: 245.3 in2 (+/- 3 127.9 in2 (+/- 5			3.0 %) Ca 5.1 %) LE	%) Canadian EqLA @ 10 Pa %) LBL ELA @ 4 Pa			
3.	3. Building Leakage Curve: Flow Coefficier Exponent (n) = Correlation Coe			t (C) = 17 0.673(+ efficient =	77.5(+/- /- 0.023) 0.99655	8.2 %)		
4.	Test Sett	tings:	Test Standard: Test Mode: Dep	CGSB pressuriz	ation			
Inf	filtration	Estimates						
1.	Estimate	ed Average Annual Infil	tration Rate:	13 0.4 32	130.2 CFM 0.43 ACH 32.5 CFM per person (using bedrooms + 1)			
2.	Estimate	ed Design Infiltration Ra	ate: Wir	nter: 17 0.4	0.2 CFM 56 ACH	Summer:	160.7 CFM 0.53 ACH	
Co	ost Estim	ates	<u> </u>					
1.	Estimate	ed Cost of Air Leakage	for Heating:	\$	960 per y	ear heating		
2.	Estimate	ed Cost of Air Leakage	for Cooling:	\$	9 per ye	ear cooling		
Me	echanica	I Ventilation Guidelin	e (based on ASI	HRAE 62	2.2-2010)			
	Recomm	nended Whole Bldg Ra	te:	32	.8 CFM			
	Bas	e Rate:				52.7 CFM		
	Sup Infil	pplemental Rate: tration Credit:				22.5 CFM <42.4 CFM>		



Date of Test: 2/5/2013 Test File: Bldg # 8H379 Flandrau State Park Residence

#### **Building Information**

#### Location Climate Information

Volume	18144
Surface Area	2736
Floor Area	2268
Height	8
# of Bedrooms	3
# of Occupants	1
Year of Construction	1940
Wind Shield	М

Ventilation Weather Factor	1.10
Energy Climate Factor	15.00
Heating Degree Days	9092
Cooling Degree Days	222
Design Winter Wind Speed	8.0 mph
Design Summer Wind Speed	14.6 mph
Design Winter Temp Diff	87 deg F
Design Summer Temp Diff	13 deg F

#### Heating and Cooling Cost and Efficiency Information

Heating Fuel	Propane
Heating Fuel Cost	\$3.60/gallon
Heating Efficiency %	92.00
Cooling Fuel Cost	\$0.090/kwh
Cooling SEER	10.0

#### **Equipment Information**

Туре	Manufacturer	Model	Serial Number	<b>Custom Calibration Date</b>
Fan	Energy Conservatory	Model 3 (110V)	17406	Default
Micromanometer	Energy Conservatory	DG700	15353-7	1/3/2013



Date of Test: 2/5/2013 Test File: Bldg # 8H379 Flandrau State Park Residence

#### **Depressurization Test:**

Environmental Data				
Indoor Temperature (°F)	Outdoor Temperature (°F)			
66.0	0.0			

.

.....

#### **Data Points**

Nominal Building Pressure (Pa)	Baseline Adjusted Building Pressure (Pa)	Fan Pressure (Pa)	Nominal Flow (cfm)	Adjusted Flow (cfm)	% Error	Fan Configuration	
-2.2	n/a	n/a					
-52.3	-50.4	217.1	2620	2450	-1.2	Ring A	
-47.2	-45.3	190.9	2461	2301	-0.2	Ring A	
-41.3	-39.4	160.8	2263	2117	0.9	Ring A	
-36.6	-34.7	134.6	2075	1941	0.6	Ring A	
-31.3	-29.4	108.2	1865	1744	1.2	Ring A	
-25.0	-23.1	81.5	1625	1519	3.5	Ring A	
-22.9	-21.0	64.4	1448	1354	-1.5	Ring A	
-19.5	-17.6	46.5	1236	1156	-5.2	Ring A	
-1.6	n/a	n/a				U U	

#### Deviations from Standard CGSB - Test Parameters

- One or more of the test data points was taken at a building pressure that differed by more than 2.5 Pascals from the target pressure.



Date of Test: 2/5/2013 Test File: Bldg # 8H379 Flandrau State Park Residence

#### Comments

Energy audit concerns:

- 1) Air infiltration is coming in from the attic space passing down through the ceiling into the wall cavities, around the door casings and the bypasses to the attic (electrical wiring, plumbing vents, top wall plates).
- 2) This building has low levels of attic insulation. The attic should have all penetrations sealed and then insulated to a minimum R-50.
- 3) The attic needs to have new vents installed to supply air flow from the bottom of the attic area to the top.
- 4) The attic access doors should be insulated doors and weatherstripped.
- 5) All electrical boxes on the exterior walls are leaking in air. Seal air leaks with caulking, spray foam and foam gaskets.
- 6) There is ductwork in the attic. This should be sealed and insulated.
- 7) Some return air ductwork in the basement was found to be disconnected. Consult with HVAC professional for proper installation of the air exchanger.
- 8) The foudation walls should be insulated with a continuous product minimum of R-10.

\*\* Refer to report with photos for more detailed information. \*\*



## **Inspection Report**

#### **Report Date**

2/5/2014

Company

Address

Thermographer

Red Door Energy Auditing LLC 206 Walnut Circle, Cold Spring, MN 56320 Alan Christenson

Customer

Site Address

Flandrau State Park Residence 1300 Summit,

**Contact Person** 

New Ulm, MN 56073 Janci Curikis



#### Image and Object Parameters

**Text Comments** 

#### Description

Flandrau State Park Residence 1300 Summit New Ulm, MN

## **Inspection Report**



# Report Date2/5/2014CompanyRed Door Energy<br/>Auditing LLCAddress206 Walnut Circle,<br/>Cold Spring, MN 56320ThermographerAlan Christenson

Customer

Site Address

**Contact Person** 



1300 Summit, New Ulm, MN 56073 Janci Curikis



Text Comments

Image and Object Parameters

Description

High efficient furnace is installed.


## Report Date

2/5/2014

Company

Address

Thermographer

Red Door Energy Auditing LLC 206 Walnut Circle, Cold Spring, MN 56320 Alan Christenson Customer

Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis

**Contact Person** 



#### Image and Object Parameters

**Text Comments** 

#### Description

The exhaust fan motor vents in the furnace was plugged with dust. The furnace needs a clean and tune.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer .

Site Address

**Contact Person** 

Flandrau State Park Residence

1300 Summit, New Ulm, MN 56073

Janci Curikis



#### Image and Object Parameters

Text Comments

#### Description

Furnace filter was very dirty. This should be replaced on a regular schedule so the furnace and AC can operate efficiently.



## Report Date

2/5/2014

Company Red Door Energy Auditing LLC Address 206 Walnut Circle, Cold Spring, MN 56320 Thermographer Alan Christenson

Customer
Site Address
Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



#### Image and Object Parameters

Text Comments

#### Description

The furnace exhaust was iced up. Close to be blocked. The location behind the AC unit seems to be containing the moisture and freezing.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address
Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



#### Image and Object Parameters

Text Comments

## Description

The home is equiped with a good ventilation system. This should be verified that it is installed properly.

Flandrau State Park

Residence 1300 Summit, New Ulm, MN 56073



Report Date	2/5/2014	
Company	Red Door Energy Auditing LLC	Customer
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address
Thermographer	Alan Christenson	Contact Perso

Contact Person	Janci Curikis	
		したかいの
LEERSE.		

#### Image and Object Parameters

**Text Comments** 

#### Description

This is the air intake for the air exchanger on the exterior of the house. The screens on these should be checked and clean evey 3 months.



Flandrau State Park

Residence

## Report Date

2/5/2014

Company

Address

Thermographer

Red Door Energy Auditing LLC

206 Walnut Circle, Cold Spring, MN 56320

Alan Christenson

Customer

Site Address

Contact Person



Image and Object Parameters

Text Comments

#### Description

Insulate the water heater to keep it from running more often.



## Report Date

2/5/2014

Company Red Door Energy Auditing LLC Address 206 Walnut Circle, Cold Spring, MN 56320 Thermographer Alan Christenson Customer

Site Address

Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis

#### Image and Object Parameters

**Text Comments** 

#### Description

Programmable thermostats can save energy and money when used properly.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	

Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Contact Person

Janci Curikis



#### Image and Object Parameters

Description

Smoke detectors where on site.



## Report Date

2/5/2014

Company

Address

Thermographer

Red Door Energy Auditing LLC 206 Walnut Circle, Cold Spring, MN 56320 Alan Christenson

Customer	
Site Address	

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis

**Contact Person** 



#### Image and Object Parameters

## Description

CO detectors where on site.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer

Site Address

**Contact Person** 

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



**Text Comments** 

## Image and Object Parameters

#### Description

The bath fan flow was measured at 20 cfm. This is minimum for bathroom size.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address
Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



#### Image and Object Parameters

**Text Comments** 

#### Description

Very low levels of attic insulation was found above the second floor ceiling. Minimum R-50 is recommended after air sealing.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address
Contact Porce

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis





#### Image and Object Parameters

Text Comments

## Description

Vermiculite was present. Take caution, some vermiculite is found to have abestos in it.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis



#### Image and Object Parameters

**Text Comments** 

#### Description

This image shows a cold air return that is partially removed allowing the furnace to pull return air direct from the basement. This will result in uneven air flow through the house, creating cold spots.



## Report Date

2/5/2014

Company Red Door Energy Auditing LLC Address 206 Walnut Circle, Cold Spring, MN 56320 Thermographer Alan Christenson

Customer
Site Address

**Contact Person** 

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



Text Comments

#### Image and Object Parameters

## Description

Another picture of the removed duct work.



#### **Report Date**

2/5/2014

Company Red Door Energy Auditing LLC Address 206 Walnut Circle, Cold Spring, MN 56320 Thermographer Alan Christenson

Customer
Site Address
Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis

Contact Person



#### Image and Object Parameters

**Text Comments** 

#### Description

Little or no attic insulation was found to be common for the house. Upgrading the insulation to a R-50 after air sealing will change the performance of the home.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer

Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis

**Contact Person** 



Image and Object Parameters

Text Comments

#### Description

The attic needs to have balance ventilation installed.



#### Report Date

Company

Address

2/5/2014

Red Door Energy Auditing LLC 206 Walnut Circle, Cold Spring, MN 56320 Alan Christenson Thermographer

Customer

Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis

**Contact Person** 



#### Image and Object Parameters

**Text Comments** 

#### Description

Another attic view.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

**Contact Person** 

Janci Curikis



**Text Comments** 

#### Image and Object Parameters

## Description

Uninsulated duct work in the attic. Seal the duct work and insulate.



# Report Date2/5/2014CompanyRed Door Energy<br/>Auditing LLCAddress206 Walnut Circle,<br/>Cold Spring, MN 56320ThermographerAlan Christenson

Customer	
Site Address	

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis

Contact Person



#### Image and Object Parameters

**Text Comments** 

#### Description

Single pane window with storms where found to be in good shape. They all could use some weather stripping.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis

**Contact Person** 



#### Image and Object Parameters

Text Comments

## Description

Insulate the foundation walls with a continuous rigid insulation to a minimum R-10.



#### Report Date

2/5/2014

Company

Address

Thermographer

Red Door Energy Auditing LLC 206 Walnut Circle, Cold Spring, MN 56320 Alan Christenson

Customer	
Site Address	
Contact Person	

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



#### Image and Object Parameters

**Text Comments** 

#### Description

This is an uninsulated attic door. These doors should be insulated and air tight.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	

Site Address

Flandrau State Park

**Contact Person** 



Janci Curikis



#### Image and Object Parameters

**Text Comments** 

## Description

Replacing the flex vent pipe with a smooth rigid metal pipe will increase the efficiency of the dryer by haveing shorter drying times.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
	52.9 °F		



#### Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:02:33 AM
Image Name	Flandrau (45a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



**Text Comments** 

#### Description

This image shows air infiltrating at the top of an exterior wall. The air appears to be coming from the attic space above.

Air sealing the attic will stop this air flow.



2/5/2014

Report Date

# Inspection Report

Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
Sp2 53.5 Sp1 31.8 Image and Object Parar	57.6 °F 31.4	Text Comments	
Camera Model	Elir b50		
Image Date	2/5/2014 11:03:44 AM		
Image Name	Flandrau (46a).jpg		
Emissivity	0.96		
Reflected apparent temperature	72.0 °F		
Object Distance	3.3 ft		
Description			

This image shows air leaking in at an outside corner. Caulking this seam will slow this air flow down.

## 

# **Inspection Report**

Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
5222	53.6 PF 5137.1 58.0		
Image and Object Par	ameters	Text Comments	
Camera Model	Flir b50		
Image Date	2/5/2014 11:04:01 AM		
Image Name	Flandrau (47a).jpg		

#### Description

Emissivity

temperature Object Distance

Reflected apparent

0.96 72.0 °F

3.3 ft

Air leaking in at the bottom plate of an exterior wall. Spray foaming the rim joist area and caulking along the bottom of the wall will help stop the air flow.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer
Site Address
Contact Person

Flandrau State Park Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis



## Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:04:15 Al
Image Name	Flandrau (48a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



Image Date	2/5/2014 11:04:15 AM
Image Name	Flandrau (48a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
Description	

#### Registers in the exterior wall don't allow proper room for insulation. Moving these to the floor would make them more efficient.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
5p244.8	501 344 34.8	Text Comments	
Camera Model	Flir b50	Text Comments	
Image Date	2/5/2014 11:07:19 AM		
Image Name	Flandrau (50a).jpg		
Emissivity	0.96		
Reflected apparent temperature	72.0 °F		
Object Distance	3.3 ft		
Description			

This image shows air leaking in through an electrical box. Intalling foam gaskets can slow the air flow.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Image and Object Parameters

	Cold	Spring, iviiv	56320
her	Alan Christenson		ו
	1	54 5 ºF	
Sp1 48.6			
Ť			

45.3

Customer	
Site Address	
Contact Person	





Camera Model	Flir b50
Image Date	2/5/2014 11:09:15 AM
Image Name	Flandrau (51a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
Description	

Another image where air is leaking into the wall from the attic space above.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Sp1 18.6

40.1 °

18

Customer	Fla
	Re
Site Address	13
	Ne
Contact Person	Ja





 Image and Object Parameters
 Text Comments

 Camera Model
 Flir b50

 Image Date
 2/5/2014 11:09:41 AM

 Image Name
 Flandrau (52a).jpg

 Emissivity
 0.96

 Reflected apparent temperature
 72.0 °F

 Object Distance
 3.3 ft

#### Description

This image shows air leaking in around a window sash. Weather stripping the windows will help slow down the air flow. This was found to be common for the house.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
Spiles	52.6 °F 15.2		
		Text Comments	
Camera Model	FIIR DOU		
Image Date	2/5/2014 11:13:11 AM		
Image Name	Flandrau (55a).jpg		
Emissivity	0.96		
Reflected apparent temperature	72.0 °F		
Object Distance	3.3 ft		
Description			

Another leaky window sash.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	Flandrau State Park Residence
Site Address	1300 Summit, New Ulm, MN 56073
Contact Person	Janci Curikis



Camera Model	Flir b50
Image Date	2/5/2014 11:14:45 AM
Image Name	Flandrau (56a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



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2 IST	10071 63 1 61 5 1	10.00 0 10.00 0 10.00 00
		THE REAL PROPERTY.

Image Date	2/5/2014 11:14:45 AM
Image Name	Flandrau (56a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
Description	

More air leaking in from the attic.

Flandrau State Park

New Ulm, MN 56073

Residence

1300 Summit,



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson



Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:17:27 AM
Image Name	Flandrau (58a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft

Contact Person	Janci Curikis

Text Comments

Customer

Site Address

Camera Model	Flir b50
Image Date	2/5/2014 11:17:27 AM
Image Name	Flandrau (58a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft

#### Description

Air leaking in from behind the door casing. Removing the casing and insulating with a non-expanding spray foam is the best solution.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
	50.9 °F		



#### Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:17:37 AM
Image Name	Flandrau (59a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
Description	



**Text Comments** 

Camera Model	
Image Date	2/5/2014 11:17:37 AM
Image Name	Flandrau (59a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
scription	

Another electrical box.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	

Site Address

**Contact Person** 

Residence 1300 Summit, New Ulm, MN 56073 Janci Curikis

Flandrau State Park



## Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:17:48 AM
Image Name	Flandrau (60a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



Text Comments

#### Description

The exterior door bottoms where found to be leaky. Replacing the sill and door sweep will help make the door fit tight.



Company Red Door Energy Cu Auditing LLC	ustomer
Address 206 Walnut Circle, Sit Cold Spring, MN 56320	ite Address
Thermographer Alan Christenson Co	ontact Perso

ər	Flandrau State Park Residence
lress	1300 Summit, New Ulm, MN 56073
Person	Janci Curikis



## Image and Object Parameters

Text Comments

## Description

The threshold is missing the weather strip.



Report Date	2/5/2014	
Company	Red Door Energy Auditing LLC	Customer
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address
Thermographer	Alan Christenson	Contact Person

Flandrau State Park Residence	
1300 Summit, New Ulm, MN 56073	
Janci Curikis	



#### Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:19:09 AM
Image Name	Flandrau (62a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



**Text Comments** 

Image Date	2/5/2014 11:19:09 AM
Image Name	Flandrau (62a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	<b>3.3 ft</b>

#### Description

Air was found to be leaking into the kitchen soffits. This is a sign of no insulation to the exterior in these locations. Open up and insulate where possible.


Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	Flandrau State Park Residence
Site Address	1300 Summit, New Ulm, MN 56073
Contact Person	Janci Curikis



	The second s
Camera Model	Flir b50
Image Date	2/5/2014 11:24:13 AM
Image Name	Flandrau (66a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



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1 III - I	SYX 60 2 2 2 2 2 2	RECEIPTION STREET
and the second sec		A Design of the second s

#### Description

This image shows that air is leaking in through the rim joist at the exterior. Spray foam this area will work best.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
Sp2 41.5	46.4 °F		
Image and Object Paran	neters	Text Comments	
Camera Model	Flir b50		
Image Date	2/5/2014 11:25:33 AM		
Image Name	Flandrau (69a).jpg		
Emissivity	0.96	•	
Reflected apparent temperature	72.0 °F	•	
Object Distance	3.3 ft		
Description			

Another rim joist area.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis



Image and Object Parameters



**Text Comments** 

Camera Model	Flir b50
Image Date	2/5/2014 11:29:00 AM
Image Name	Flandrau (71a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft
Description	

#### Description

Unintentional opening in the first floor with air leaking in. Close off and air seal the hole.

Flandrau State Park

Residence 1300 Summit, New Ulm, MN 56073

Janci Curikis



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Report Date	2/5/2014	
Company	Red Door Energy Auditing LLC	Customer
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address
Thermographer	Alan Christenson	Contact Person

40.3 °F



**Text Comments** 



0.96

72.0 °F

3.3 ft

Description

Emissivity

temperature Object Distance

Reflected apparent

Low levels of insulation at the sloped ceilings of the second floor. This can be a hard area to get at. Consult with an insulation contractor.



Report Date	2/5/2014
Company	Red Door Energy Auditing LLC
Address	206 Walnut Circle, Cold Spring, MN 56320
Thermographer	Alan Christenson

Customer	Flandrau State Park Residence
Site Address	1300 Summit, New Ulm, MN 56073
Contact Person	Janci Curikis



### Image and Object Parameters

Camera Model	Flir b50
Image Date	2/5/2014 11:51:22 AM
Image Name	Flandrau (78a).jpg
Emissivity	0.96
Reflected apparent temperature	72.0 °F
Object Distance	3.3 ft



**Text Comments** 

## Description

Air leaking in at the second floor.



Report Date	2/5/2014		
Company	Red Door Energy Auditing LLC	Customer	Flandrau State Park Residence
Address	206 Walnut Circle, Cold Spring, MN 56320	Site Address	1300 Summit, New Ulm, MN 56073
Thermographer	Alan Christenson	Contact Person	Janci Curikis
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Image and Object Para	neters	Text Comments	
Camera Model	Flir b50		
Image Date	2/5/2014 12:13:11 PM		
Image Name	Flandrau (80a).jpg		
Emissivity	0.96		
Reflected apparent temperature	72.0 °F		
Object Distance	3.3 ft		
Description			

Electrical box in the ceiling of the second floor. Air seal these boxes in the attic to stop the air flow.