
The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

Appendix A

Town of Henniker Municipal Buildings IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*

What is Infrared Imaging?

Infrared (IR) imaging allows for the visual observation of temperature differences. Using the IR camera, it is possible to capture heat signatures of objects and convert them into visible images. Human vision can see only visible light, which is only a small part of the electromagnetic spectrum. The infrared radiation emitted by or reflected from objects is detected and picked up by thermal infrared imagers. The thermal imager lens directs the infrared rays onto an infrared sensor array. These transform the infrared energy into electrical signals and these electric signals are then converted into an image.

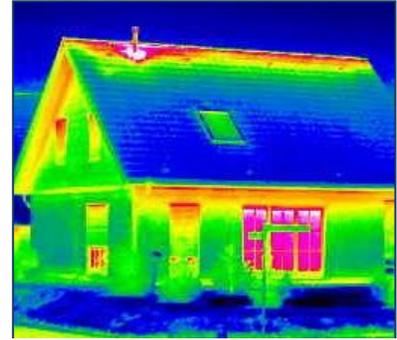


Photo courtesy of <http://www.nachi.org>

An infrared camera can help in the understanding of a building's systems and components. Infrared radiation penetrates areas that visible light cannot, and reveals obscure conditions that could not be detected with the human eye. Its ability to read heat as color and then display that information in a way that's easy to understand makes it a key tool in inspecting buildings. Abnormally hot electrical components and areas of moisture can be located based on apparent temperature differences. Heat loss, air leakage and even areas of insufficient insulation in a building envelope can be pinpointed quickly and accurately.

The Three Methods of Heat Transfer

Heat can be transferred by any of three methods: conduction, convection or radiation. Often more than one form of heat transfer is at work within a building. Heat always travels from areas of high temperature to areas of low temperature, and the greater the difference in temperature (ΔT) the more heat transfer that will occur.

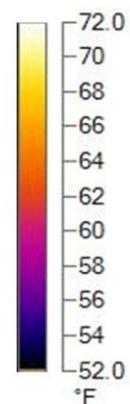
Conduction is the transfer of thermal energy from one object to another through direct contact.

Convection is the transfer of heat that occurs when molecules move and/or currents circulate between the warm and cool air (convection can also happen in gas and fluids).

Radiation is the movement of heat that occurs as radiant energy moves without a direct medium of transfer. In other words, heat moves through space from one object to another without the objects being in contact.

How to Read Thermal Images

Each image has a scale to the right of the image. That scale has a range that goes from the highest temperature detected within the image, to the lowest and the coordinating color that represents that temperature. Each image will have its own scale and range. It is important to look at the scale, its high and low temperatures to analyze the image correctly. Generally the oranges and yellows represent warmer temperatures and the purple and dark blues represent colder temperatures.



Example of a thermal image scale

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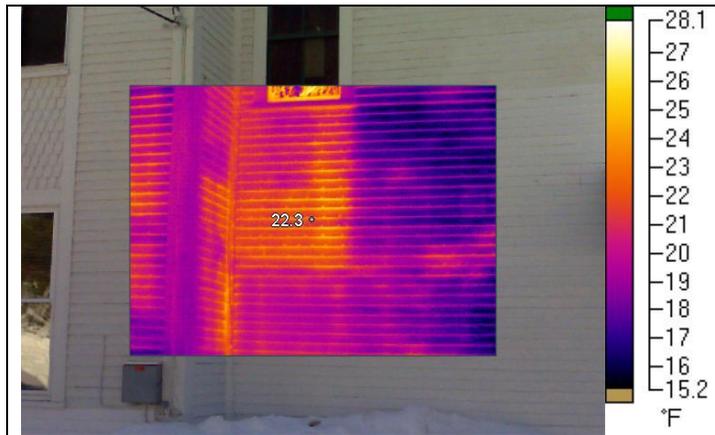
Town Hall IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*

Prepared for:

Town Hall
18 Depot Hill Road



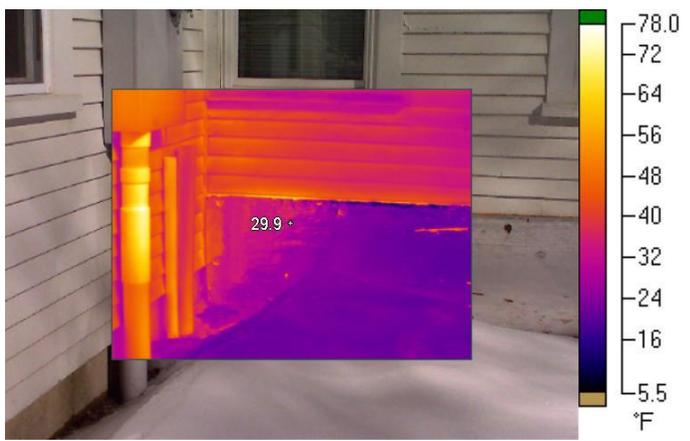


In this photo the exterior of the building is showing variances in temperature. There appear to be warmer and cooler areas due to the location of insulation..

IR001352.IS2
3/3/2011 1:55:35 PM

Image Info

Average Temperature	19.7°F
Image Range	15.3°F to 27.8°F
Image Time	3/3/2011 1:55:35 PM



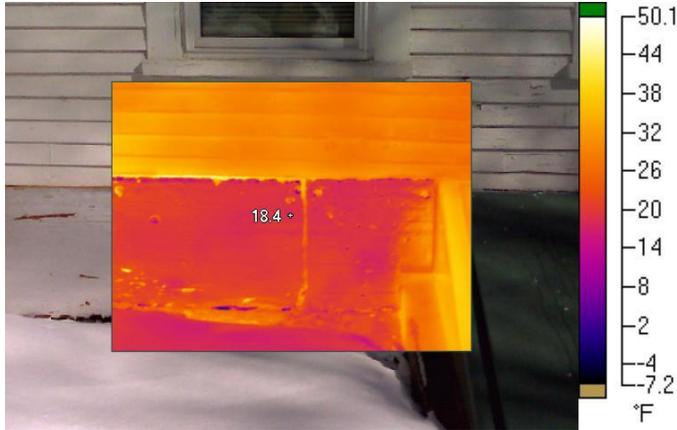
This photo is of the back of building where some insulation was added to the foundation. The insulation is working but should be permanently installed and covered with protective siding.

*Note: on an April 7th site visit this insulation had been removed.

IR001354.IS2
3/3/2011 1:56:24 PM

Image Info

Average Temperature	34.1°F
Image Range	~6.3°F to 77.1°F
Image Time	3/3/2011 1:56:24 PM

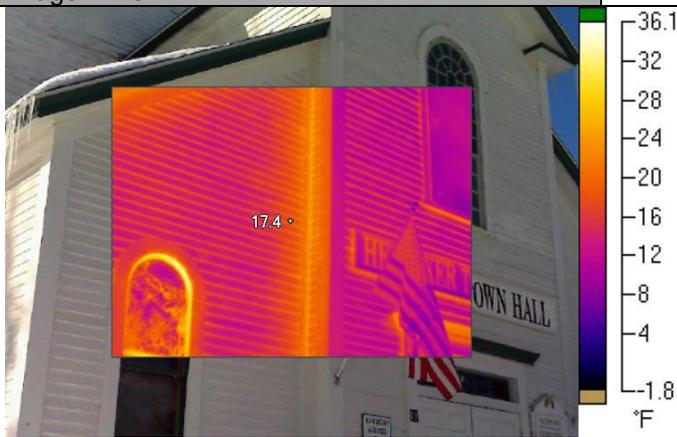


Another shot of the foundation wall with added exterior insulation near the bulkhead doors preventing heat loss through the foundation.

IR001355.IS2
3/3/2011 1:56:30 PM

Image Info

Average Temperature	25.0°F
Image Range	~-5.4°F to 48.3°F
Image Time	3/3/2011 1:56:30 PM

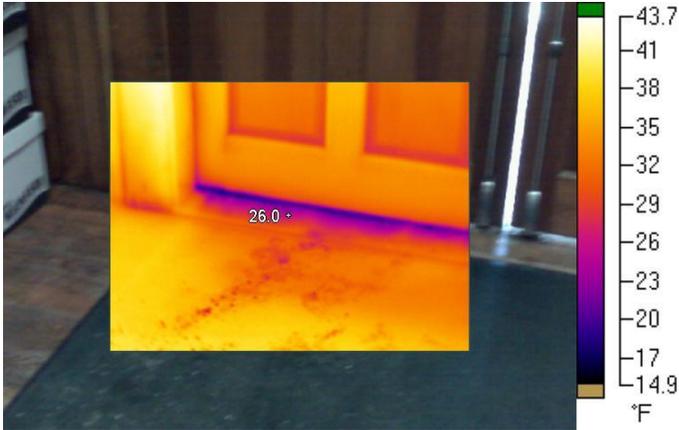


There is unheated space behind these walls so we see very little temperature differences in the wall.

IR001367.IS2
3/3/2011 2:01:12 PM

Image Info

Average Temperature	15.2°F
Image Range	~-0.7°F to 34.4°F
Image Time	3/3/2011 2:01:12 PM

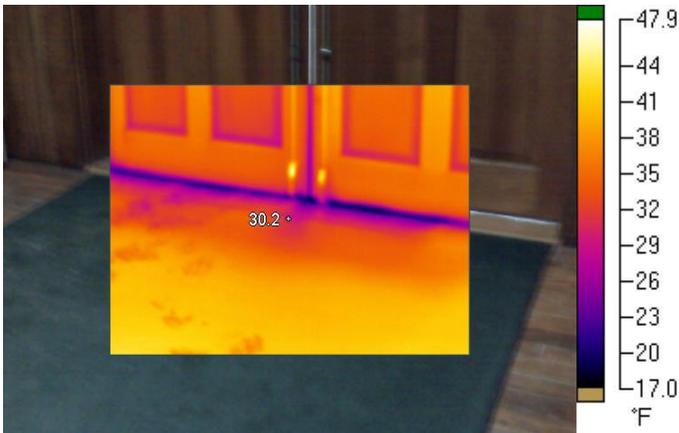


Inside the double exterior doors have large gaps at the bottoms and between the doors where cold air comes in.

IR001370.IS2
3/3/2011 2:02:57 PM

Image Info

Average Temperature	33.4°F
Image Range	17.9°F to 42.9°F
Image Time	3/3/2011 2:02:57 PM



Note the cold entering at the bottom of the doors and traveling across the floor due to the large gaps.

IR001371.IS2
3/3/2011 2:03:09 PM

Image Info

Average Temperature	35.4°F
Image Range	18.7°F to 46.3°F
Image Time	3/3/2011 2:03:09 PM



Wall of sitting / waiting area. This image shows gaps and inconsistencies in the insulation. Indicating possible missing or settling batt insulation. If the bats were not properly tacked in they can start to settle within their bay, decreasing their effectiveness.

The batt has settled to the bottom of this bay.

This bay seems to not have a fiberglass batt in it at all.

IR001375.IS2
3/3/2011 2:05:51 PM

Image Info

Average Temperature	65.6°F
Image Range	59.2°F to 72.9°F
Image Time	3/3/2011 2:05:51 PM



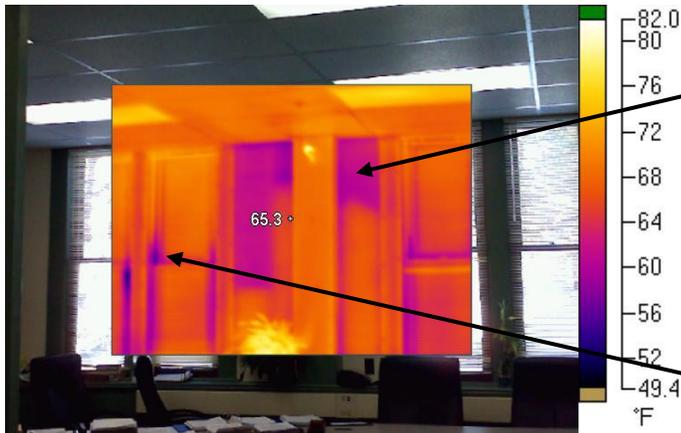
This wall separates the office space, which is conditioned, from the main entrance and stairwell, which is not. This wall is showing cool and is lacking insulation. Note the original lathe.

Un-insulated wall

IR001376.IS2
3/3/2011 2:05:57 PM

Image Info

Average Temperature	64.5°F
Image Range	58.6°F to 70.2°F
Image Time	3/3/2011 2:05:57 PM



In the Selectmen Meeting Room it appears that the insulation in the walls is settling in the bays, decreasing its effectiveness in the upper portion of the walls.

Also in the meeting room the areas around the windows show that cold air is infiltrating from the outside.

IR001377.IS2
3/3/2011 2:06:23 PM

Image Info

Average Temperature	66.6°F
Image Range	52.9°F to 80.3°F
Image Time	3/3/2011 2:06:23 PM



Air leakage occurring around the windows in the meeting room.

IR001379.IS2
3/3/2011 2:06:33 PM

Image Info

Average Temperature	66.7°F
Image Range	49.8°F to 72.7°F
Image Time	3/3/2011 2:06:33 PM

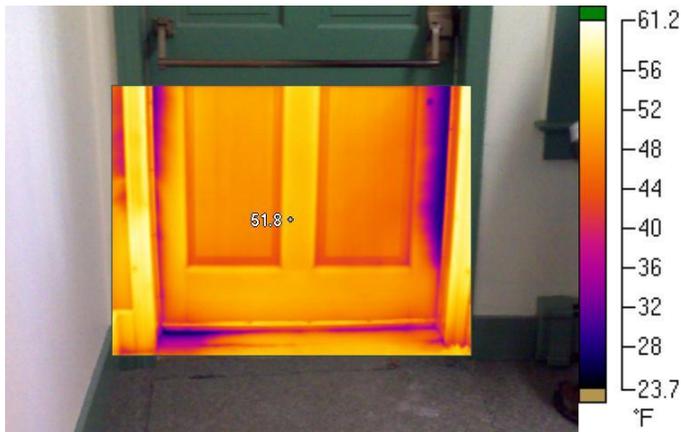


Assessing office wall. Again the fiberglass bats may be settling, allowing cold to conduct through the empty spaces.

IR001381.IS2
3/3/2011 2:07:13 PM

Image Info

Average Temperature	74.7°F
Image Range	65.8°F to 78.9°F
Image Time	3/3/2011 2:07:13 PM

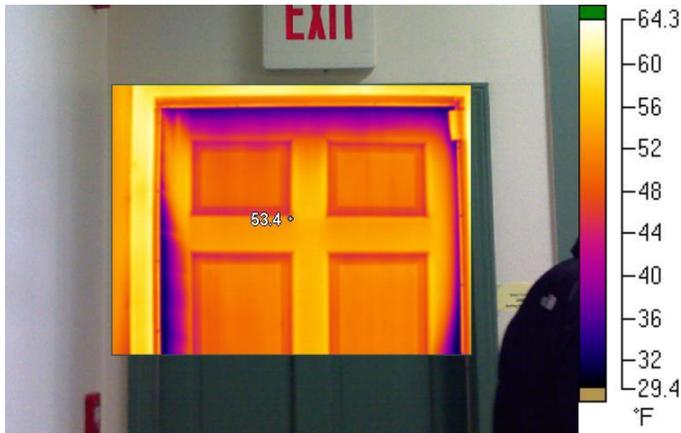


Back exterior door. Cold air is coming in and long the bottom and sides of door. Note the air coming in is close to 23 degrees.

IR001385.IS2
3/3/2011 2:11:45 PM

Image Info

Average Temperature	48.0°F
Image Range	25.2°F to 59.8°F
Image Time	3/3/2011 2:11:45 PM

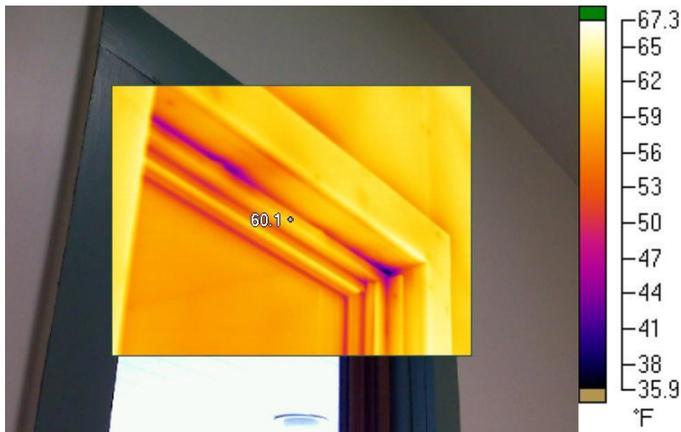


Back exterior door. Cold air is coming in through the top as well.

IR001386.IS2
3/3/2011 2:11:51 PM

Image Info

Average Temperature	50.5°F
Image Range	31.0°F to 62.9°F
Image Time	3/3/2011 2:11:51 PM

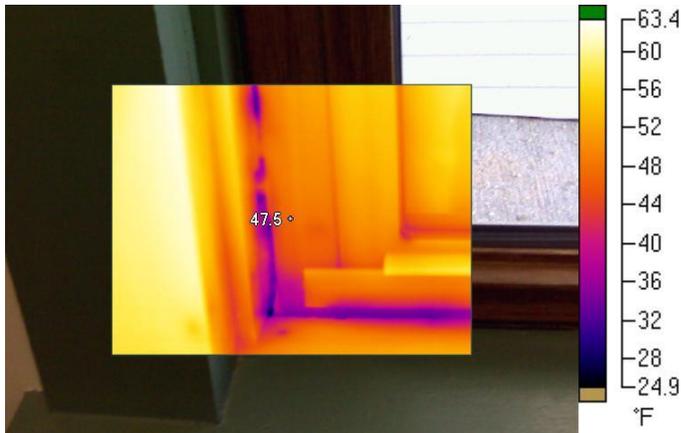


Interior doorway. Cool air along top may indicate cold moving down from the unconditioned upstairs.

IR001387.IS2
3/3/2011 2:12:17 PM

Image Info

Average Temperature	58.9°F
Image Range	38.0°F to 65.9°F
Image Time	3/3/2011 2:12:17 PM

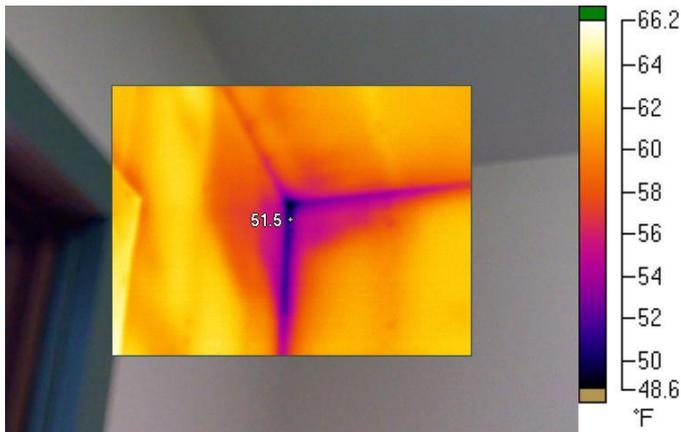


Window in the employee lounge area. This window is letting cold air in around the window seal.

IR001388.IS2
3/3/2011 2:12:38 PM

Image Info

Average Temperature	51.5°F
Image Range	26.8°F to 63.0°F
Image Time	3/3/2011 2:12:38 PM

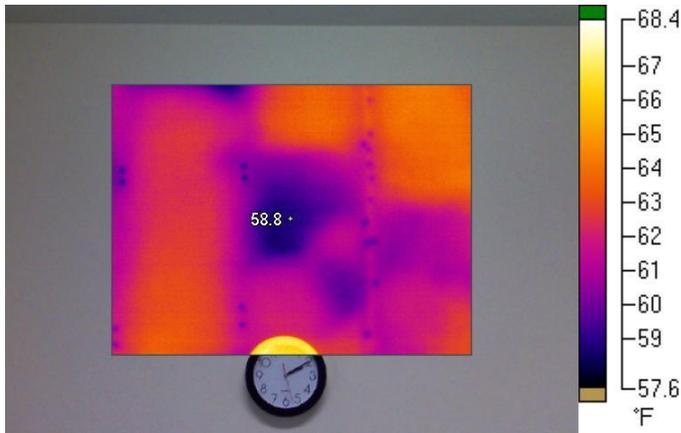


Corner of a room showing cold.

IR001389.IS2
3/3/2011 2:12:52 PM

Image Info

Average Temperature	60.2°F
Image Range	48.9°F to 66.0°F
Image Time	3/3/2011 2:12:52 PM

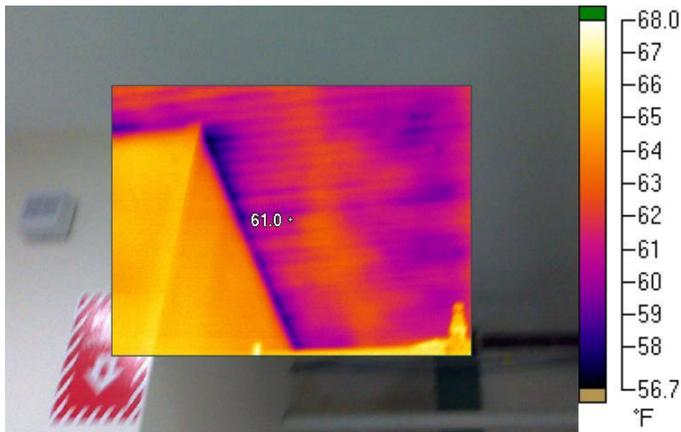


Cold spot in the wall again indicates that the fiberglass bats may be settling within their bays, or is pushed back and not touching all sides of the wall allowing for cold to "pocket" in the wall.

IR001390.IS2
3/3/2011 2:13:03 PM

Image Info

Average Temperature	61.9°F
Image Range	58.3°F to 67.6°F
Image Time	3/3/2011 2:13:03 PM

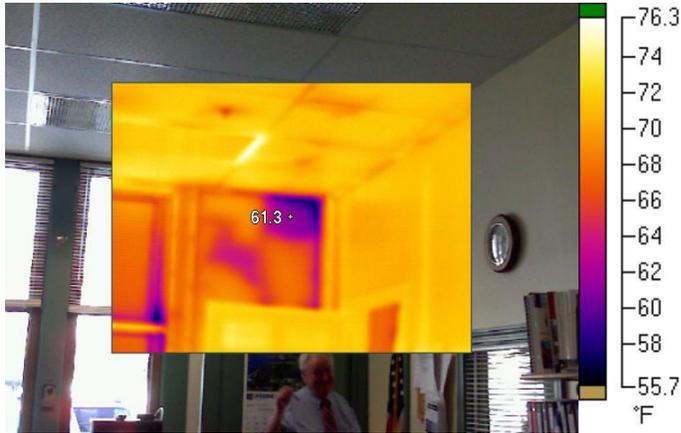


Wall to ceiling connection where cold is conducting through the floor of the space above, which is unconditioned.

IR001395.IS2
3/3/2011 2:14:35 PM

Image Info

Average Temperature	62.3°F
Image Range	57.1°F to 67.9°F
Image Time	3/3/2011 2:14:35 PM

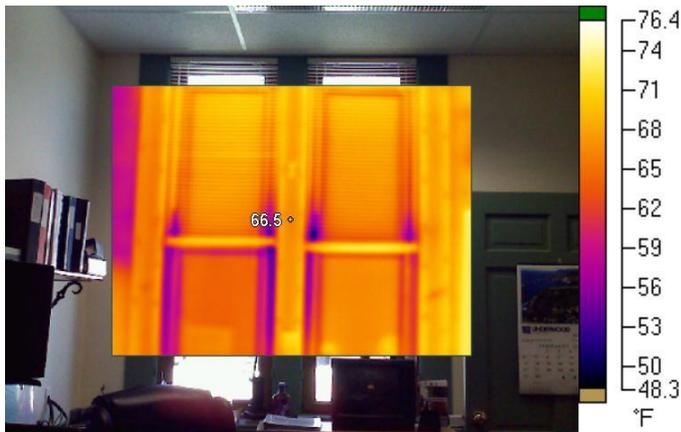


Town Administrator's Office where there is again evidence of settling of fiberglass bats in the top right portion of the wall. There also appears to be cool air coming in around the window sashes.

IR001396.IS2
3/3/2011 2:15:40 PM

Image Info

Average Temperature	69.9°F
Image Range	56.7°F to 76.0°F
Image Time	3/3/2011 2:15:40 PM

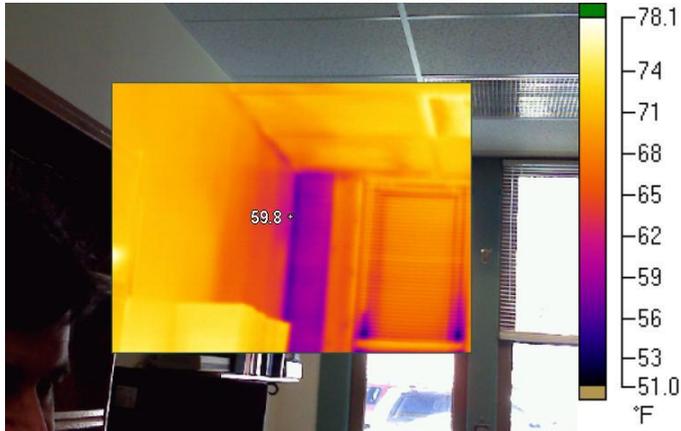


Town Administrator's Office windows. Air is coming in around the windows.

IR001397.IS2
3/3/2011 2:18:18 PM

Image Info

Average Temperature	66.1°F
Image Range	50.1°F to 73.3°F
Image Time	3/3/2011 2:18:18 PM

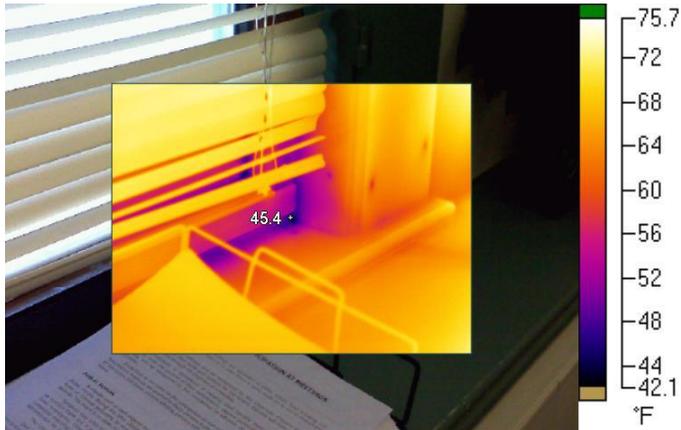


Town Administrator's Office. The bay to the left of the window may be missing insulation.

IR001398.IS2
3/3/2011 2:19:13 PM

Image Info

Average Temperature	68.5°F
Image Range	52.9°F to 77.3°F
Image Time	3/3/2011 2:19:13 PM



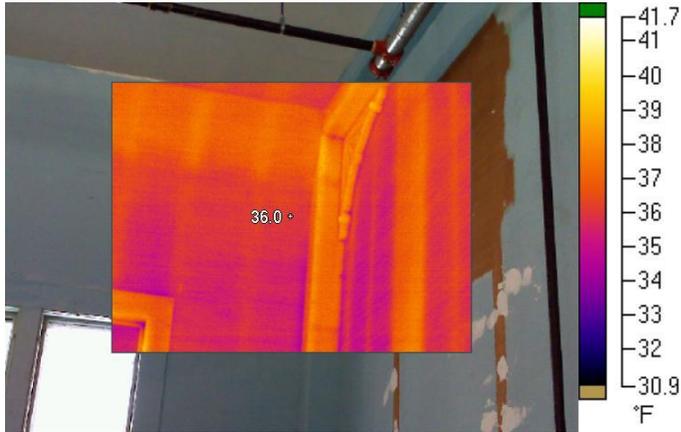
Cool coming in at a window corner.

IR001399.IS2
3/3/2011 2:22:38 PM

Image Info

Average Temperature	65.2°F
Image Range	43.7°F to 73.9°F
Image Time	3/3/2011 2:22:38 PM

The following images were taken outside of what we would consider the building's Thermal Envelope. The spaces are unused for anything but storage and not heated.

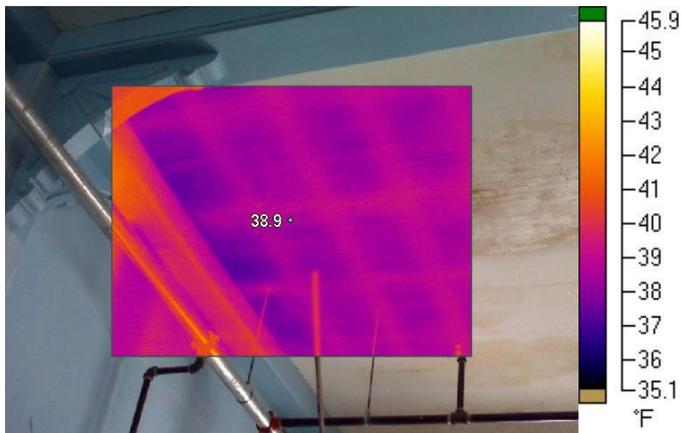


Upstairs wall of Town Hall

IR001407.IS2
3/3/2011 2:29:38 PM

Image Info

Average Temperature	36.3°F
Image Range	33.3°F to 39.3°F
Image Time	3/3/2011 2:29:38 PM

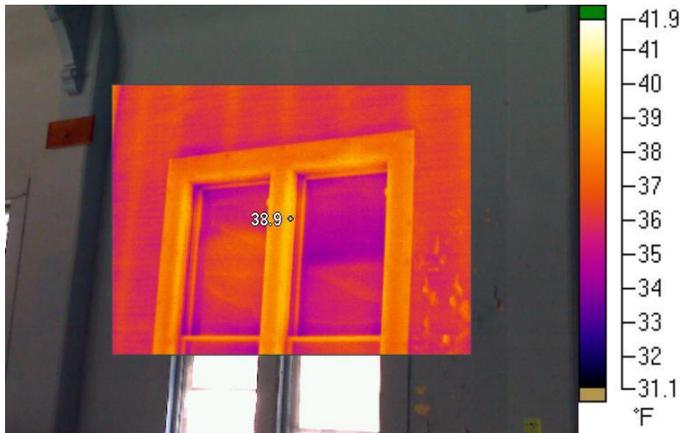


Ceiling of upstairs area in Town Hall showing lathe and plaster ceilings.

IR001408.IS2
3/3/2011 2:29:46 PM

Image Info

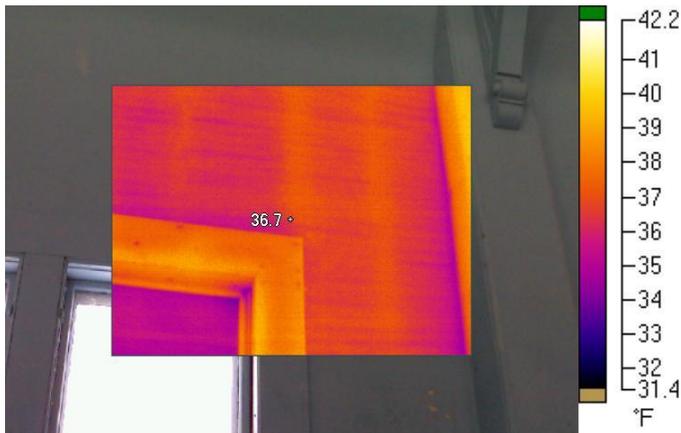
Average Temperature	39.2°F
Image Range	37.1°F to 43.9°F
Image Time	3/3/2011 2:29:46 PM



IR001409.IS2
3/3/2011 2:30:02 PM

Image Info

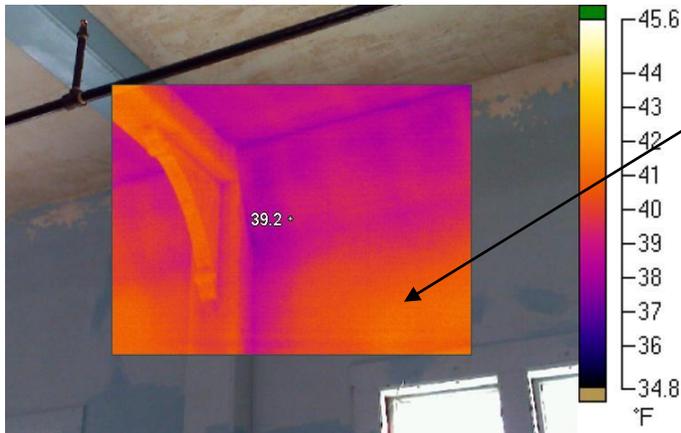
Average Temperature	36.5°F
Image Range	33.2°F to 39.6°F
Image Time	3/3/2011 2:30:02 PM



IR001411.IS2
3/3/2011 2:30:28 PM

Image Info

Average Temperature	36.7°F
Image Range	33.5°F to 40.0°F
Image Time	3/3/2011 2:30:28 PM

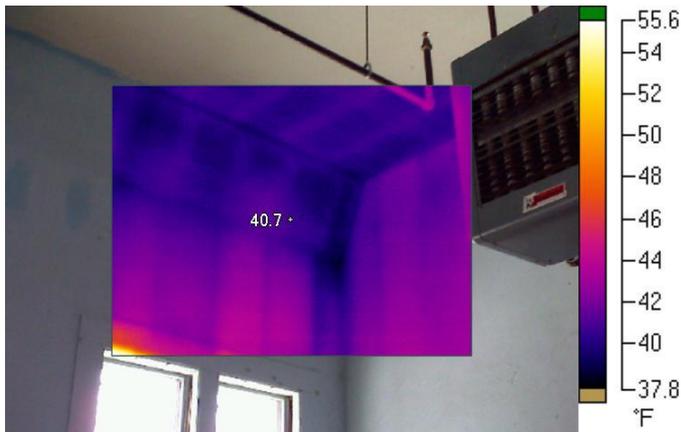


Warm areas on the walls of this unconditioned space are heated from the sun.

IR001412.IS2
3/3/2011 2:31:09 PM

Image Info

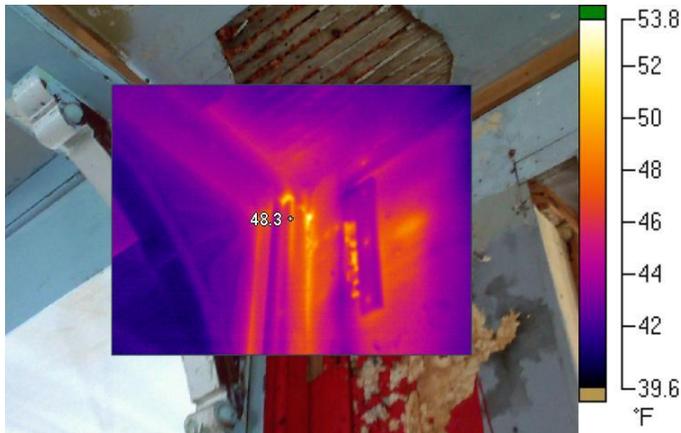
Average Temperature	40.0°F
Image Range	37.6°F to 42.7°F
Image Time	3/3/2011 2:31:09 PM



IR001413.IS2
3/3/2011 2:31:29 PM

Image Info

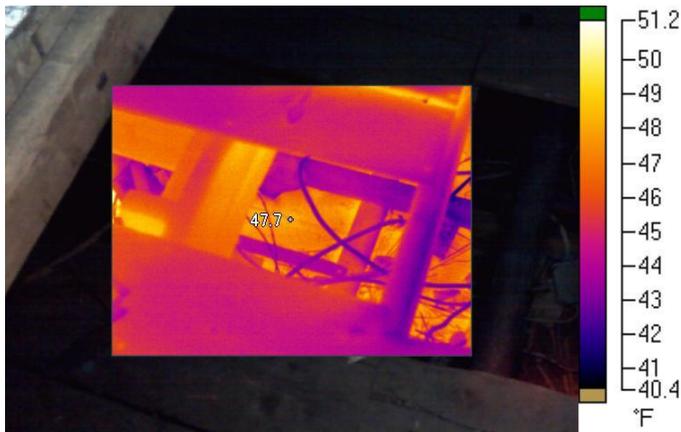
Average Temperature	41.3°F
Image Range	38.1°F to 55.2°F
Image Time	3/3/2011 2:31:29 PM



IR001414.IS2
3/3/2011 2:33:52 PM

Image Info

Average Temperature	43.7°F
Image Range	39.9°F to 53.4°F
Image Time	3/3/2011 2:33:52 PM

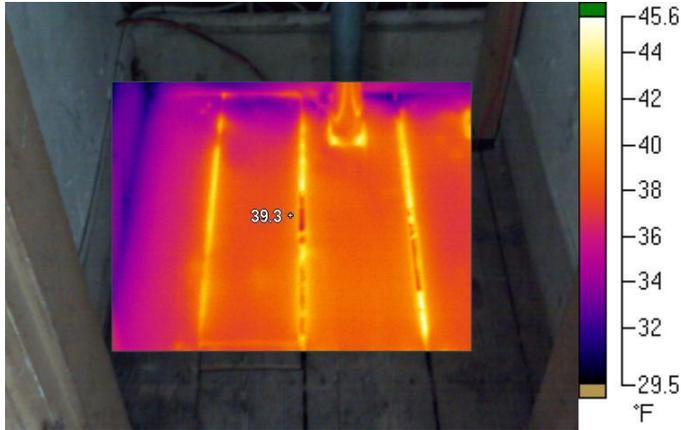


View under the trap door on stage. Heat can be seen coming up from below.

IR001415.IS2
3/3/2011 2:34:01 PM

Image Info

Average Temperature	45.3°F
Image Range	40.7°F to 50.8°F
Image Time	3/3/2011 2:34:01 PM

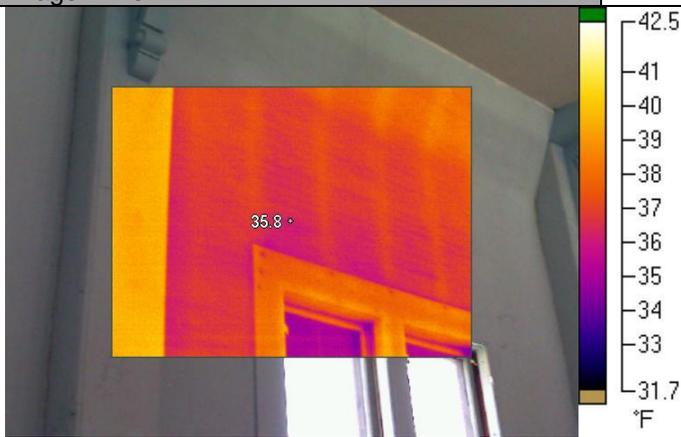


More evidence of heat coming up from the blow conditioned office space.

IR001417.IS2
3/3/2011 2:38:32 PM

Image Info

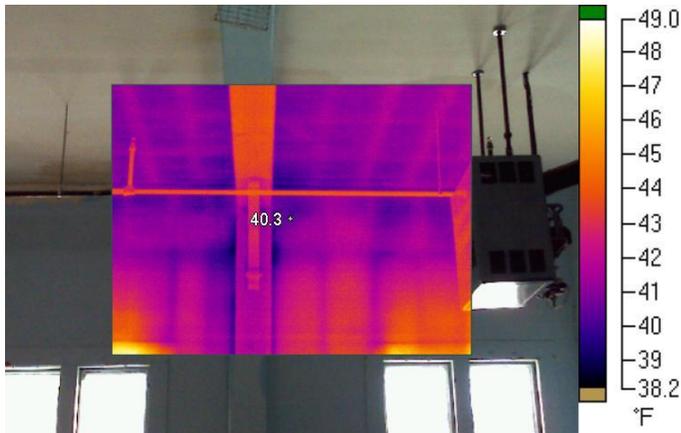
Average Temperature	37.4°F
Image Range	29.8°F to 45.2°F
Image Time	3/3/2011 2:38:32 PM



IR001419.IS2
3/3/2011 2:39:21 PM

Image Info

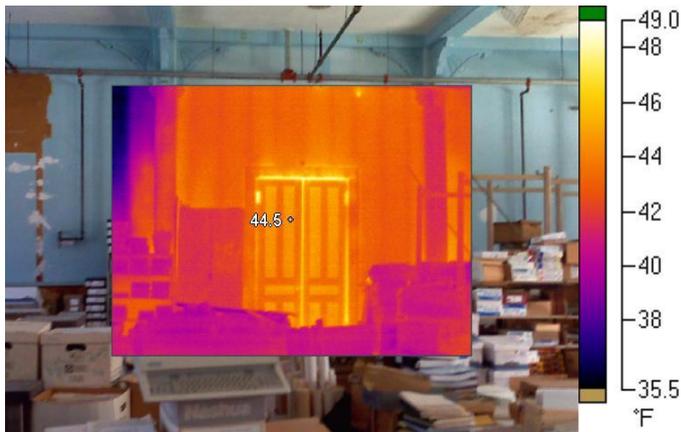
Average Temperature	37.4°F
Image Range	33.8°F to 40.4°F
Image Time	3/3/2011 2:39:21 PM



IR001420.IS2
3/3/2011 2:40:01 PM

Image Info

Average Temperature	41.7°F
Image Range	38.7°F to 48.4°F
Image Time	3/3/2011 2:40:01 PM

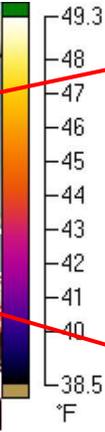
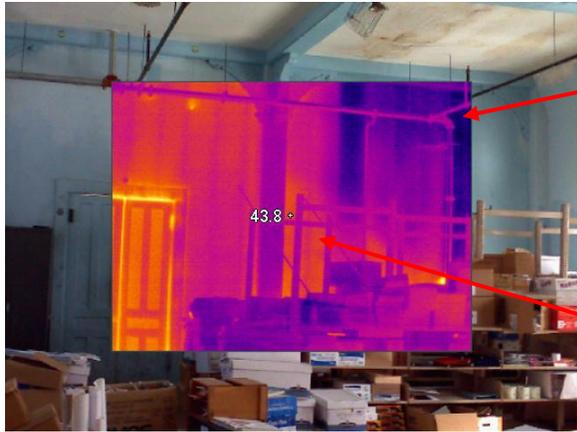


IR001421.IS2
3/3/2011 2:40:51 PM

Heat escapes the office space downstairs and makes its way into the entry where it rises. This may be why the door is showing 10 degrees warmer than some of its surroundings.

Image Info

Average Temperature	42.3°F
Image Range	35.6°F to 48.6°F
Image Time	3/3/2011 2:40:51 PM



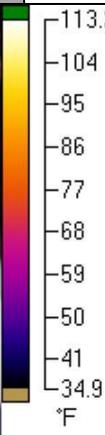
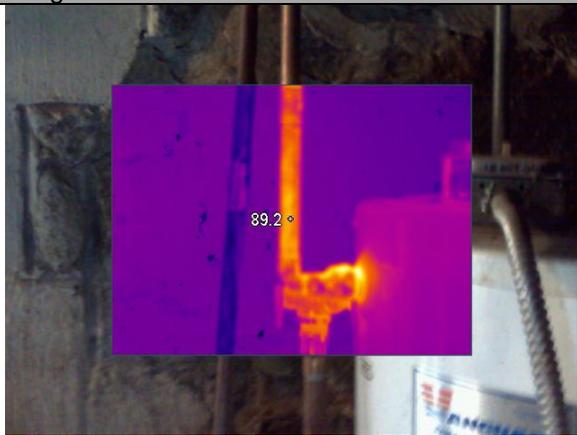
On the other side of this wall is the outside

This part of the wall has interior space on the other side.

IR001423.IS2
3/3/2011 2:41:13 PM

Image Info

Average Temperature	42.3°F
Image Range	38.9°F to 48.8°F
Image Time	3/3/2011 2:41:13 PM



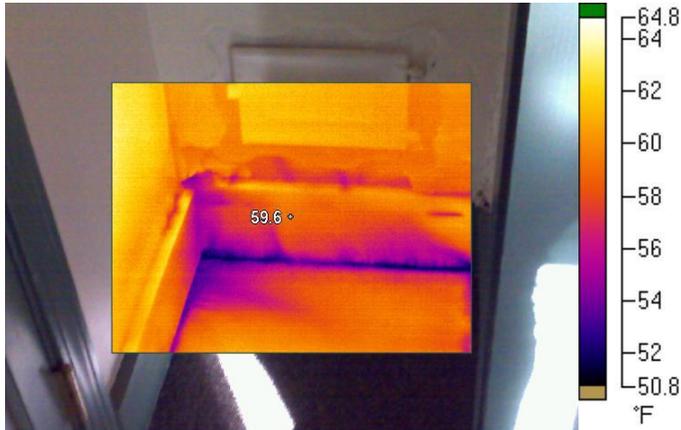
Un-insulated hot water pipe in basement.

IR001427.IS2
3/3/2011 2:56:57 PM

Image Info

Average Temperature	55.9°F
Image Range	35.6°F to 110.4°F
Image Time	3/3/2011 2:56:57 PM

The remaining images were taken during the Blower Door Testing that occurred March 3, 2011. During a Blower Door Test the building is depressurized, allowing outside air and air from unconditioned areas of a building, like the attic, to be pulled into the building through weak areas of the building's envelope. The infrared images or IR images taken during the testing are often more exaggerated and allow for easy pinpointing of air leakage. Air movement also appears in the images in a distinct wispy or feathery pattern, making it easy to identify.

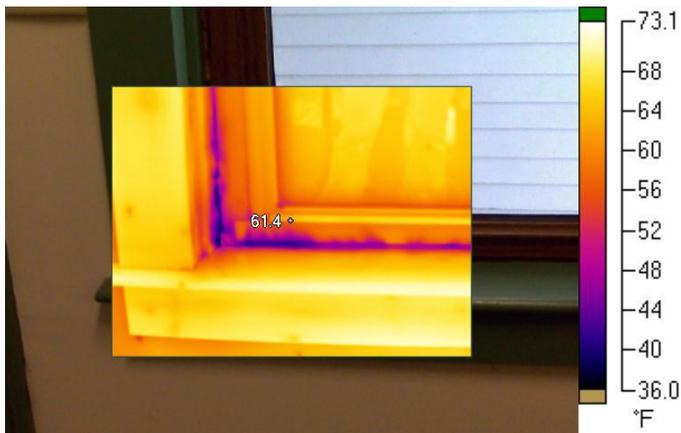


Looking down at the floor of a closet on an exterior wall. Showing cold moving from the crawl space below the 1st floor. There is no insulation or air barrier beneath the 1st level floor.

IR001428.IS2
3/3/2011 3:36:33 PM

Image Info

Average Temperature	59.3°F
Image Range	51.0°F to 64.4°F
Image Time	3/3/2011 3:36:33 PM

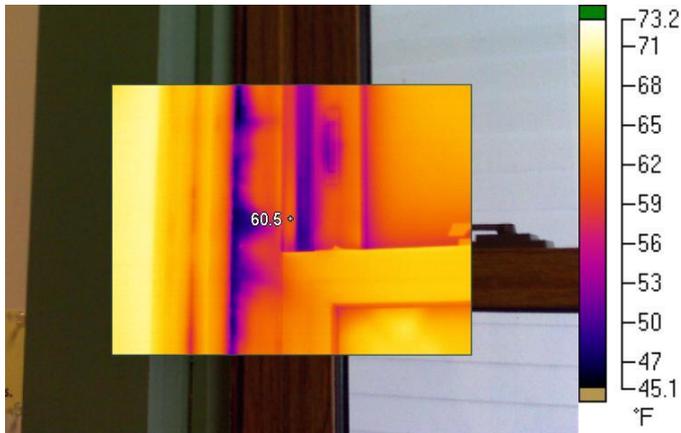


Air infiltration around a window in employee lounge area.

IR001429.IS2
3/3/2011 3:36:41 PM

Image Info

Average Temperature	63.4°F
Image Range	37.8°F to 71.7°F
Image Time	3/3/2011 3:36:41 PM

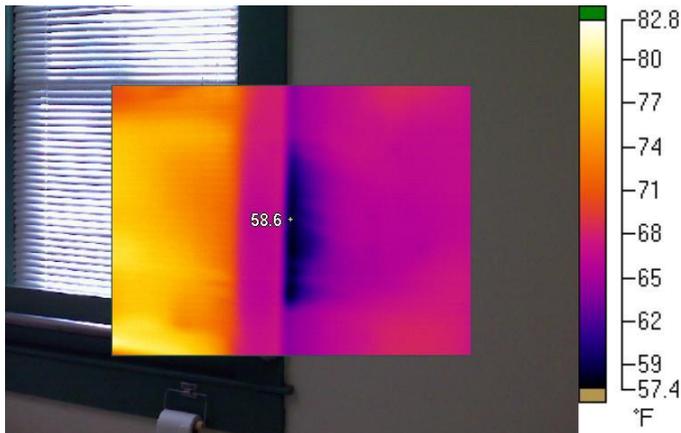


Window in employee lounge area showing air infiltration at a different part of the window.

IR001430.IS2
3/3/2011 3:36:49 PM

Image Info

Average Temperature	62.9°F
Image Range	45.7°F to 71.3°F
Image Time	3/3/2011 3:36:49 PM

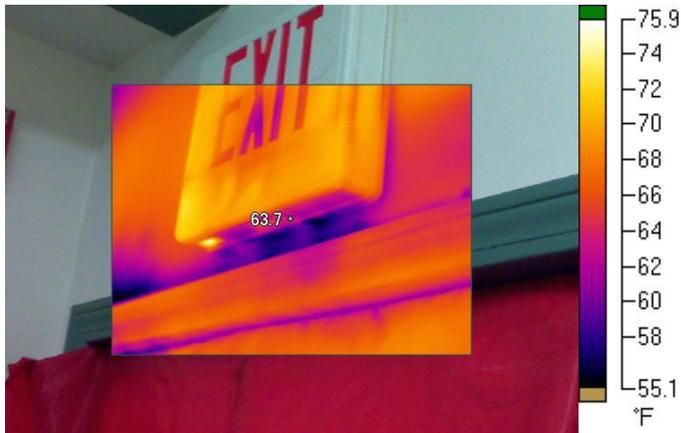


This bathroom window shows air movement from behind the trim, not from the window itself, indicating cold air movement within the wall.

IR001432.IS2
3/3/2011 3:37:15 PM

Image Info

Average Temperature	69.6°F
Image Range	57.7°F to 81.8°F
Image Time	3/3/2011 3:37:15 PM

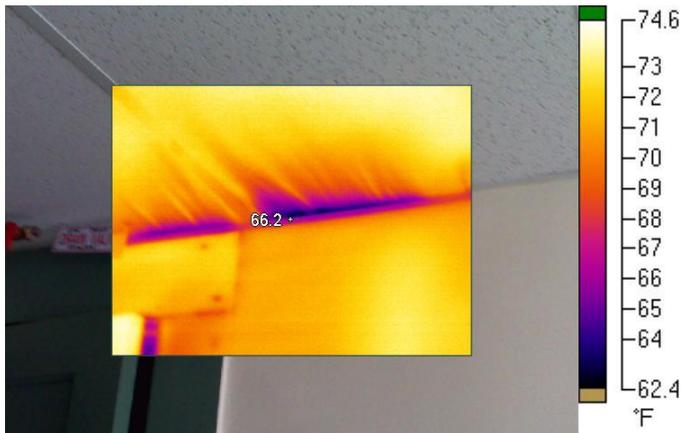


Leakage around the back door exiting the employee lounge area. Again this air is coming in around the trim indicating air movement within the walls.

IR001433.IS2
3/3/2011 3:37:25 PM

Image Info

Average Temperature	65.8°F
Image Range	55.3°F to 75.5°F
Image Time	3/3/2011 3:37:25 PM

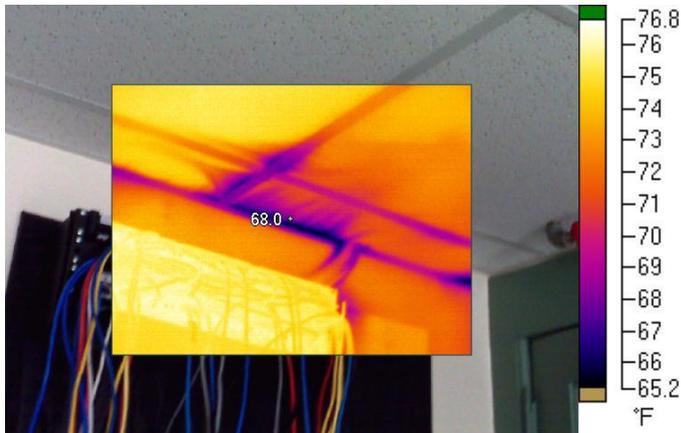


Air movement from above the drop ceiling indicating cold air coming in from the space above.

IR001435.IS2
3/3/2011 3:38:12 PM

Image Info

Average Temperature	71.3°F
Image Range	62.7°F to 74.4°F
Image Time	3/3/2011 3:38:12 PM

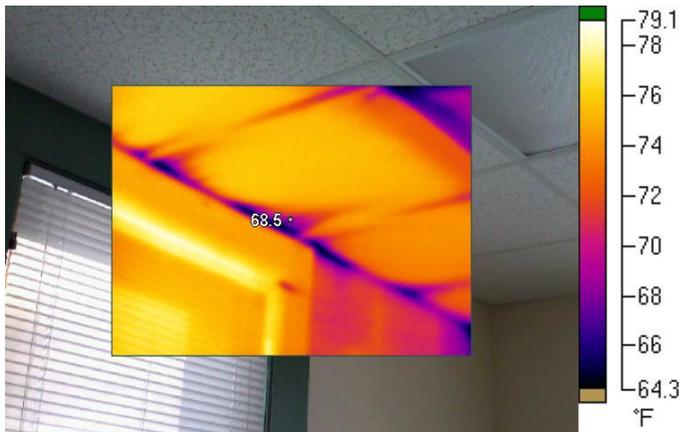


Air movement from above the drop ceiling indicating cold air coming in from the space above.

IR001436.IS2
3/3/2011 3:38:17 PM

Image Info

Average Temperature	73.0°F
Image Range	65.4°F to 76.4°F
Image Time	3/3/2011 3:38:17 PM

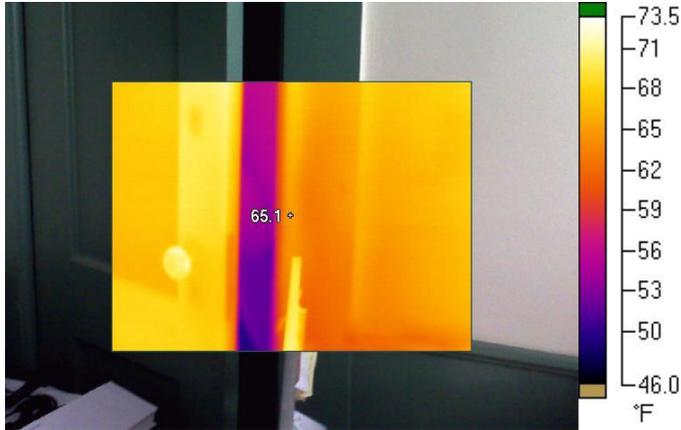


More air movement above the drop ceiling.

IR001437.IS2
3/3/2011 3:38:26 PM

Image Info

Average Temperature	73.8°F
Image Range	64.3°F to 78.8°F
Image Time	3/3/2011 3:38:26 PM



Cold closet in an office space. The wall and closet show nearly a 30 degree difference.

IR001440.IS2
3/3/2011 3:39:17 PM

Image Info

Average Temperature	64.9°F
Image Range	49.0°F to 72.2°F
Image Time	3/3/2011 3:39:17 PM

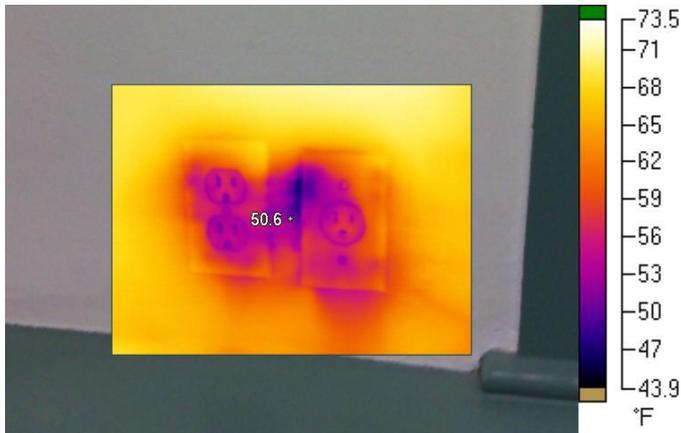


Air movement around windows in Town Administrator's Office.

IR001444.IS2
3/3/2011 3:40:14 PM

Image Info

Average Temperature	65.9°F
Image Range	47.9°F to 73.0°F
Image Time	3/3/2011 3:40:14 PM

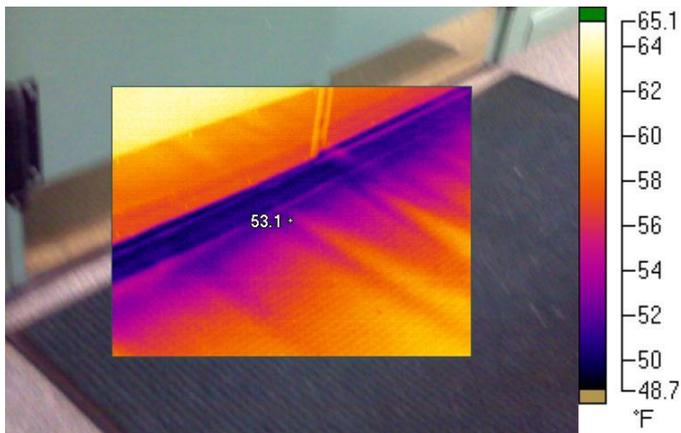


Leaky electrical sockets are another indication of cold air movement within the walls.

IR001445.IS2
3/3/2011 3:40:28 PM

Image Info

Average Temperature	63.3°F
Image Range	45.8°F to 71.5°F
Image Time	3/3/2011 3:40:28 PM

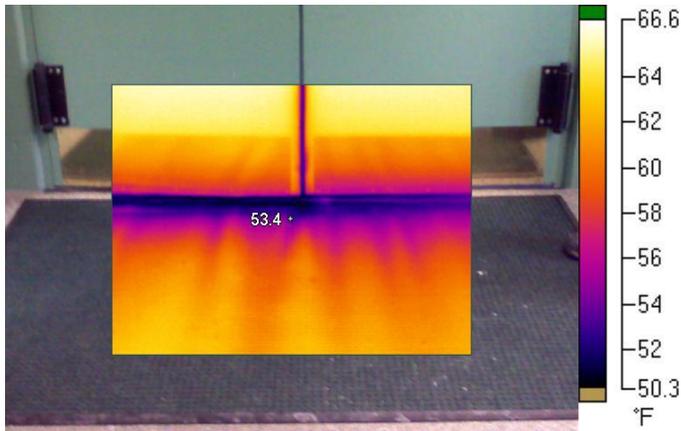


The double swing doors to the office are allowing a lot of air movement from the unconditioned stairwell into the warm office spaces. We recommend these get replaced with thermally broken, insulated and weather stripped doors.

IR001449.IS2
3/3/2011 3:41:22 PM

Image Info

Average Temperature	56.6°F
Image Range	49.0°F to 64.7°F
Image Time	3/3/2011 3:41:22 PM

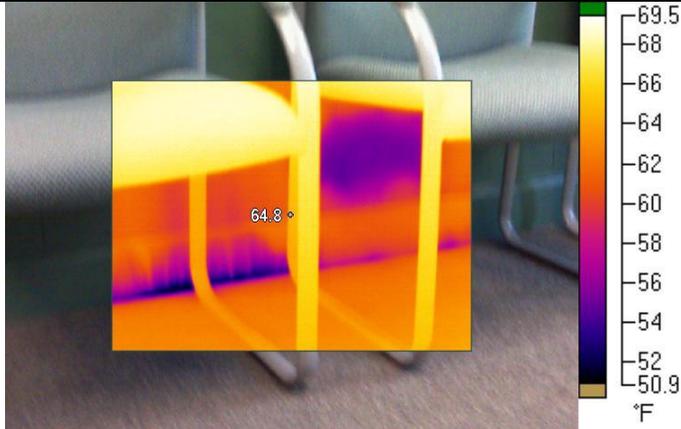


These are the interior double swing doors. They are not doing a good job of keeping the cold air from the stairwell out. There was a visible gap between the doors and between the doors and the floor. These doors allow a significant amount of cold air into the conditioned office spaces.

IR001450.IS2
3/3/2011 3:41:38 PM

Image Info

Average Temperature	60.1°F
Image Range	50.3°F to 66.2°F
Image Time	3/3/2011 3:41:38 PM



Floor boards along the waiting area show a lot of air movement. Cold air moving up from the crawlspace below.

IR001452.IS2
3/3/2011 3:42:08 PM

Image Info

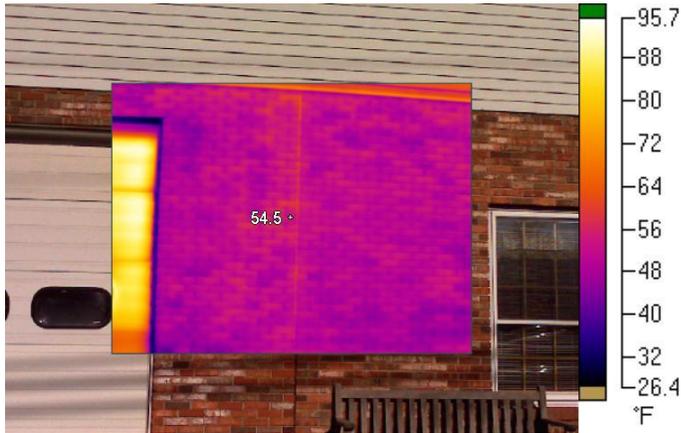
Average Temperature	62.8°F
Image Range	51.0°F to 69.2°F
Image Time	3/3/2011 3:42:08 PM

The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

Police Station IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*

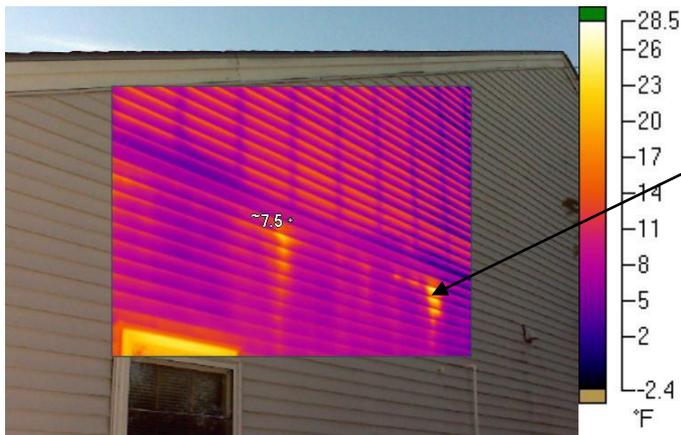


Exterior connection of the garage to the police station. It does not appear that there is much heat loss occurring at the connection.

IR000810.IS2
2/24/2011 8:53:26 AM

Image Info

Average Temperature	53.5°F
Image Range	28.5°F to 93.8°F
Image Time	2/24/2011 8:53:26 AM



In the rear of the building the framing members in the attic are visible due to warm air moving up into the attic space. Warm spots on the building are gaps between the batt insulation where heat is escaping.

IR000826.IS2
2/24/2011 8:57:30 AM

Image Info

Average Temperature	~8.8°F
Image Range	~-1.0°F to 26.3°F
Image Time	2/24/2011 8:57:30 AM

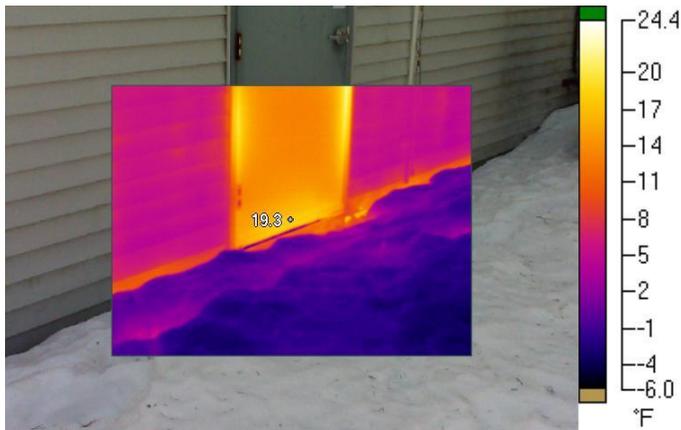


Another image of the rear of the building. There is more heat loss occurring at the back wall area that is the boiler room.

IR000828.IS2
2/24/2011 8:57:47 AM

Image Info

Average Temperature	~7.3°F
Image Range	<-22.2°F to 53.3°F
Image Time	2/24/2011 8:57:47 AM



Exterior metal door showing heat loss. The slab edge in this image is also showing some heat loss. Heat from the inside of the building is easily conducted outward by the concrete slab.

IR000830.IS2
2/24/2011 8:58:33 AM

Image Info

Average Temperature	~5.1°F
Image Range	~-4.6°F to 23.2°F
Image Time	2/24/2011 8:58:33 AM

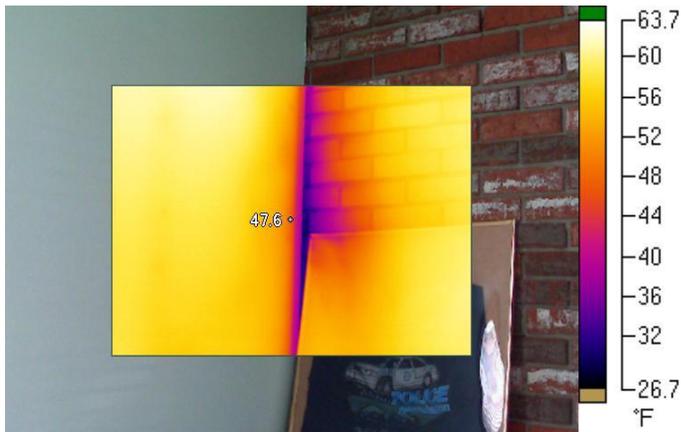


The bottom of the garage door is showing some heat loss. This heat loss can be addressed with weather stripping.

IR000838.IS2
2/24/2011 9:02:52 AM

Image Info

Average Temperature	22.4°F
Image Range	14.7°F to 39.5°F
Image Time	2/24/2011 9:02:52 AM

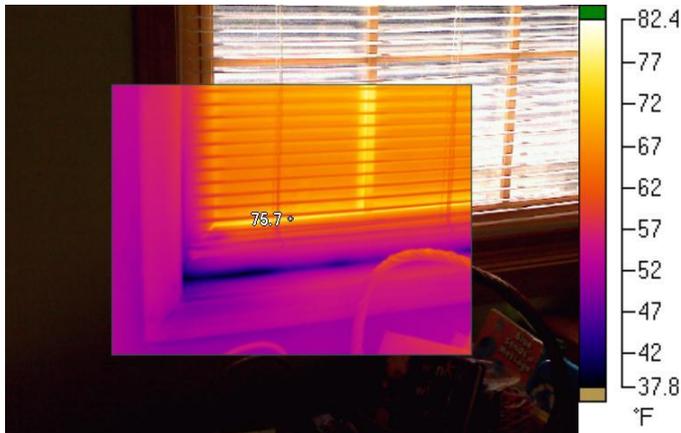


On the interior the corner of the brick façade of the garage and the wall of the lobby area. This area has cold air infiltration.

IR000843.IS2
2/24/2011 9:04:57 AM

Image Info

Average Temperature	54.9°F
Image Range	28.1°F to 61.9°F
Image Time	2/24/2011 9:04:57 AM



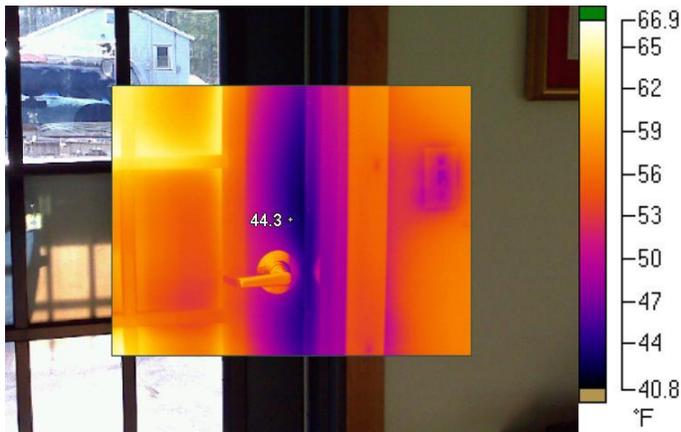
A typical window in one of the office areas. Many of the window corners were found to be cold. This could be due to poor insulation and air sealing around the window frame when it was installed.

IR000844.IS2

2/24/2011 9:05:22 AM

Image Info

Average Temperature	58.9°F
Image Range	38.7°F to 80.5°F
Image Time	2/24/2011 9:05:22 AM



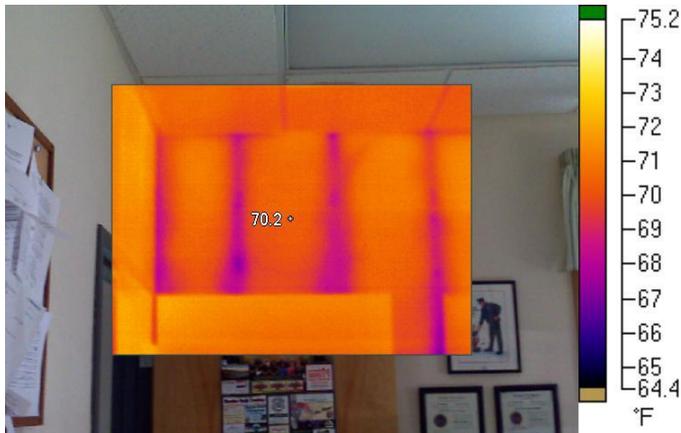
Main entrance door to the Police Station. Cold air is able to enter the conditioned space due to a poor seal around the door.

IR000846.IS2

2/24/2011 9:06:07 AM

Image Info

Average Temperature	54.2°F
Image Range	42.3°F to 66.3°F
Image Time	2/24/2011 9:06:07 AM



Rear exterior wall. The wood framing members are visible. Cold air is conducting inward through the wood framing members. This is called thermal bridging.

IR000847.IS2

2/24/2011 9:07:07 AM

Image Info

Average Temperature	70.4°F
Image Range	67.0°F to 72.5°F
Image Time	2/24/2011 9:07:07 AM



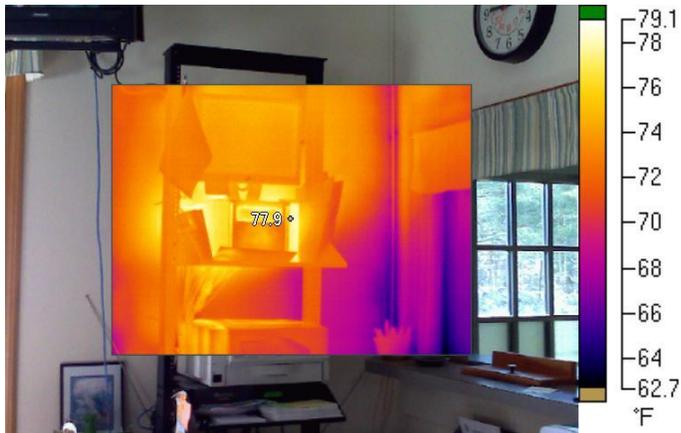
This exterior corner is showing cold conducted to the interior by the framing members at the corner. This is very typical of standard building practices, because there is no room for insulation at the corners. We saw this at several exterior corners in the building.

IR000849.IS2

2/24/2011 9:07:27 AM

Image Info

Average Temperature	70.0°F
Image Range	62.3°F to 73.9°F
Image Time	2/24/2011 9:07:27 AM

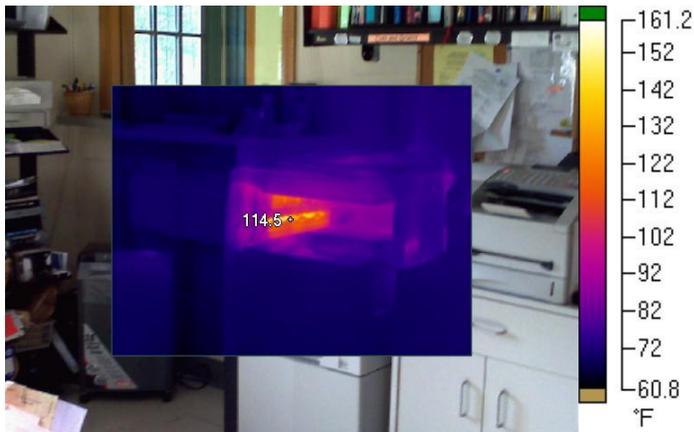


Front office space. There is excess heat given off of the office equipment. (Note that the temperature of the equipment is nearly 80 degrees.) This can increase energy used by air conditioning used in the cooling months. Tuning off unused office equipment in the summer while not in use will help.

IR000852.IS2
2/24/2011 9:11:06 AM

Image Info

Average Temperature	71.8°F
Image Range	62.8°F to 78.7°F
Image Time	2/24/2011 9:11:06 AM

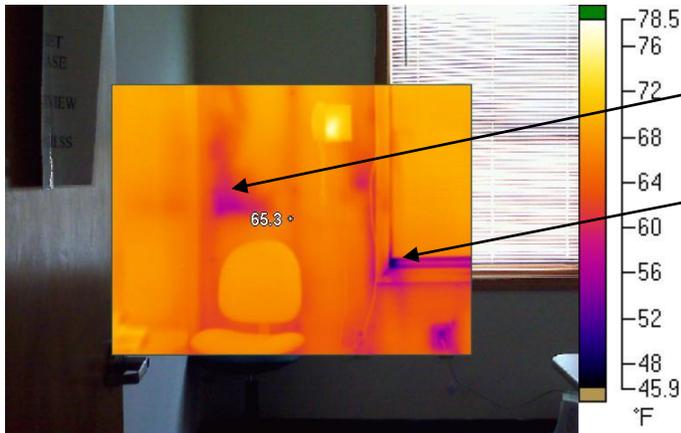


More excess heat from office equipment.

IR000853.IS2
2/24/2011 9:11:19 AM

Image Info

Average Temperature	71.9°F
Image Range	62.1°F to 159.4°F
Image Time	2/24/2011 9:11:19 AM



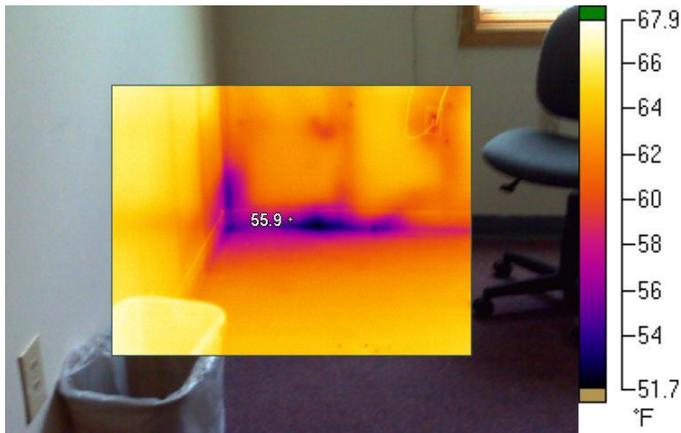
The interview room shows some cold spots on the wall. The cooler area above the chair may be caused from a batt of insulation that is pushed back or has settled in the bay. Also note the cold at the corner of the window.

IR000857.IS2

2/24/2011 9:12:48 AM

Image Info

Average Temperature	66.0°F
Image Range	47.4°F to 77.0°F
Image Time	2/24/2011 9:12:48 AM



Still in the interview room, we see a very cold area in the corner and at the wall to floor connection. Heat is likely being lost through the bottom plate framing where there is no insulation.

IR000862.IS2

2/24/2011 9:13:54 AM

Image Info

Average Temperature	62.7°F
Image Range	51.8°F to 67.5°F
Image Time	2/24/2011 9:13:54 AM

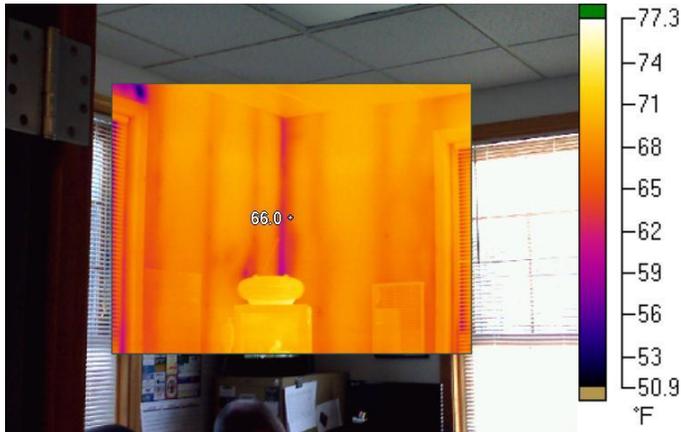


Another image of a window that is cold around the edges.

IR000864.IS2
2/24/2011 9:16:58 AM

Image Info

Average Temperature	66.8°F
Image Range	42.7°F to 80.4°F
Image Time	2/24/2011 9:16:58 AM

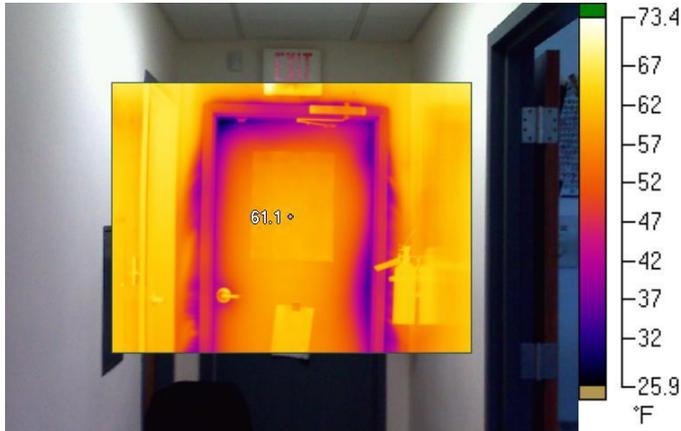


Another exterior corner where cold is being conducted to the interior conditioned space through the framing members.

IR000866.IS2
2/24/2011 9:17:17 AM

Image Info

Average Temperature	67.9°F
Image Range	52.4°F to 75.4°F
Image Time	2/24/2011 9:17:17 AM

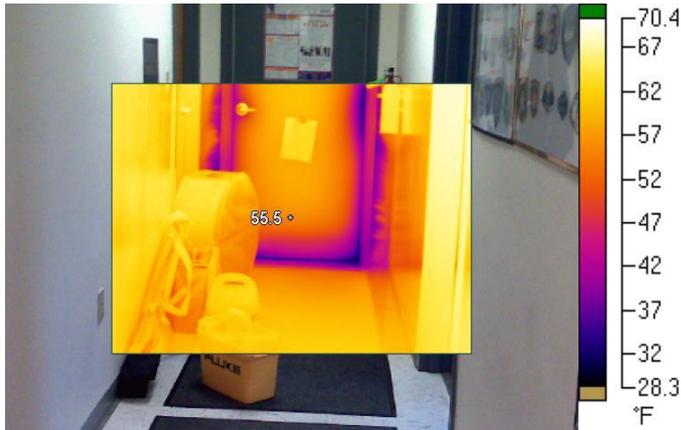


This is the back metal exit door in the hallway off the office area. This door is showing cold air entering around the door.

IR000867.IS2
2/24/2011 9:17:29 AM

Image Info

Average Temperature	56.5°F
Image Range	27.6°F to 72.1°F
Image Time	2/24/2011 9:17:29 AM

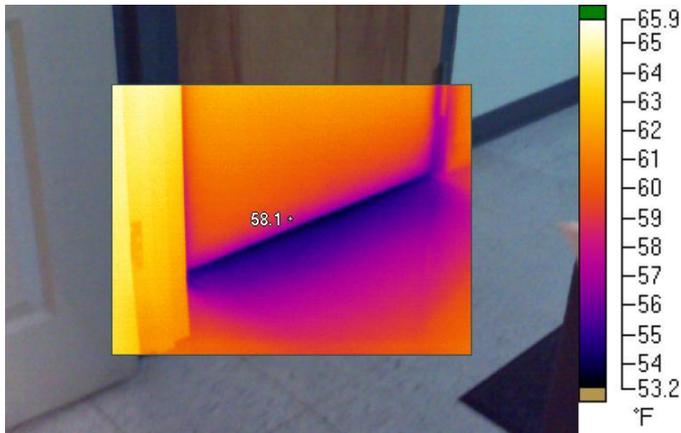


A bottom view of the door.

IR000868.IS2
2/24/2011 9:17:36 AM

Image Info

Average Temperature	58.0°F
Image Range	29.1°F to 69.1°F
Image Time	2/24/2011 9:17:36 AM



This is one of the doors that leads to the garage with a great amount of cold coming in from beneath the door. There is a large space beneath the door (the other door leading to the garage from the officer work space was weather stripped). There is also the concern of carbon monoxide making its way into the officer workspace from the garage. Adding weather stripping to this door would prevent the cooler air from the garage (and any carbon monoxide) from entering into the officer workspace.

IR000870.IS2
2/24/2011 9:18:38 AM

Image Info

Average Temperature	59.7°F
Image Range	53.5°F to 65.5°F
Image Time	2/24/2011 9:18:38 AM

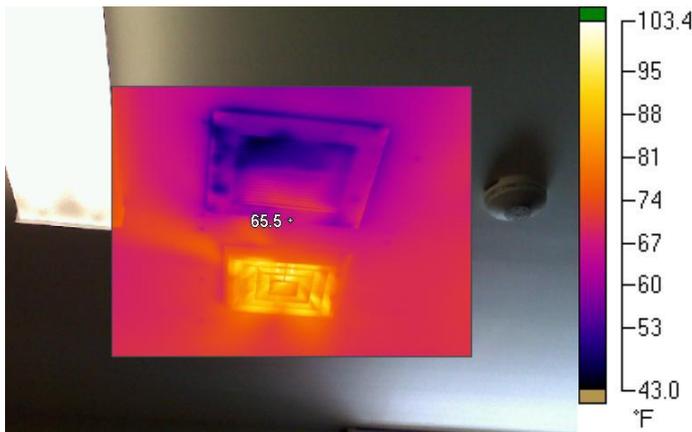
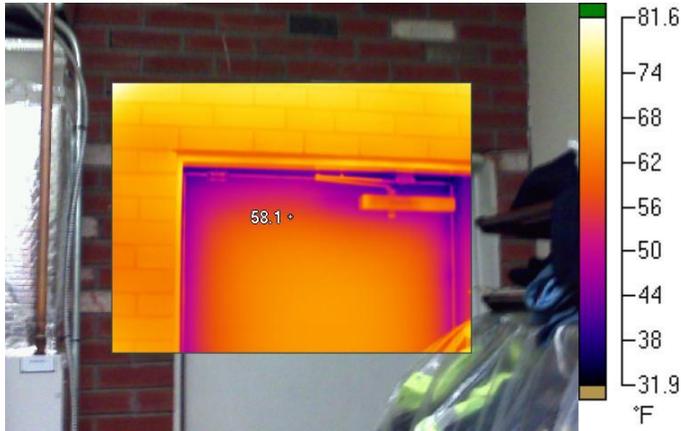


Image of a supply and a return vent that are located too close to one another. You can see heat going right to the return.

IR000883.IS2
2/24/2011 9:23:21 AM

Image Info

Average Temperature	67.6°F
Image Range	44.9°F to 101.2°F
Image Time	2/24/2011 9:23:21 AM



Another exterior door that is showing cold entering around the edges.

IR000885.IS2
2/24/2011 9:24:15 AM

Image Info

Average Temperature	62.2°F
Image Range	34.7°F to 81.3°F
Image Time	2/24/2011 9:24:15 AM



Bottom view of that door.

IR000886.IS2
2/24/2011 9:24:22 AM

Image Info

Average Temperature	50.5°F
Image Range	23.1°F to 72.8°F
Image Time	2/24/2011 9:24:22 AM

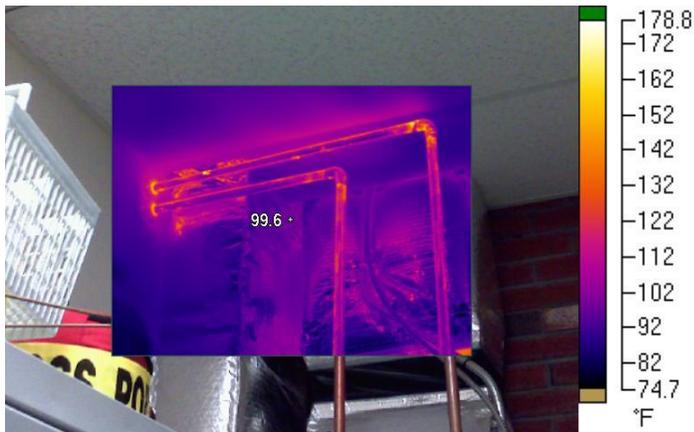


Exposed hot water pipes should be insulated. Leaving hot water pipes un-insulated reduces the efficiency of the heating system due to the heat loss.

IR000887.IS2
2/24/2011 9:24:35 AM

Image Info

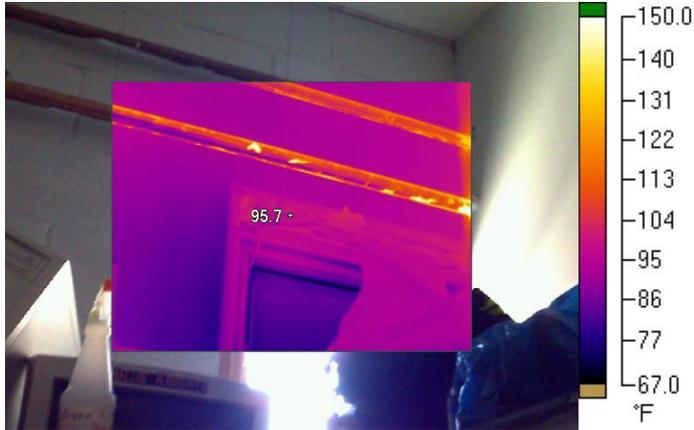
Average Temperature	94.7°F
Image Range	66.6°F to 168.5°F
Image Time	2/24/2011 9:24:35 AM



IR000888.IS2
2/24/2011 9:24:43 AM

Image Info

Average Temperature	97.4°F
Image Range	77.0°F to ~177.0°F
Image Time	2/24/2011 9:24:43 AM

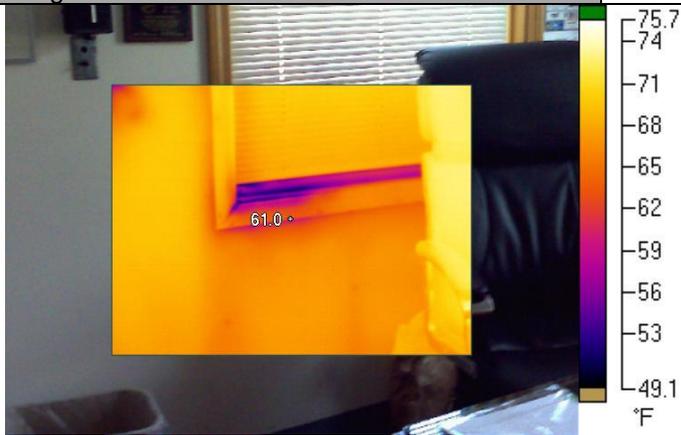


More water pipes that could be insulated.

IR000890.IS2
2/24/2011 9:26:31 AM

Image Info

Average Temperature	93.0°F
Image Range	69.2°F to 149.5°F
Image Time	2/24/2011 9:26:31 AM

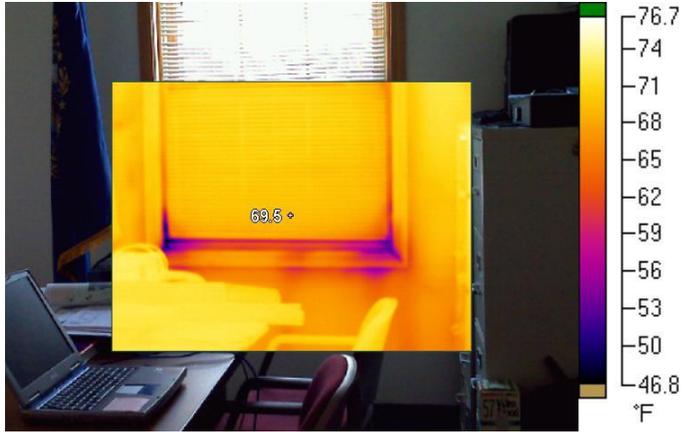


Cool window corner located in the Chief's Office.

IR000898.IS2
2/24/2011 10:13:30 AM

Image Info

Average Temperature	67.7°F
Image Range	50.9°F to 73.4°F
Image Time	2/24/2011 10:13:30 AM



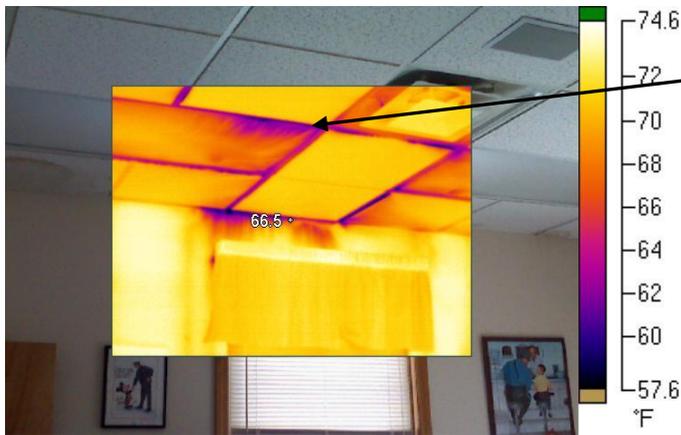
Another window showing cold corners.

IR000900.IS2
2/24/2011 10:13:51 AM

Image Info

Average Temperature	68.9°F
Image Range	47.5°F to 75.5°F
Image Time	2/24/2011 10:13:51 AM

The remaining images were taken during blower door testing.



Cold air is able to move through and around the batts from the attic space to above the ceiling tiles and into the conditioned spaces.

IR000904.IS2
2/24/2011 10:14:54 AM

Image Info

Average Temperature	70.4°F
Image Range	57.6°F to 74.2°F
Image Time	2/24/2011 10:14:54 AM

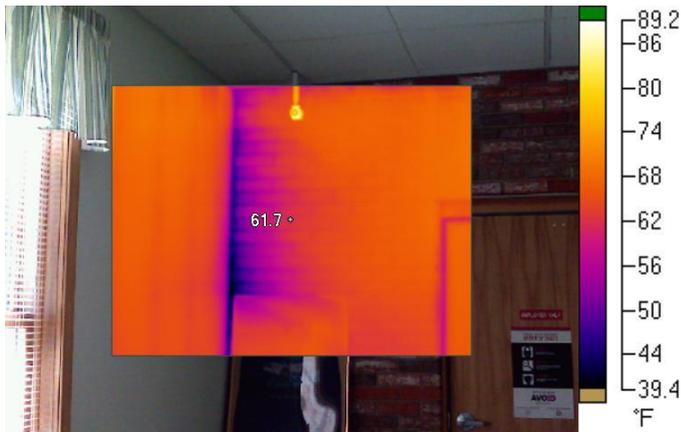


Door leading from the lobby the garage. Shows that air is able to move into the lobby. Doors to the Garage are very important to weather strip for indoor air quality reasons as well.

IR000905.IS2
2/24/2011 10:15:06 AM

Image Info

Average Temperature	66.0°F
Image Range	58.6°F to 72.0°F
Image Time	2/24/2011 10:15:06 AM

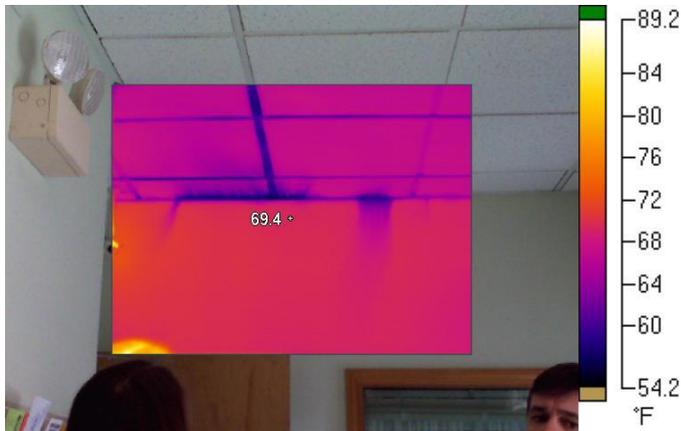


Exterior wall and the shared wall between the lobby and garage. Air movement is occurring at the connection.

IR000906.IS2
2/24/2011 10:15:16 AM

Image Info

Average Temperature	64.2°F
Image Range	39.9°F to 87.3°F
Image Time	2/24/2011 10:15:16 AM



More air movement from the cold attic above the drop ceiling.

IR000908.IS2
2/24/2011 10:15:42 AM

Image Info

Average Temperature	68.0°F
Image Range	55.3°F to 87.0°F
Image Time	2/24/2011 10:15:42 AM

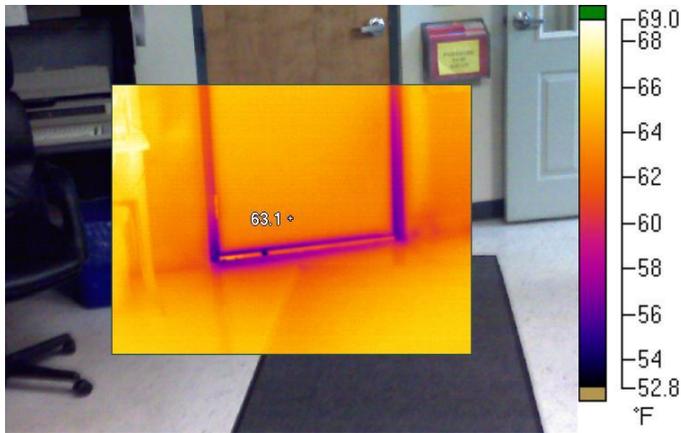


A wall in the Chief's Office. There are issues with air movement from the attic space above. Cold air is able to enter the area between studs and move around the fiberglass batts. This is due to an unsealed top plate.

IR000913.IS2
2/24/2011 10:16:39 AM

Image Info

Average Temperature	68.7°F
Image Range	61.8°F to 72.2°F
Image Time	2/24/2011 10:16:39 AM

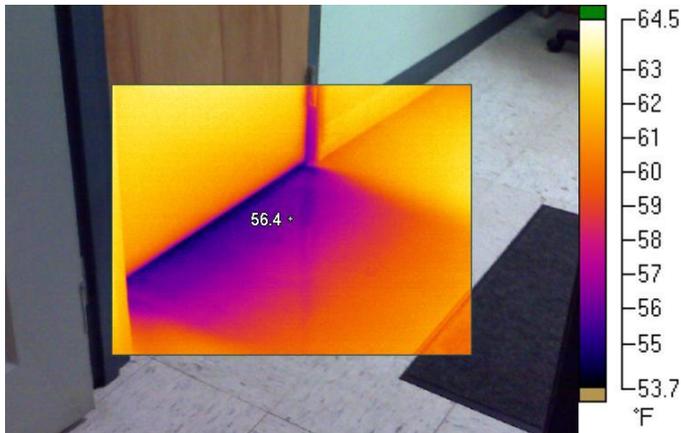


Door leading to the garage from the officer work space. This door **is** weather stripped.

IR000915.IS2
2/24/2011 10:17:14 AM

Image Info

Average Temperature	63.6°F
Image Range	53.1°F to 68.7°F
Image Time	2/24/2011 10:17:14 AM

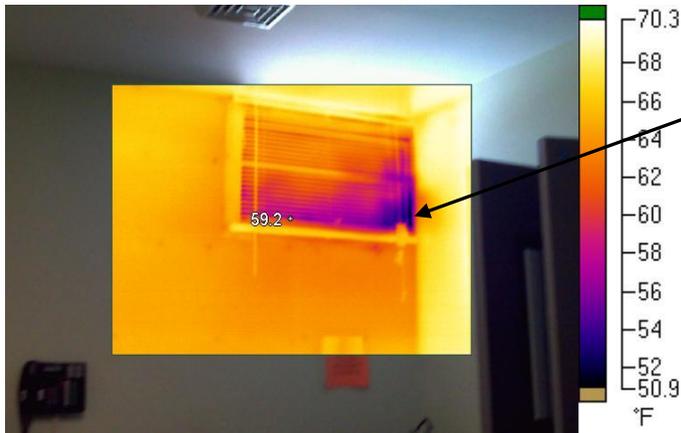


Door leading to the garage from the holding room. This door is not performing well due to lack of weather stripping along the bottom. Cold is not the only thing the door is letting in. Carbon Monoxide that is produced by cars in the garage will leak into the building through places like this, affecting indoor air quality as well.

IR000916.IS2
2/24/2011 10:17:21 AM

Image Info

Average Temperature	60.1°F
Image Range	54.2°F to 64.0°F
Image Time	2/24/2011 10:17:21 AM



Window in the holding area. This window shows more cold air coming in around the right corner.

IR000917.IS2

2/24/2011 10:17:29 AM

Image Info

Average Temperature	64.6°F
Image Range	51.3°F to 70.2°F
Image Time	2/24/2011 10:17:29 AM

The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

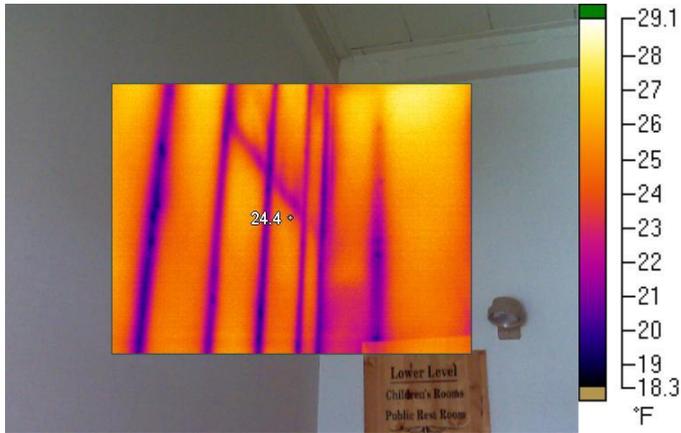
Tucker Free Library IR Imaging Report

***As part of the Level II Energy Audit for the
Town of Henniker***

Prepared for:

The Tucker Free Library
31 Western Avenue
Henniker, NH 03242



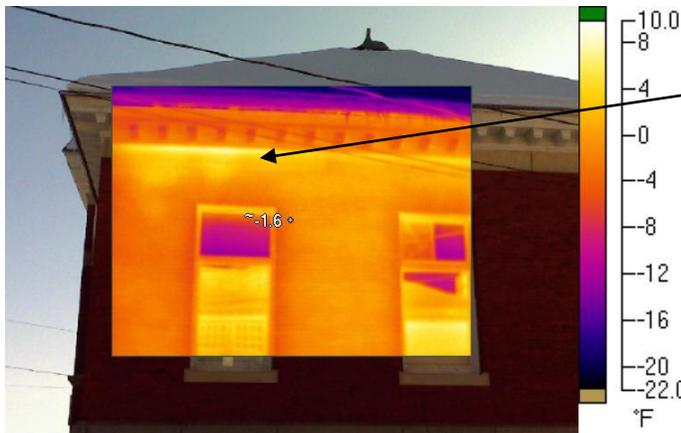


In the walls of unconditioned stairwell the studs are conducting cold from the outside inward. Placement of the fiberglass bats is also visible in the picture.

IR001085.IS2
3/3/2011 8:26:19 AM

Image Info

Average Temperature	24.3°F
Image Range	19.0°F to 28.3°F
Image Time	3/3/2011 8:26:19 AM

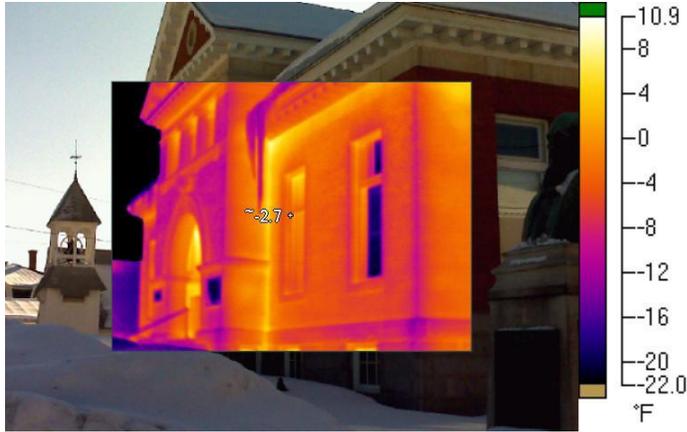


Exterior view of non-fiction room. Note the heat loss occurring at the wall to roof connection.

IR001089.IS2
3/3/2011 8:29:27 AM

Image Info

Average Temperature	--2.4°F
Image Range	--20.9°F to ~8.4°F
Image Time	3/3/2011 8:29:27 AM

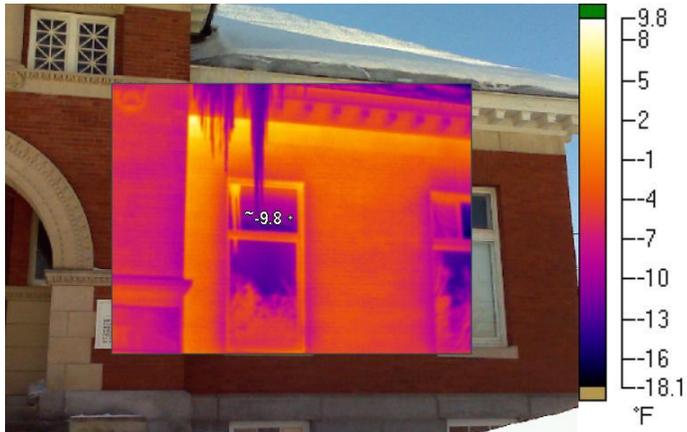


Front façade of Library

IR001091.IS2
3/3/2011 8:30:28 AM

Image Info

Average Temperature	~-7.8°F
Image Range	<-22.2°F to ~10.1°F
Image Time	3/3/2011 8:30:28 AM

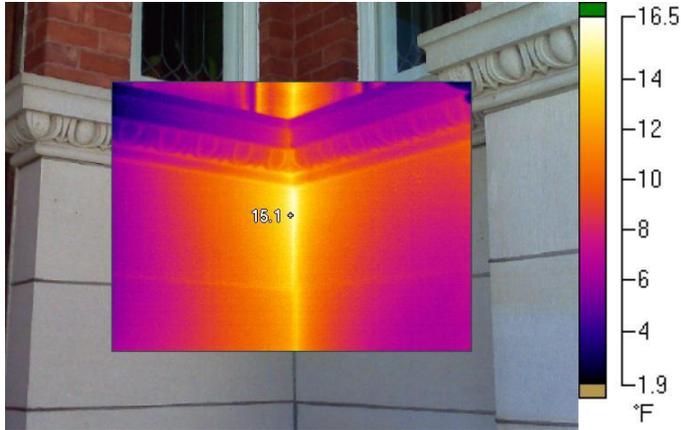


Note the heat loss at the tops of the wall, enabling the ice dams.

IR001095.IS2
3/3/2011 8:32:10 AM

Image Info

Average Temperature	~-5.2°F
Image Range	~-16.4°F to ~-8.3°F
Image Time	3/3/2011 8:32:10 AM



Here the corner connection is losing heat to the outdoors.

IR001101.IS2
3/3/2011 8:33:42 AM

Image Info

Average Temperature	~8.5°F
Image Range	~2.1°F to 16.1°F
Image Time	3/3/2011 8:33:42 AM

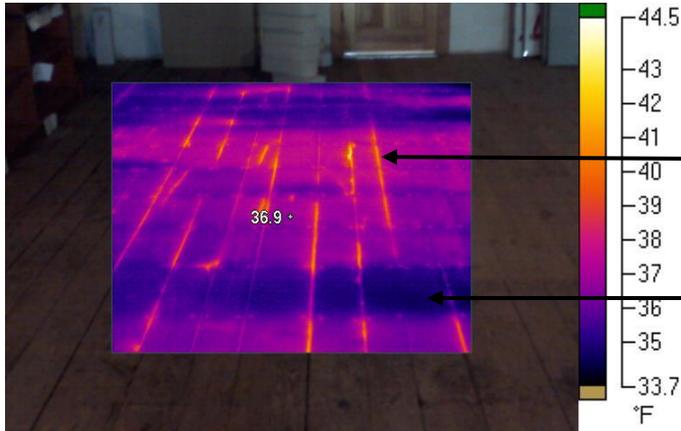


Floor to wall connection in the attic. Air sealing should be done in the attic to prevent air movement between the unconditioned attic and the conditioned space below. Currently the warm conditioned air from the main floor is traveling up into the attic space.

IR001109.IS2
3/3/2011 8:42:56 AM

Image Info

Average Temperature	34.3°F
Image Range	29.7°F to 42.9°F
Image Time	3/3/2011 8:42:56 AM



Attic floorboards showing heat loss from the lower level and showing a variance in the level of insulation.

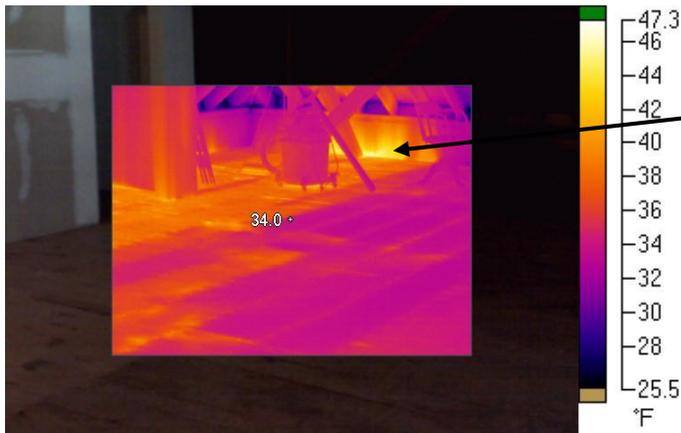
Heat escaping from the space below.

Colder areas are higher levels of insulation.

IR001110.IS2
3/3/2011 8:43:06 AM

Image Info

Average Temperature	36.4°F
Image Range	33.9°F to 44.2°F
Image Time	3/3/2011 8:43:06 AM

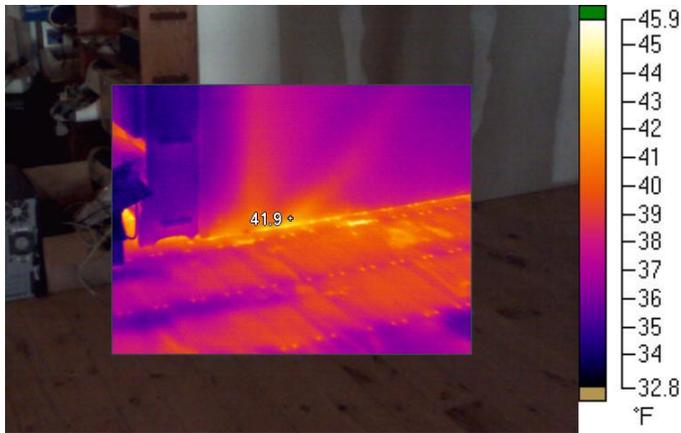


Heat is escaping up into the attic from the floor below. This is especially occurring along the wall to floor connection, shown in the top right portion of the photo.

IR001113.IS2
3/3/2011 8:44:36 AM

Image Info

Average Temperature	35.2°F
Image Range	25.8°F to 46.9°F
Image Time	3/3/2011 8:44:36 AM

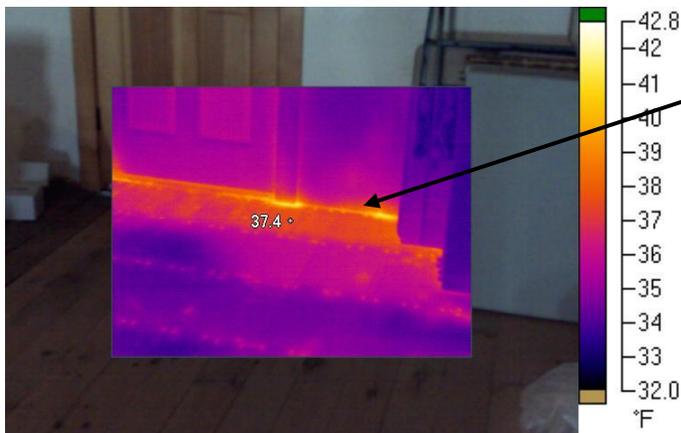


More heat loss is occurring at the connection of the attic floor and wall. These areas should be air sealed to prevent this.

IR001116.IS2
3/3/2011 8:45:35 AM

Image Info

Average Temperature	37.7°F
Image Range	33.1°F to 45.6°F
Image Time	3/3/2011 8:45:35 AM

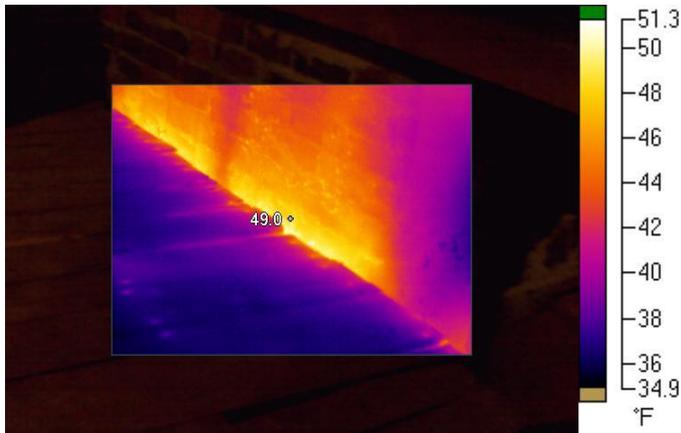


Entrance to small finished space in the attic, a break in the insulation line or level of insulation was found here.

IR001117.IS2
3/3/2011 8:45:50 AM

Image Info

Average Temperature	35.2°F
Image Range	32.9°F to 41.9°F
Image Time	3/3/2011 8:45:50 AM



Heat loss is occurring at all floor to wall connections, this is the chimney to the fireplace where it meets the floor. Heat loss is occurring here as well.

IR001118.IS2
3/3/2011 8:47:25 AM

Image Info

Average Temperature	40.9°F
Image Range	35.0°F to 51.0°F
Image Time	3/3/2011 8:47:25 AM

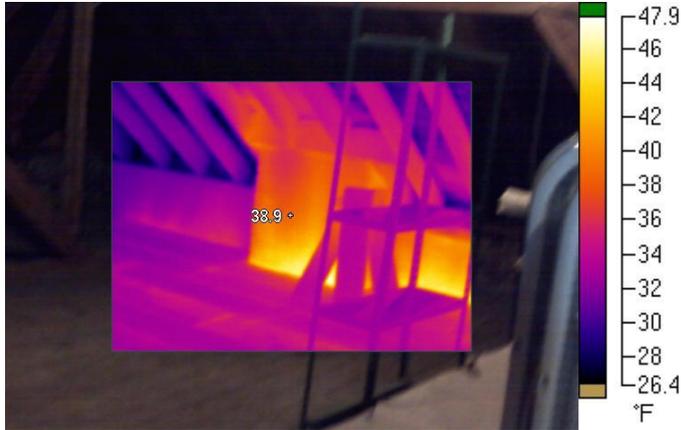


From behind the chimney we see a great deal of heat loss at the chimney. The fireplace is not being used. The heat shown here is space heating traveling up the chimney.

IR001125.IS2
3/3/2011 8:53:05 AM

Image Info

Average Temperature	37.0°F
Image Range	28.0°F to 53.4°F
Image Time	3/3/2011 8:53:05 AM



Where the chimney is penetrating the attic floor heat is coming in around the chimney from the main floor.

IR001129.IS2
3/3/2011 8:56:52 AM

Image Info

Average Temperature	34.2°F
Image Range	26.7°F to 47.5°F
Image Time	3/3/2011 8:56:52 AM

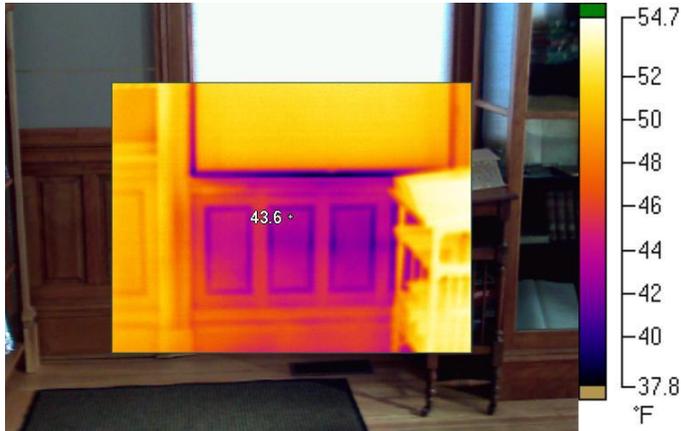


Curved section of ceiling in the New Hampshire Room. The cooler spots may indicate areas where insulation levels are lower, due to the difficulty of getting insulation in the tight curved area.

IR001135.IS2
3/3/2011 9:01:35 AM

Image Info

Average Temperature	52.0°F
Image Range	41.5°F to 56.4°F
Image Time	3/3/2011 9:01:35 AM

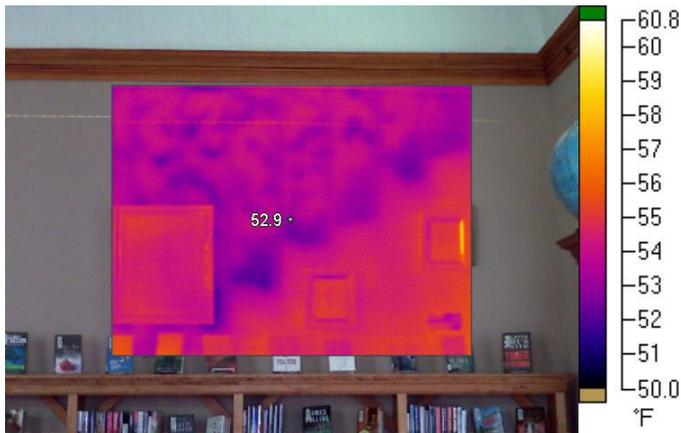


The area below the window is showing cold.

IR001136.IS2
3/3/2011 9:01:47 AM

Image Info

Average Temperature	48.2°F
Image Range	38.1°F to 54.6°F
Image Time	3/3/2011 9:01:47 AM

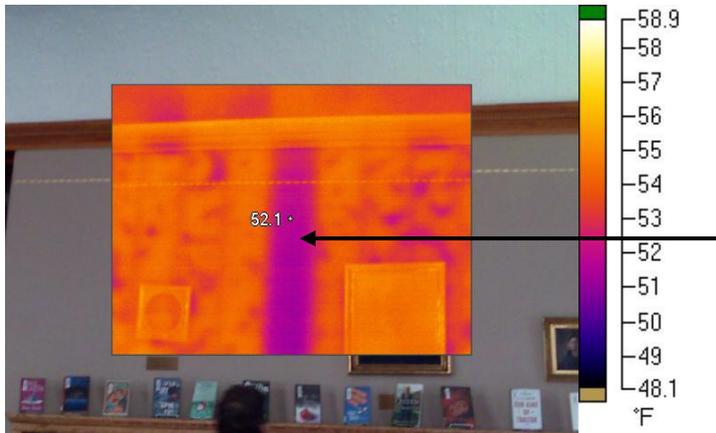


New Hampshire room. Behind this wall is the unconditioned stairwell leading to the attic. Below the stairs is showing warm because it is a heated space below (the stairwell to the lower level) and the cold above is to the unconditioned attic.

IR001140.IS2
3/3/2011 9:03:32 AM

Image Info

Average Temperature	54.0°F
Image Range	51.6°F to 59.1°F
Image Time	3/3/2011 9:03:32 AM

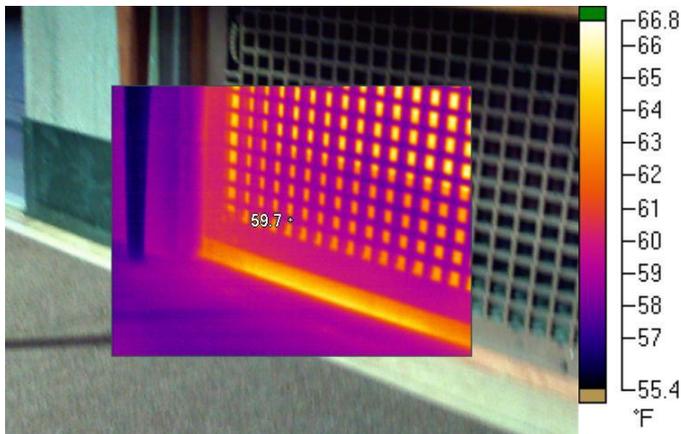


Another section of wall in the New Hampshire Room. The unconditioned stairwell to the attic is behind this wall. The colder area on the wall could be caused by inconsistent insulation in the attic and lack of air sealing. Cold air from the attic is able to enter the area between these two studs and travel down.

IR001141.IS2
3/3/2011 9:03:47 AM

Image Info

Average Temperature	53.8°F
Image Range	50.9°F to 56.0°F
Image Time	3/3/2011 9:03:47 AM

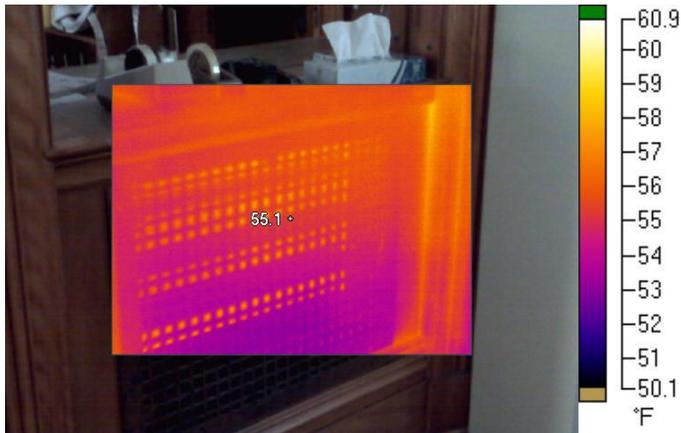


These vents are no longer used. This image shows that heat/air is traveling into these vents/ducts.

IR001146.IS2
3/3/2011 9:08:13 AM

Image Info

Average Temperature	59.7°F
Image Range	55.7°F to 66.5°F
Image Time	3/3/2011 9:08:13 AM

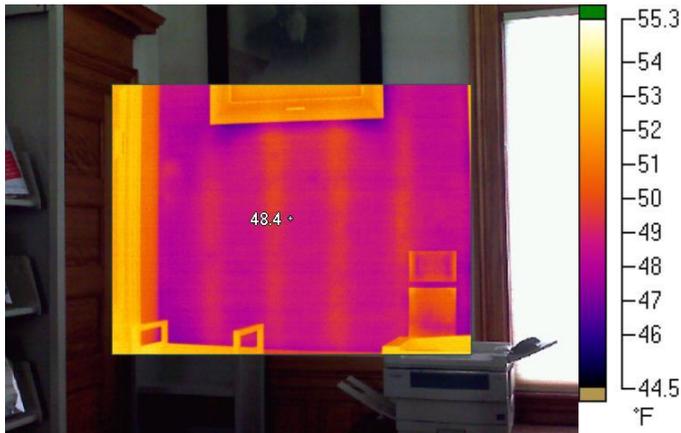


Warm showing behind the vent indicated that warm air is entering these ducts as well.

IR001155.IS2
3/3/2011 9:13:11 AM

Image Info

Average Temperature	55.2°F
Image Range	52.6°F to 58.4°F
Image Time	3/3/2011 9:13:11 AM

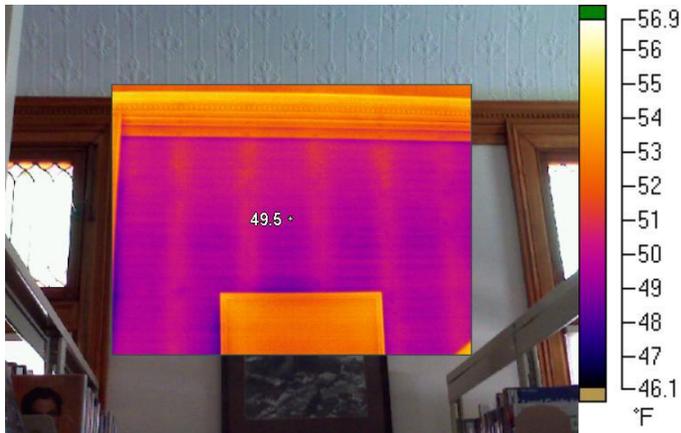


Non-fiction room exterior wall where lathe and plaster wall construction is visible. We found no signs if insulation in any walls.

IR001156.IS2
3/3/2011 9:13:18 AM

Image Info

Average Temperature	49.2°F
Image Range	45.8°F to 53.8°F
Image Time	3/3/2011 9:13:18 AM

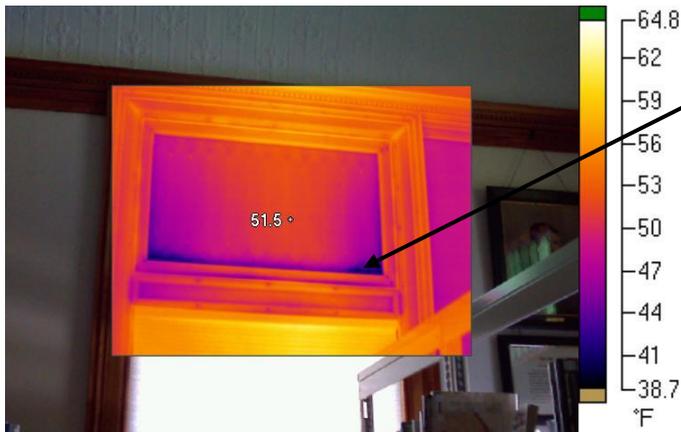


More lathe and plaster is visible in the walls of the non-fiction room.

IR001158.IS2
3/3/2011 9:14:06 AM

Image Info

Average Temperature	50.8°F
Image Range	47.5°F to 55.4°F
Image Time	3/3/2011 9:14:06 AM



Awning section of window showing cold air entering on the bottom corners (where the window would open)

IR001159.IS2
3/3/2011 9:14:53 AM

Image Info

Average Temperature	52.1°F
Image Range	39.4°F to 62.5°F
Image Time	3/3/2011 9:14:53 AM



Heating grate supplying 106 degree air.

IR001163.IS2

3/3/2011 9:15:35 AM

Image Info

Average Temperature	51.6°F
Image Range	38.9°F to 104.6°F
Image Time	3/3/2011 9:15:35 AM



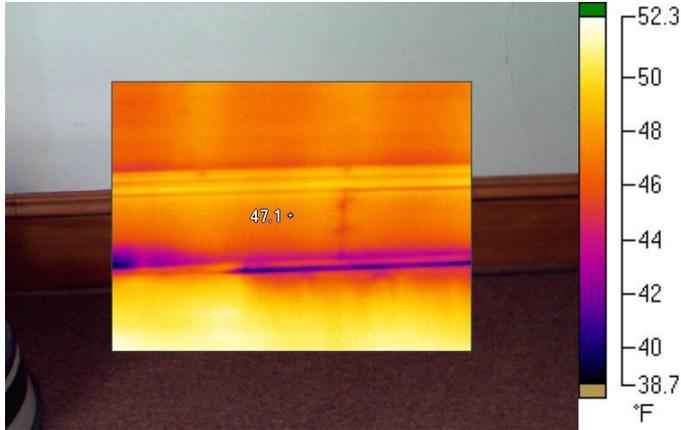
Wall sections under windows were found to be especially leaky and cool.

IR001164.IS2

3/3/2011 9:15:40 AM

Image Info

Average Temperature	46.1°F
Image Range	38.4°F to 52.1°F
Image Time	3/3/2011 9:15:40 AM

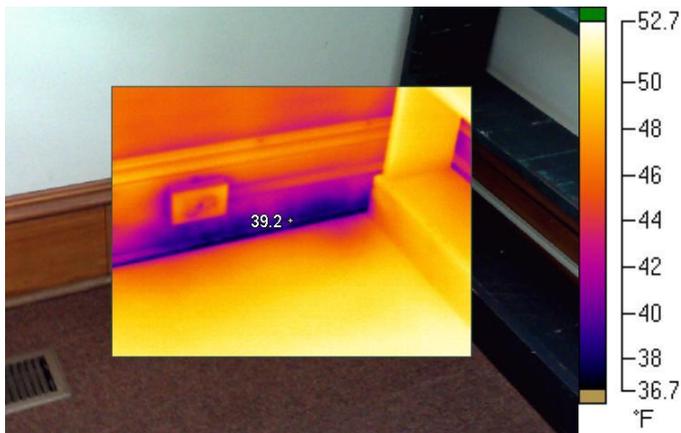


Base boards from the non-fiction room show cold air entering from the basement storage area that is currently unconditioned space.

IR001167.IS2
3/3/2011 9:17:56 AM

Image Info

Average Temperature	47.5°F
Image Range	39.0°F to 52.1°F
Image Time	3/3/2011 9:17:56 AM



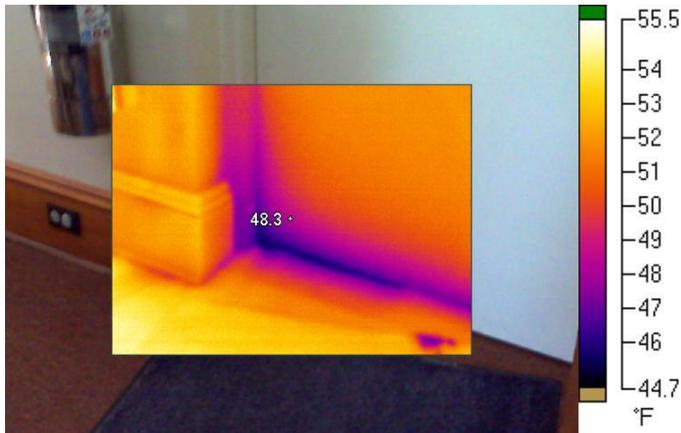
Cold air moving up the baseboards.

IR001169.IS2
3/3/2011 9:18:50 AM

Image Info

Average Temperature	46.8°F
Image Range	36.6°F to 52.5°F
Image Time	3/3/2011 9:18:50 AM

Image Time	3/3/2011 9:19:55 AM
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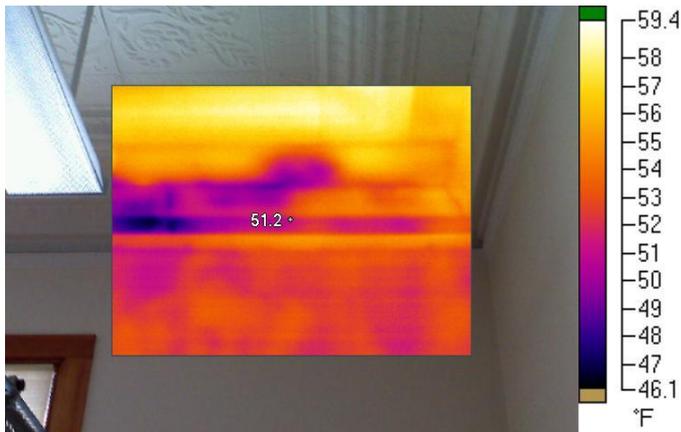


Door leading from the fiction room to the unconditioned stairwell. Cold air from the stairwell is leaking into the conditioned spaces. Doors to the stairwell should be weather stripped to prevent the cold unconditioned air from entering.

IR001171.IS2
3/3/2011 9:26:30 AM

Image Info

Average Temperature	50.9°F
Image Range	45.2°F to 54.9°F
Image Time	3/3/2011 9:26:30 AM

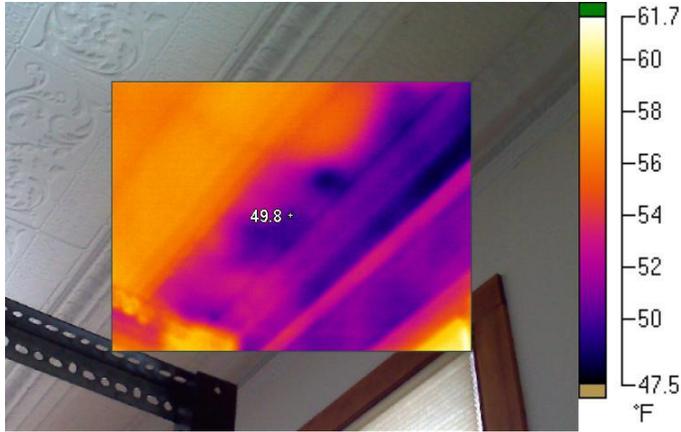


Some colder spots show up along the wall to ceiling connection of the stacks room.

IR001172.IS2
3/3/2011 9:26:59 AM

Image Info

Average Temperature	53.7°F
Image Range	46.4°F to 59.1°F
Image Time	3/3/2011 9:26:59 AM

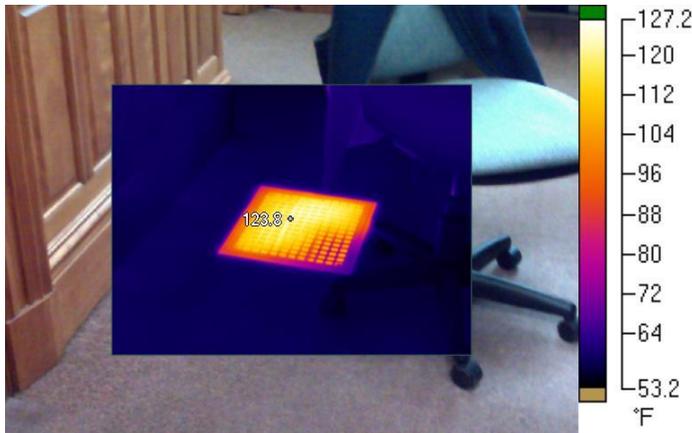


Another view of the wall to ceiling connection. It is apparent that the insulation does not go to the edge of the ceiling here. This may be one cause of the ice dams.

IR001175.IS2
3/3/2011 9:27:29 AM

Image Info

Average Temperature	53.3°F
Image Range	47.7°F to 61.3°F
Image Time	3/3/2011 9:27:29 AM

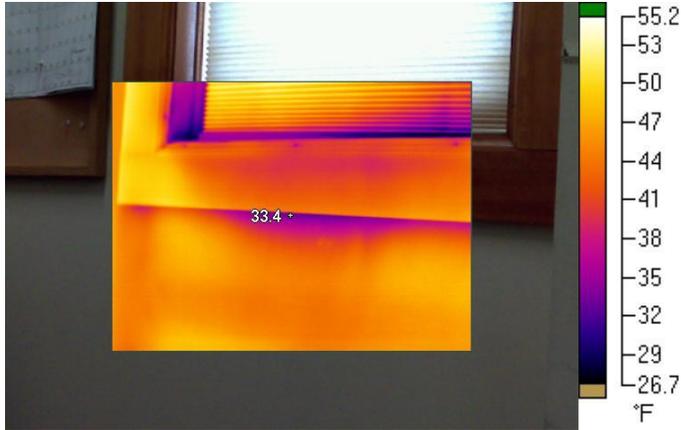


Supply vent.

IR001177.IS2
3/3/2011 9:30:01 AM

Image Info

Average Temperature	62.6°F
Image Range	54.1°F to 125.3°F
Image Time	3/3/2011 9:30:01 AM

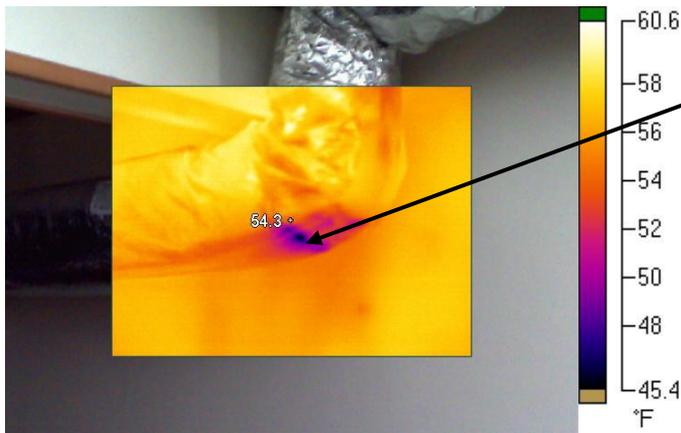


Newer window in the computer room shows leakage below and behind the trim.

IR001184.IS2
3/3/2011 9:32:01 AM

Image Info

Average Temperature	43.6°F
Image Range	27.2°F to 53.2°F
Image Time	3/3/2011 9:32:01 AM

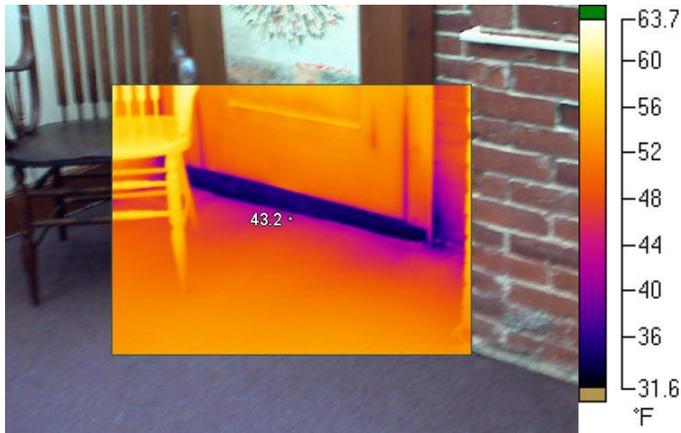


Supply and/or return vent from the ERV. Only small leaks were found in the ducting.

IR001198.IS2
3/3/2011 9:58:05 AM

Image Info

Average Temperature	56.4°F
Image Range	45.7°F to 60.2°F
Image Time	3/3/2011 9:58:05 AM

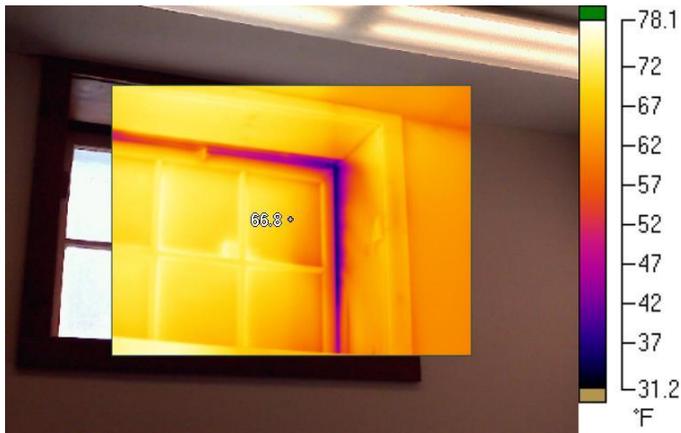


Exterior door of the juvenile room, showing a lot of cold air entering beneath the door.

IR001201.IS2
3/3/2011 9:59:48 AM

Image Info

Average Temperature	49.9°F
Image Range	32.2°F to 61.5°F
Image Time	3/3/2011 9:59:48 AM

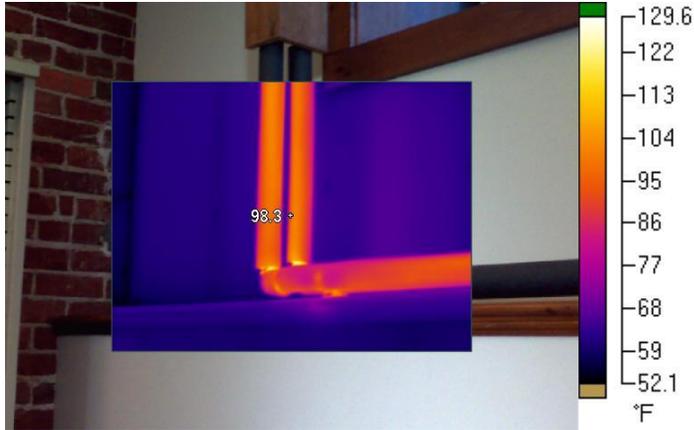


Hopper window in juvenile room showing cold air entering around window.

IR001203.IS2
3/3/2011 10:00:02 AM

Image Info

Average Temperature	66.0°F
Image Range	33.8°F to 76.2°F
Image Time	3/3/2011 10:00:02 AM



Insulated hot water pipes in the juvenile room.

IR001208.IS2
3/3/2011 10:03:17 AM

Image Info

Average Temperature	67.4°F
Image Range	53.5°F to 128.2°F
Image Time	3/3/2011 10:03:17 AM

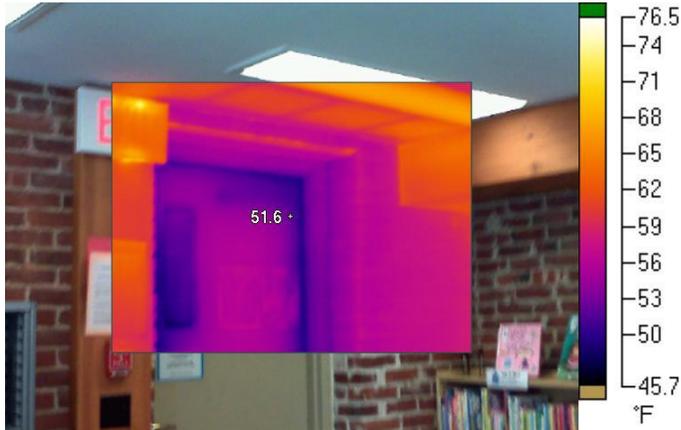


Supply ducts, heading to the main floor, in the children's room.

IR001209.IS2
3/3/2011 10:03:38 AM

Image Info

Average Temperature	67.2°F
Image Range	61.5°F to 88.3°F
Image Time	3/3/2011 10:03:38 AM

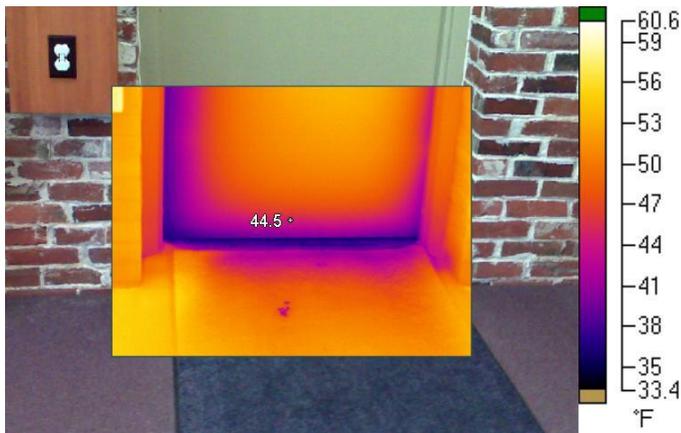


There is cold air infiltrating into the Children's Room from the door leading to unconditioned stairwell.

IR001222.IS2
3/3/2011 10:07:51 AM

Image Info

Average Temperature	57.2°F
Image Range	48.0°F to 73.8°F
Image Time	3/3/2011 10:07:51 AM

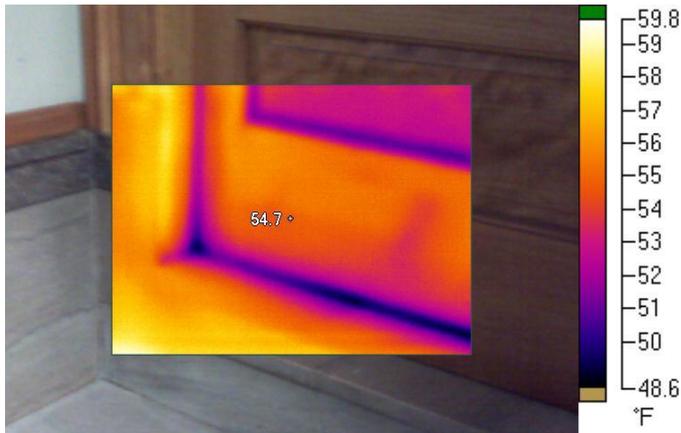


Bottom of door leading to stairwell in the Children's Room. Again we see cold air entering the conditioned space from the stair well.

IR001223.IS2
3/3/2011 10:07:57 AM

Image Info

Average Temperature	48.5°F
Image Range	34.9°F to 58.9°F
Image Time	3/3/2011 10:07:57 AM

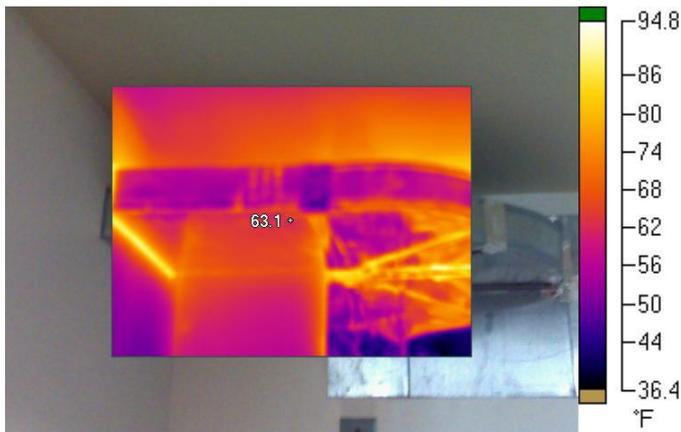


Door leading to the attic stairwell. The door is letting cold air from the unconditioned attic through to the main floor of the library.

IR001236.IS2
3/3/2011 10:55:18 AM

Image Info

Average Temperature	54.5°F
Image Range	48.8°F to 59.6°F
Image Time	3/3/2011 10:15:18 AM



Un-insulated duct work in the unconditioned stairwell.

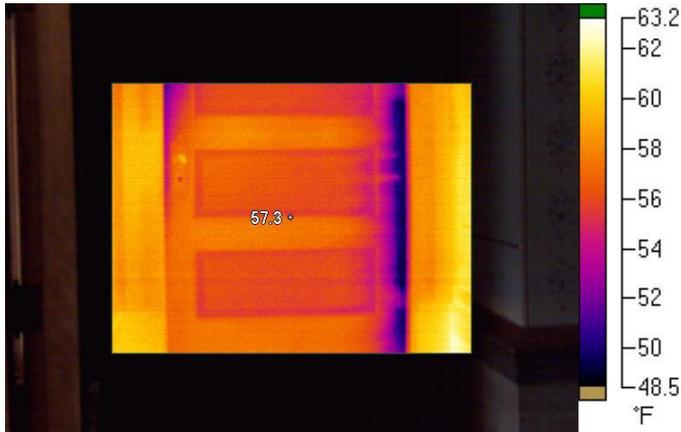
IR001238.IS2
3/3/2011 10:56:49 AM

Image Info

Average Temperature	63.9°F
Image Range	38.0°F to 92.6°F
Image Time	3/3/2011 10:56:49 AM

Blower Door Testing Images

The remaining images were taken during the Blower Door Testing that occurred on the morning of March 7, 2011. During a Blower Door Test the building is depressurized, allowing outside air and air from unconditioned areas of a building, like the attic, to be pulled into the building through weak areas of the building's envelope. The infrared images or IR images taken during the testing are often more exaggerated and allow for easy pinpointing of air leakage. Air movement also appears in the images in a distinct wispy or feathery pattern, making it easy to identify.

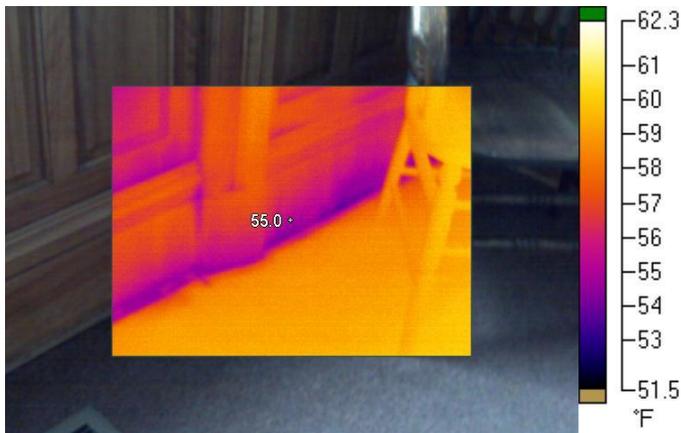


Colder air from the attic is entering the conditioned space, from around the door.

IR001463.IS2
3/7/2011 8:51:42 AM

Image Info

Average Temperature	57.0°F
Image Range	48.6°F to 62.9°F
Image Time	3/7/2011 8:51:42 AM

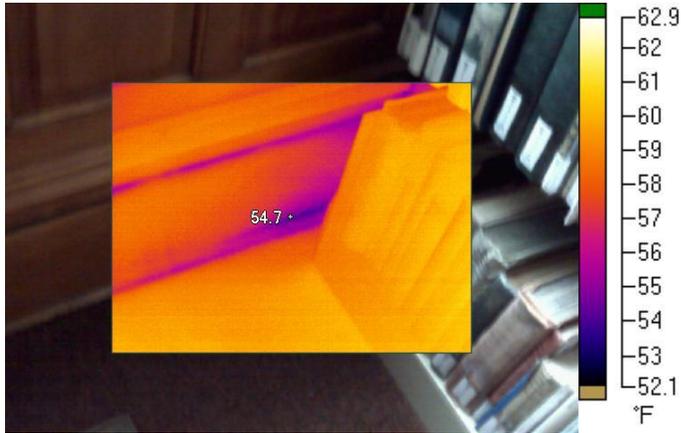


Cold air was coming up from the unconditioned basement storage area to the Non Fiction Room.

IR001468.IS2
3/7/2011 8:54:18 AM

Image Info

Average Temperature	57.7°F
Image Range	53.3°F to 60.5°F
Image Time	3/7/2011 8:54:18 AM

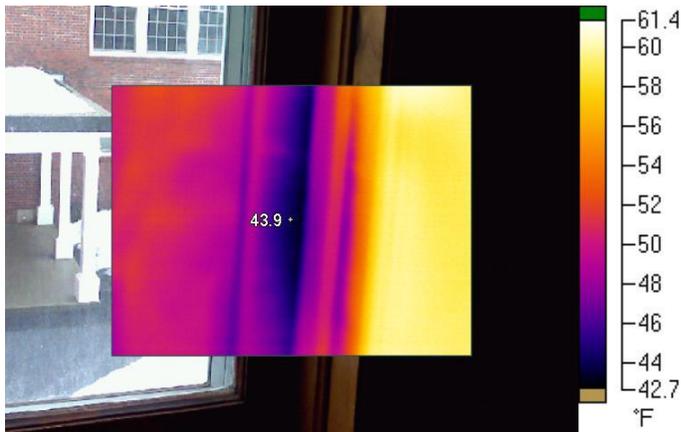


More cool air coming in around the baseboards.

IR001469.IS2
3/7/2011 8:54:38 AM

Image Info

Average Temperature	58.7°F
Image Range	53.9°F to 61.1°F
Image Time	3/7/2011 8:54:38 AM

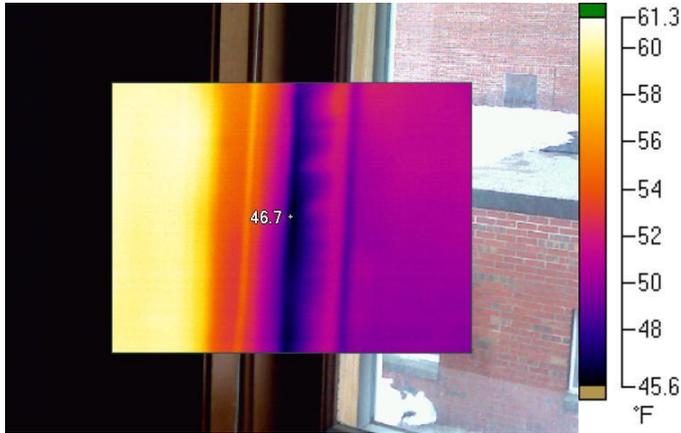


Leaky window where cold air is coming in.

IR001470.IS2
3/7/2011 8:55:27 AM

Image Info

Average Temperature	52.2°F
Image Range	43.0°F to 61.0°F
Image Time	3/7/2011 8:55:27 AM

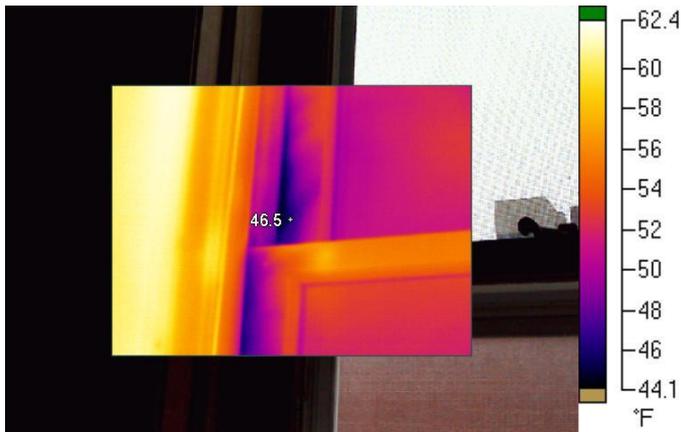


Another window allowing cold air movement into the conditioned space.

IR001471.IS2
3/7/2011 8:55:37 AM

Image Info

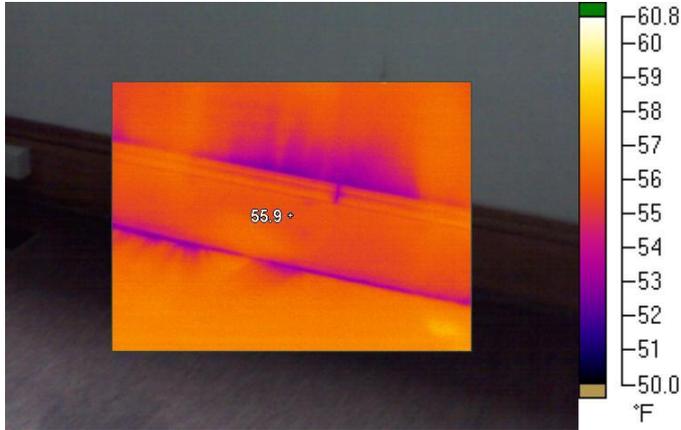
Average Temperature	53.5°F
Image Range	45.8°F to 61.2°F
Image Time	3/7/2011 8:55:37 AM



IR001472.IS2
3/7/2011 8:55:45 AM

Image Info

Average Temperature	54.5°F
Image Range	44.4°F to 62.2°F
Image Time	3/7/2011 8:55:45 AM

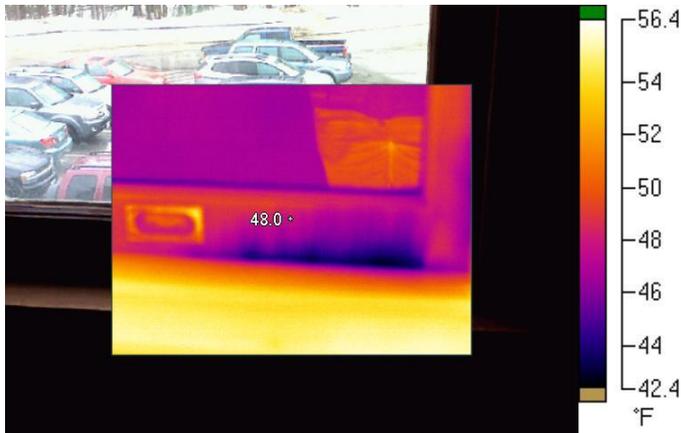


More air movement around the baseboards, indicating air movement within the walls and/or between floors.

IR001474.IS2
3/7/2011 8:56:24 AM

Image Info

Average Temperature	55.8°F
Image Range	52.3°F to 58.5°F
Image Time	3/7/2011 8:56:24 AM

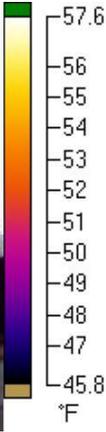
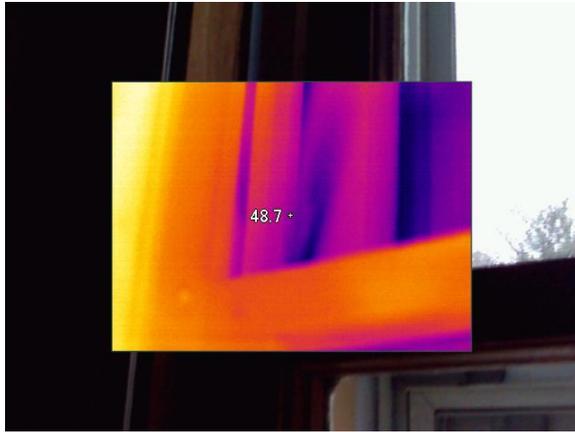


Window on southern side of the building with cold air leaking in.

IR001475.IS2
3/7/2011 8:56:29 AM

Image Info

Average Temperature	49.5°F
Image Range	42.5°F to 56.1°F
Image Time	3/7/2011 8:56:29 AM

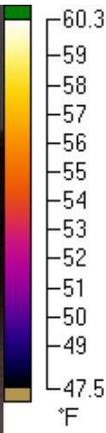
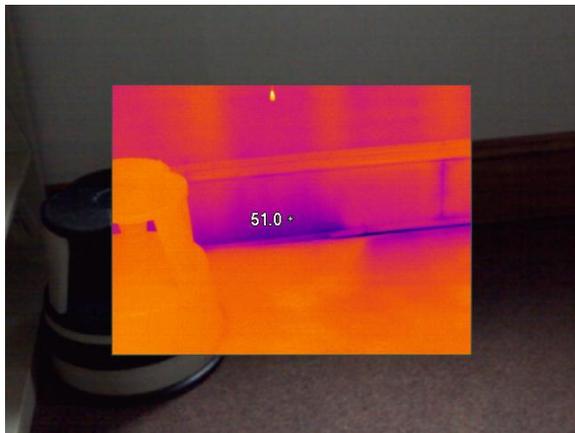


Cold air is coming in at the sash of this window and moving up the window pane.

IR001477.IS2
3/7/2011 8:57:46 AM

Image Info

Average Temperature	51.5°F
Image Range	45.8°F to 57.2°F
Image Time	3/7/2011 8:57:46 AM

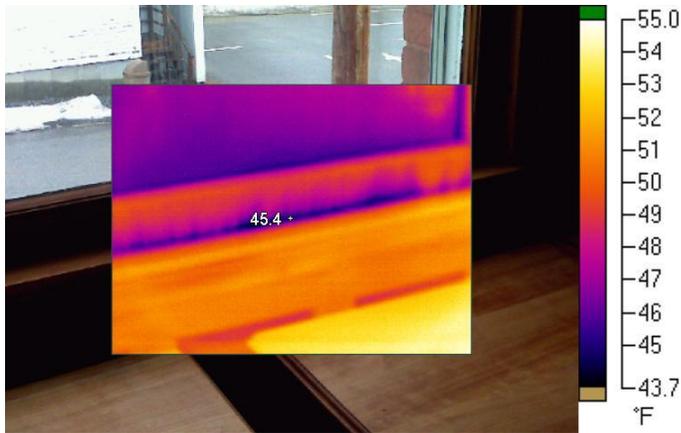


Cold air moving up the bottom of the wall.

IR001481.IS2
3/7/2011 8:58:47 AM

Image Info

Average Temperature	53.8°F
Image Range	47.8°F to 59.9°F
Image Time	3/7/2011 8:58:47 AM



Another leaky window in the New Hampshire Room.

IR001486.IS2
3/7/2011 9:00:59 AM

Image Info

Average Temperature	49.1°F
Image Range	43.9°F to 54.7°F
Image Time	3/7/2011 9:00:59 AM

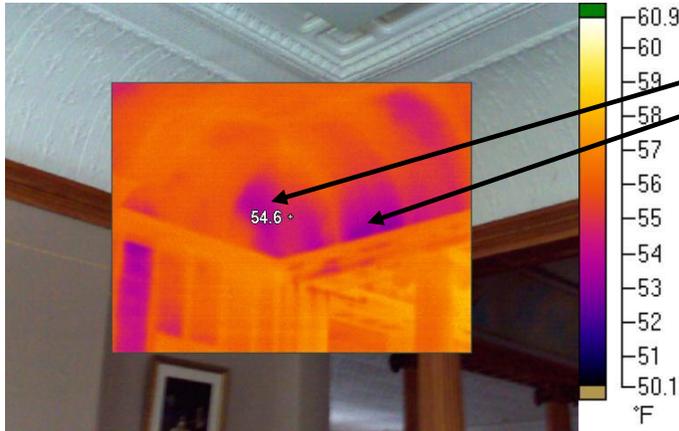


Many of the awning windows showed air movement. This is just one example.

IR001489.IS2
3/7/2011 9:01:53 AM

Image Info

Average Temperature	52.1°F
Image Range	42.9°F to 56.5°F
Image Time	3/7/2011 9:01:53 AM

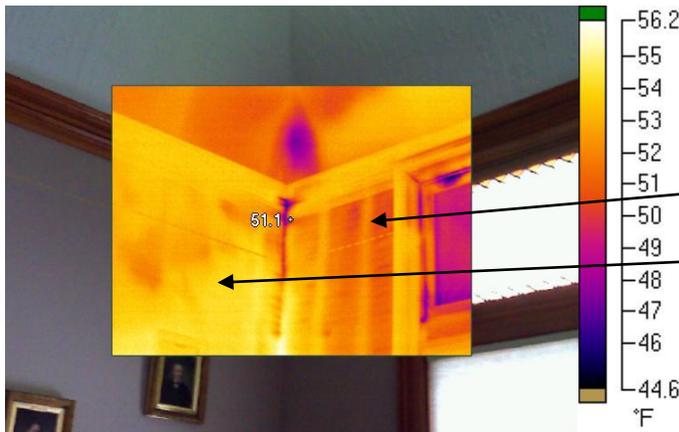


The curved ceiling of the New Hampshire room showed areas of less insulation.

IR001490.IS2
3/7/2011 9:02:11 AM

Image Info

Average Temperature	55.9°F
Image Range	52.6°F to 58.4°F
Image Time	3/7/2011 9:02:11 AM



Exterior wall connection in the New Hampshire room. The exterior walls were shown to have no insulation and the lathe and plaster was visible.

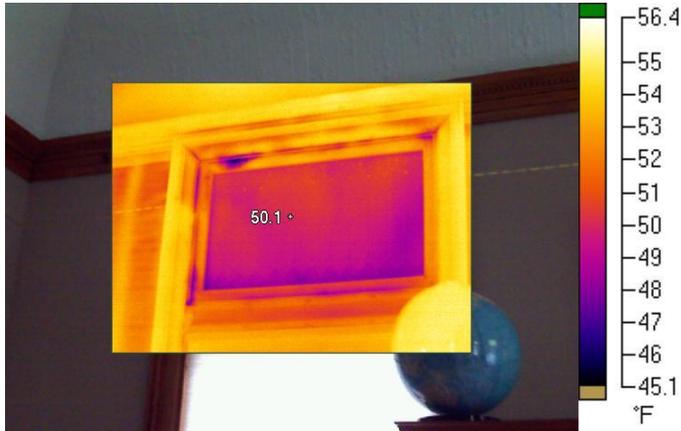
Exterior wall with lathe and plaster visible

Interior wall

IR001491.IS2
3/7/2011 9:02:35 AM

Image Info

Average Temperature	52.4°F
Image Range	44.8°F to 56.0°F
Image Time	3/7/2011 9:02:35 AM



Another awning window showing air leakage around the edges.

IR001492.IS2
3/7/2011 9:02:42 AM

Image Info

Average Temperature	52.1°F
Image Range	45.4°F to 56.0°F
Image Time	3/7/2011 9:02:42 AM



Note cold areas around the windows indicating that cold air is entering.

The area underneath the window also showed cold.

Cold corner of window

Cold area beneath window

IR001496.IS2
3/7/2011 9:04:28 AM

Image Info

Average Temperature	51.8°F
Image Range	43.0°F to 56.2°F
Image Time	3/7/2011 9:04:28 AM



Un-insulated walls of the bathroom.

IR001499.IS2
3/7/2011 9:06:04 AM

Image Info

Average Temperature	52.6°F
Image Range	46.8°F to 56.8°F
Image Time	3/7/2011 9:06:04 AM



Window above the toilet in the ladies room. Note the cold around the edges.

IR001500.IS2
3/7/2011 9:06:11 AM

Image Info

Average Temperature	54.5°F
Image Range	47.8°F to 57.6°F
Image Time	3/7/2011 9:06:11 AM



Exterior door of the Juvenile room. The area beneath the door was extremely cold 35° when the indoor temperature was between 55° and 60°.

IR001504.IS2
3/7/2011 9:08:22 AM

Image Info

Average Temperature	46.7°F
Image Range	35.7°F to 51.5°F
Image Time	3/7/2011 9:08:22 AM

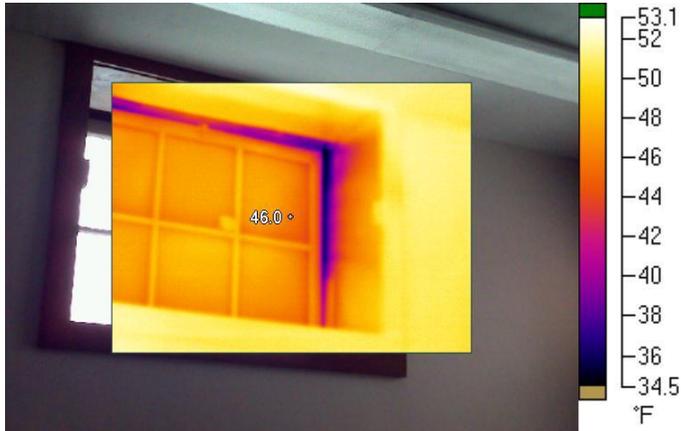


Door and window of juvenile room. The window is showing air movement around the corners.

IR001506.IS2
3/7/2011 9:08:48 AM

Image Info

Average Temperature	44.8°F
Image Range	35.8°F to 50.0°F
Image Time	3/7/2011 9:08:48 AM

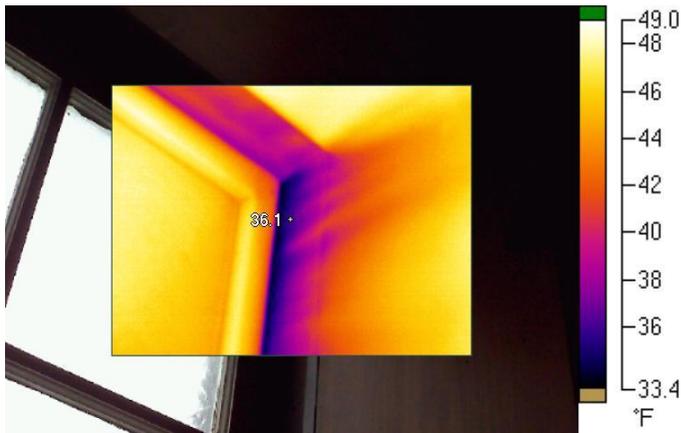


A hopper window from the juvenile room showing a lot of air movement along the edges, possibly caused by inability to properly close.

IR001507.IS2
3/7/2011 9:08:55 AM

Image Info

Average Temperature	48.2°F
Image Range	34.8°F to 52.7°F
Image Time	3/7/2011 9:08:55 AM

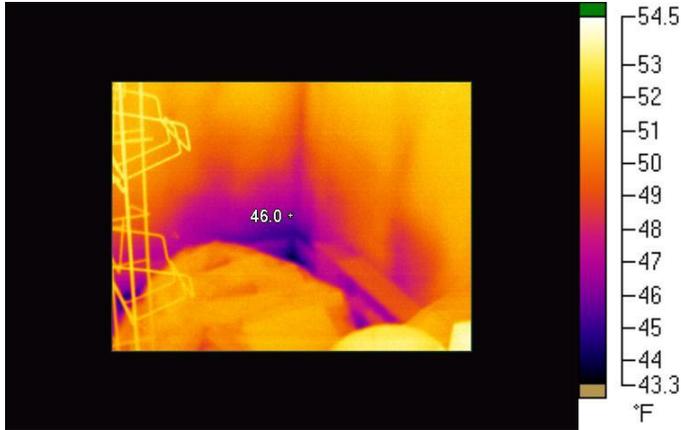


Distinct air movement pattern in hopper window in the Juvenile Room.

IR001514.IS2
3/7/2011 9:11:49 AM

Image Info

Average Temperature	44.0°F
Image Range	33.6°F to 48.6°F
Image Time	3/7/2011 9:11:49 AM

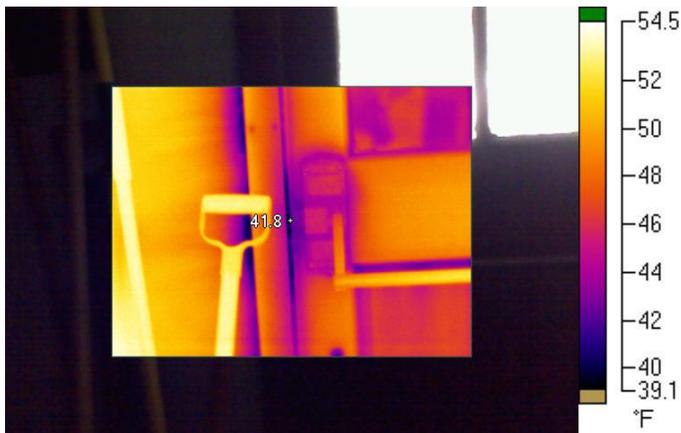


Corner of the Kindergarten room showing cold conducting up from the un-insulated slab.

IR001529.IS2
3/7/2011 9:18:29 AM

Image Info

Average Temperature	50.1°F
Image Range	43.6°F to 54.2°F
Image Time	3/7/2011 9:18:29 AM

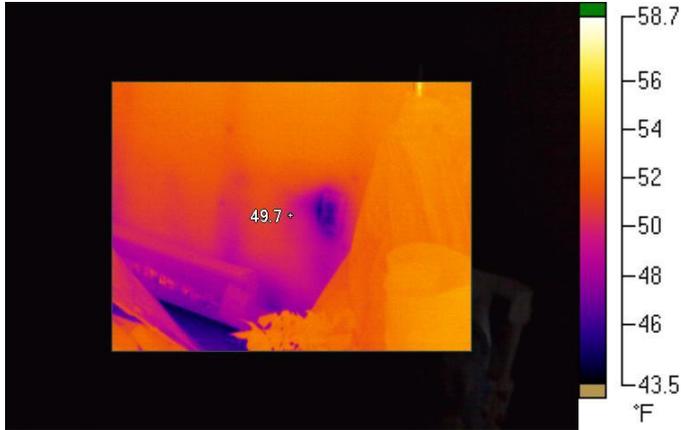


Exterior door of the Kindergarten room shows a lot of air movement around the door and around the frame.

IR001531.IS2
3/7/2011 9:18:47 AM

Image Info

Average Temperature	48.0°F
Image Range	39.4°F to 54.3°F
Image Time	3/7/2011 9:18:47 AM



The cold spot on the wall of the Kindergarten room is an electrical socket. This indicates that air movement is occurring in the wall, and there is likely no insulation in the walls.

IR001534.IS2
3/7/2011 9:19:44 AM

Image Info

Average Temperature	51.4°F
Image Range	43.8°F to 58.3°F
Image Time	3/7/2011 9:19:44 AM

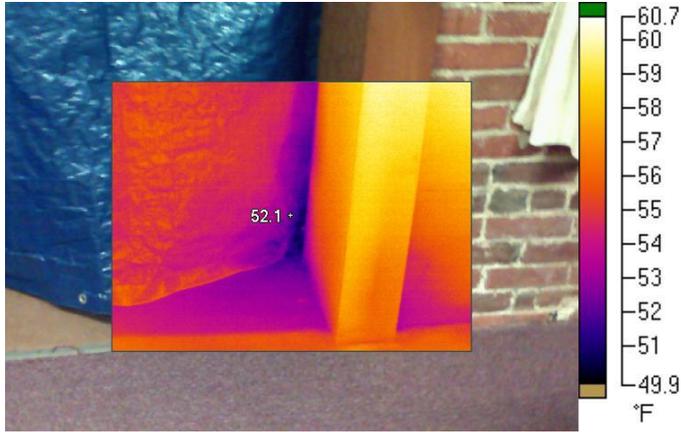


In the Employee lounge or kitchen area there is a semi-hidden window that could be removed to prevent heat loss.

IR001537.IS2
3/7/2011 9:21:59 AM

Image Info

Average Temperature	61.1°F
Image Range	42.0°F to 76.0°F
Image Time	3/7/2011 9:21:59 AM



We attempted to block off the employee lounge / kitchen area before performing the test so as not to include the unheated storage space between the boiler room and the employee lounge.

Note the cold that is able to enter the conditioned kitchen area.

IR001539.IS2
3/7/2011 9:22:51 AM

Image Info

Average Temperature	55.5°F
Image Range	50.3°F to 60.2°F
Image Time	3/7/2011 9:22:51 AM

The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

Fire Station IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*



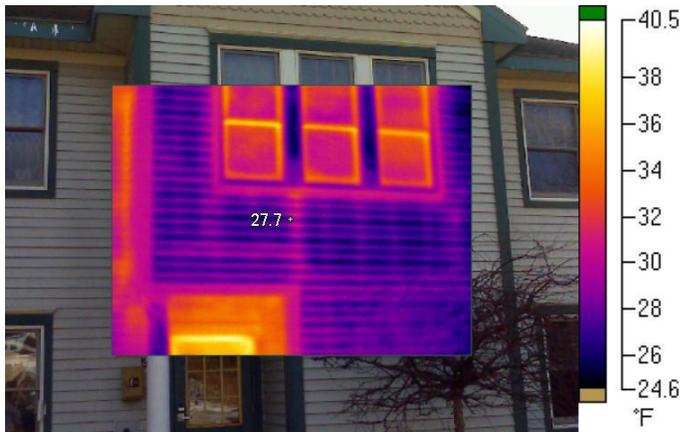


Looking at the front façade of the Fire Station, we see heat loss through the main entrance door and the surrounding overhang.

IR002439.IS2
3/24/2011 7:05:57 AM

Image Info

Average Temperature	31.3°F
Image Range	25.5°F to 42.1°F
Image Time	3/24/2011 7:05:57 AM

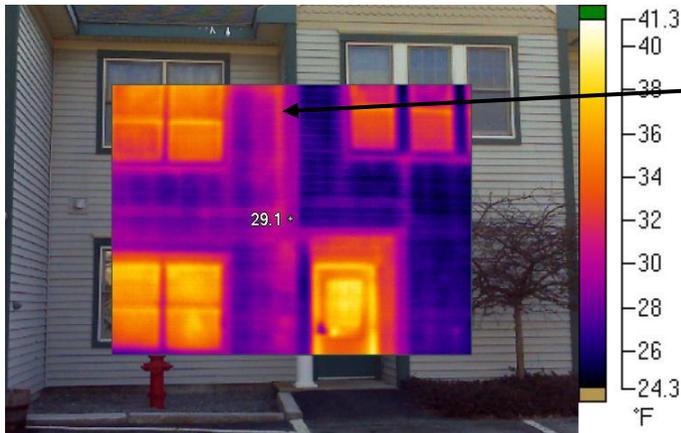


Again looking at the front façade of the building, heat is being conducted out of the building via framing members and around the windows.

IR002440.IS2
3/24/2011 7:06:09 AM

Image Info

Average Temperature	29.6°F
Image Range	24.6°F to 39.6°F
Image Time	3/24/2011 7:06:09 AM



Note the high level of heat loss at the corner of the building.

IR002441.IS2
3/24/2011 7:06:43 AM

Image Info

Average Temperature	30.2°F
Image Range	24.6°F to 39.6°F
Image Time	3/24/2011 7:06:43 AM

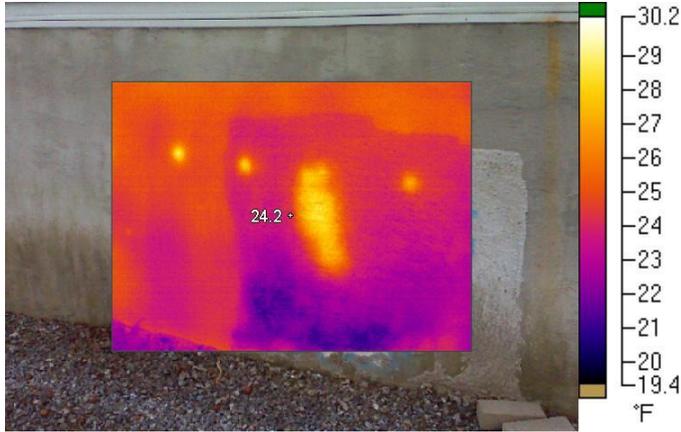


Here heat is being lost through the top and sides of the front garage doors.

IR002446.IS2
3/24/2011 7:09:00 AM

Image Info

Average Temperature	29.4°F
Image Range	20.3°F to 56.9°F
Image Time	3/24/2011 7:09:00 AM

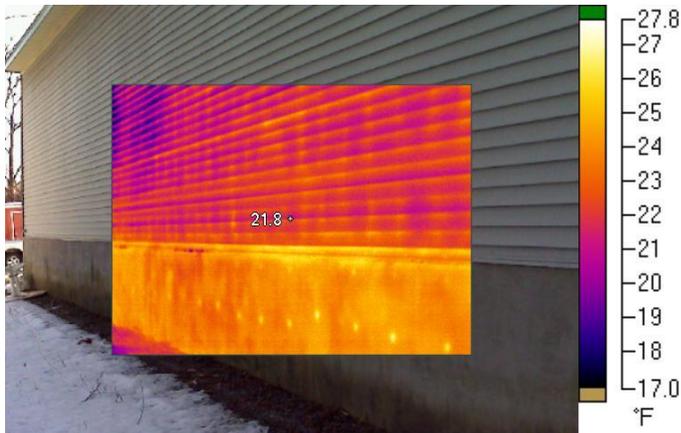


Foundation wall along north side of the building. The darker spots are moisture/mold in and on the concrete foundation. Moisture in a building material drastically increases heat loss through that material, and the presence of mold means that the material is not drying as quickly as it should, but this is a small area not to be of much concern.

IR002449.IS2
3/24/2011 7:11:32 AM

Image Info

Average Temperature	24.1°F
Image Range	20.4°F to 29.1°F
Image Time	3/24/2011 7:11:32 AM



North side of the building. The foundation wall is showing a high level of heat loss, as well as the wall to foundation connection.

IR002450.IS2
3/24/2011 7:12:21 AM

Image Info

Average Temperature	22.8°F
Image Range	17.0°F to 27.3°F
Image Time	3/24/2011 7:12:21 AM



Here we see exposed foundation insulation. The plans called for the rigid insulation on the interior of the footing, but here it is present on the exterior. It is preventing heat loss though the foundation well here however other areas still have a large amount of heat loss though the foundation.

IR002460.IS2

3/24/2011 7:21:06 AM

Image Info

Average Temperature	27.2°F
Image Range	24.1°F to 29.8°F
Image Time	3/24/2011 7:21:06 AM



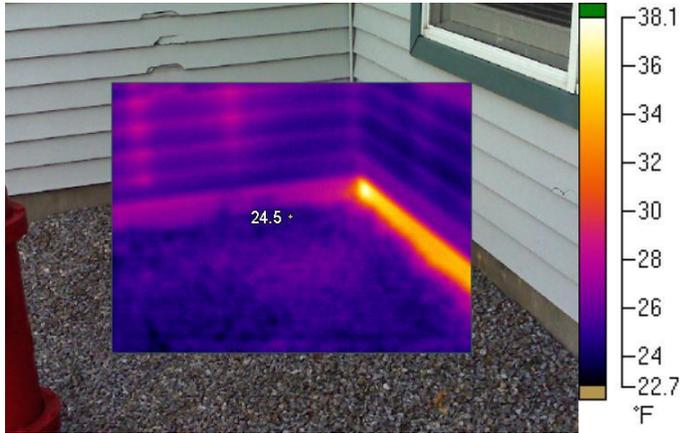
On the Western or front façade of the building the foundation to the fire house is showing heat loss.

IR002462.IS2

3/24/2011 7:22:16 AM

Image Info

Average Temperature	25.9°F
Image Range	22.2°F to 34.9°F
Image Time	3/24/2011 7:22:16 AM

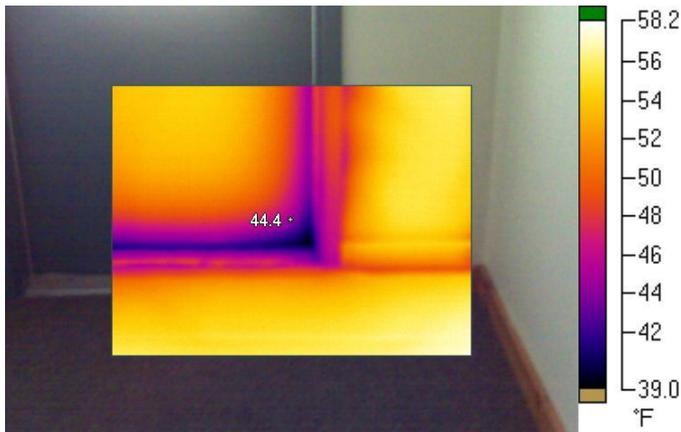


Front façade of the building where the fire house and the garage meet. The fire house slab is showing much more heat loss than the garage slab. Possibly because the fire station section is being heated to higher temperatures, or there may be discontinuity in the foundation insulation.

IR002463.IS2
3/24/2011 7:22:27 AM

Image Info

Average Temperature	25.7°F
Image Range	22.9°F to 37.9°F
Image Time	3/24/2011 7:22:27 AM

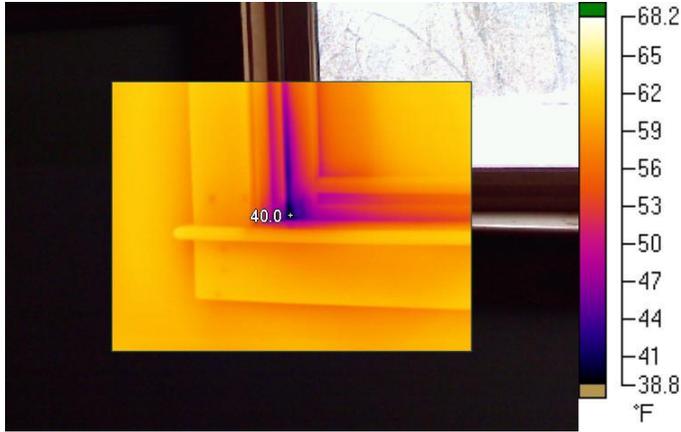


Main entrance door to the fire house. From the interior the door shows cold air infiltration around the bottom. Especially in the corners of the doorway.

IR002465.IS2
3/24/2011 7:24:10 AM

Image Info

Average Temperature	51.8°F
Image Range	39.1°F to 57.9°F
Image Time	3/24/2011 7:24:10 AM



Typical window in the fire station showed cold air infiltration around the corners.

IR002471.IS2

3/24/2011 7:26:28 AM

Image Info

Average Temperature	60.5°F
Image Range	39.1°F to 65.1°F
Image Time	3/24/2011 7:26:28 AM



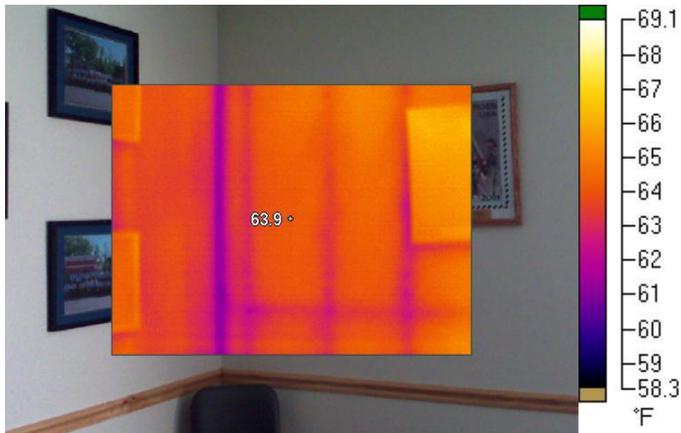
Cold electrical outlet and floor edge. Floor edge is likely cold because the slab is conducting cold from the exterior into the room.

IR002472.IS2

3/24/2011 7:27:10 AM

Image Info

Average Temperature	62.9°F
Image Range	53.9°F to 66.7°F
Image Time	3/24/2011 7:27:10 AM

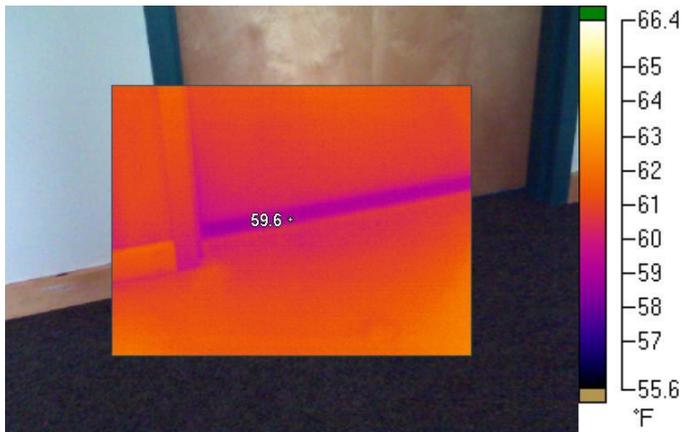


This corner shows cold from the lack of insulation in corners due to traditional framing that does not allow for insulation at the corners.

IR002473.IS2
3/24/2011 7:27:23 AM

Image Info

Average Temperature	63.9°F
Image Range	60.8°F to 66.6°F
Image Time	3/24/2011 7:27:23 AM



Door between the garage and the fire station appears to be doing a good job of keeping the spaces separated. There is not much cool air coming in from the garage.

IR002475.IS2
3/24/2011 7:28:13 AM

Image Info

Average Temperature	61.2°F
Image Range	58.7°F to 63.2°F
Image Time	3/24/2011 7:28:13 AM

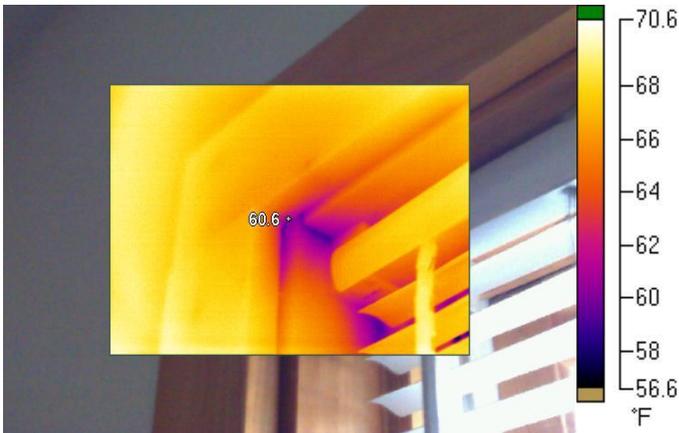


Corner of the radio room. The exterior wall is showing cold along the bottom. This is the interior spot that coincides with the slab heat loss on the western façade.

IR002482.IS2
3/24/2011 7:32:34 AM

Image Info

Average Temperature	63.4°F
Image Range	48.8°F to 68.4°F
Image Time	3/24/2011 7:32:34 AM



Another window showing cold air infiltration at the corner.

IR002483.IS2
3/24/2011 7:33:09 AM

Image Info

Average Temperature	66.7°F
Image Range	56.9°F to 70.3°F
Image Time	3/24/2011 7:33:09 AM



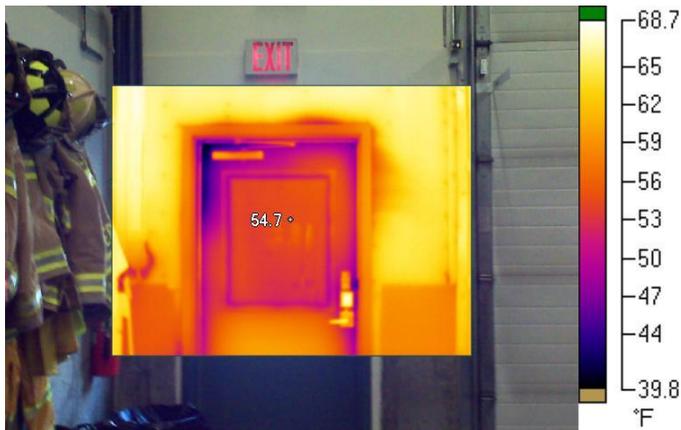
Door to the garage that is planned to be replaced. There is a lot of cold infiltrating along the bottom of the doorway. This door was also rusting along the bottom.

IR002484.IS2

3/24/2011 7:34:03 AM

Image Info

Average Temperature	56.3°F
Image Range	31.7°F to 66.2°F
Image Time	3/24/2011 7:34:03 AM



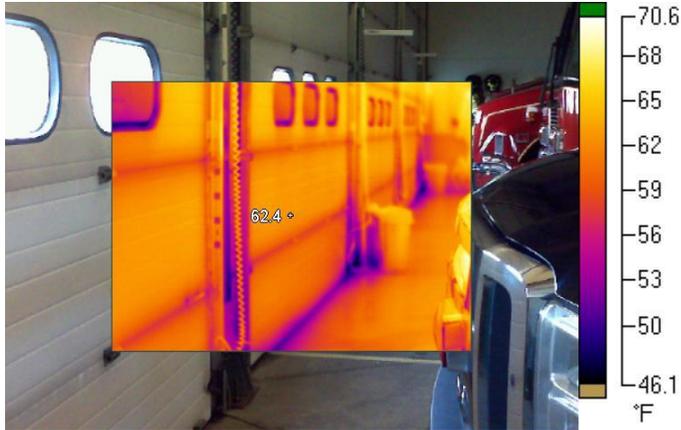
This photo shows the lack of insulation around the framing of the door. When this door is replaced it would be an ideal time to spray foam around the framing.

IR002485.IS2

3/24/2011 7:34:11 AM

Image Info

Average Temperature	58.8°F
Image Range	40.0°F to 68.4°F
Image Time	3/24/2011 7:34:11 AM

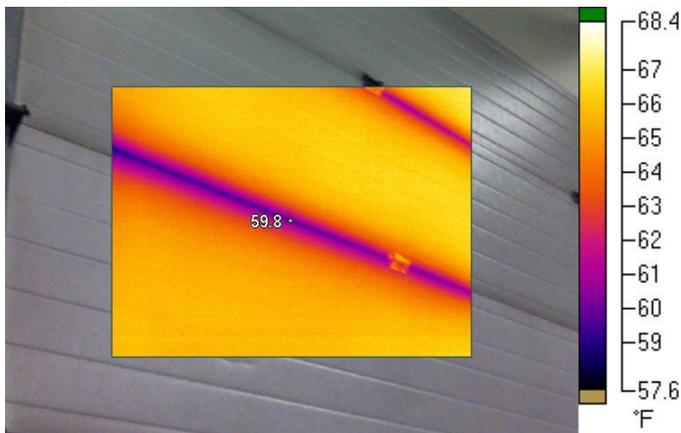


Interior view of multiple garage doors. There is a pattern of cold air coming in around the corners of the doors and along the bottoms. Weather stripping is needed here.

IR002487.IS2
3/24/2011 7:34:49 AM

Image Info

Average Temperature	60.5°F
Image Range	46.3°F to 70.4°F
Image Time	3/24/2011 7:34:49 AM

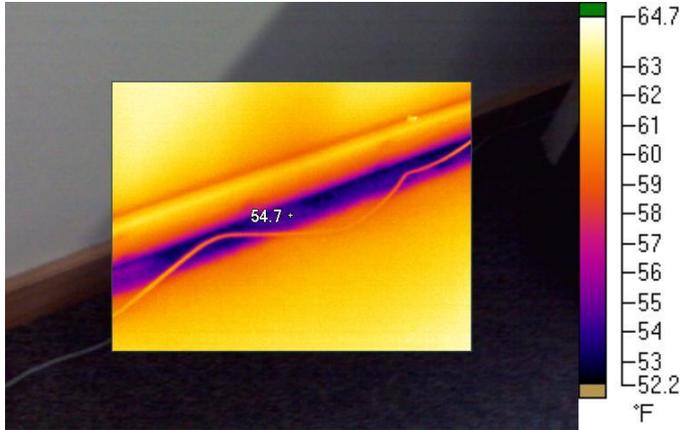


Where the doors hinge is also an area where cold is coming in.

IR002488.IS2
3/24/2011 7:35:03 AM

Image Info

Average Temperature	64.9°F
Image Range	58.8°F to 67.2°F
Image Time	3/24/2011 7:35:03 AM



A lot of cold appeared to be coming in along the floorboards of the Southwestern office space. Cold is being conducted inward by the slab because there is no thermal break between the foundation and the framing.

IR002493.IS2
3/24/2011 7:38:06 AM

Image Info

Average Temperature	60.8°F
Image Range	52.4°F to 64.6°F
Image Time	3/24/2011 7:38:06 AM



Exterior corner of the southwest office. Here we see the cold corner as well as framing members that are conducting cold into the building.

IR002494.IS2
3/24/2011 7:38:23 AM

Image Info

Average Temperature	67.5°F
Image Range	59.6°F to 70.3°F
Image Time	3/24/2011 7:38:23 AM

The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

Community Center IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*



This is the entrance door to the Teen Center on the front façade of the building. Heat loss is occurring at the base of the door and heating brick walk way. This is an example of wasted heat.

IR000986.IS2

2/24/2011 1:35:59 PM

Image Info

Average Temperature	45.3°F
Image Range	39.5°F to 49.1°F
Image Time	2/24/2011 1:35:59 PM



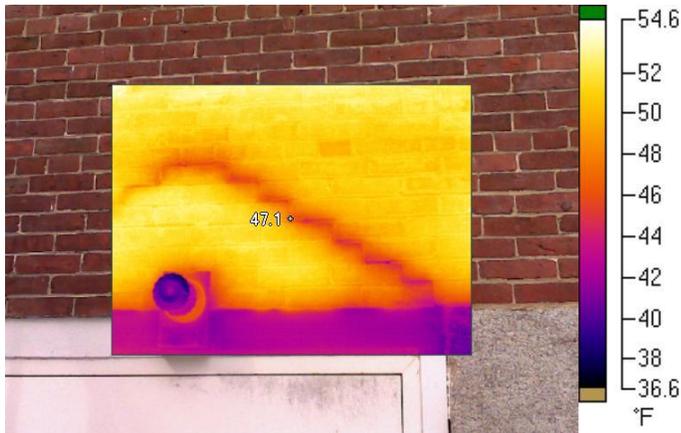
Decorative section above the doorway. From the exterior these areas are warm meaning they are conducting heat to the outdoors. From the interior we could see where these decorative triangle archways were located on the exterior indicating they are an area where heat is escaping the building.

IR000988.IS2

2/24/2011 1:36:20 PM

Image Info

Average Temperature	45.7°F
Image Range	33.9°F to 55.1°F
Image Time	2/24/2011 1:36:20 PM



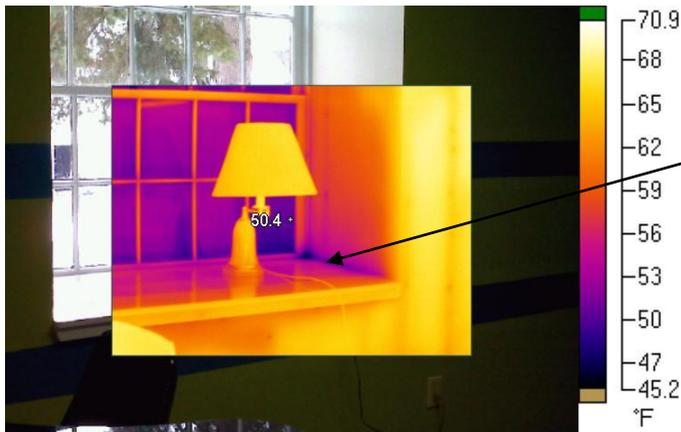
This is a crack in the exterior brick work above the Teen Center door, on the front façade. Heat is able to move through the wall and escape to the outside here.

IR000989.IS2

2/24/2011 1:36:47 PM

Image Info

Average Temperature	48.9°F
Image Range	36.9°F to 54.4°F
Image Time	2/24/2011 1:36:47 PM



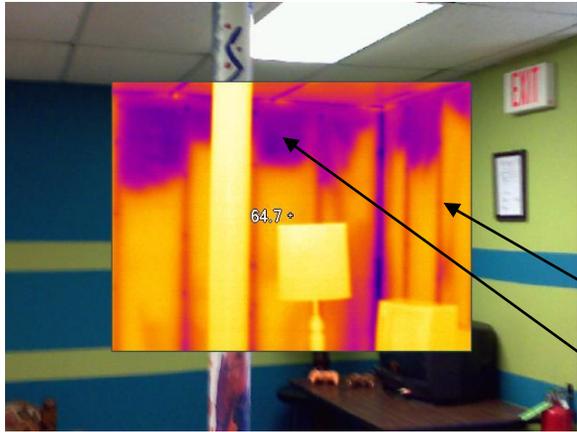
Teen Center window. There is cold air in the corner of the large window sill. We saw this throughout the space.

IR000991.IS2

2/24/2011 1:37:10 PM

Image Info

Average Temperature	60.1°F
Image Range	46.0°F to 68.9°F
Image Time	2/24/2011 1:37:10 PM



This image of two exterior walls shows the framing members as well as the insulation within the walls. These fiberglass batts appear to be settling within their bays. Note the colder temperatures visible in the top portions of the bay; this indicates that the batt is either pushed back or has settled. This settling is usually caused by improper installation. Settling batts lose their full effectiveness and R-value (insulating value).

Framing member

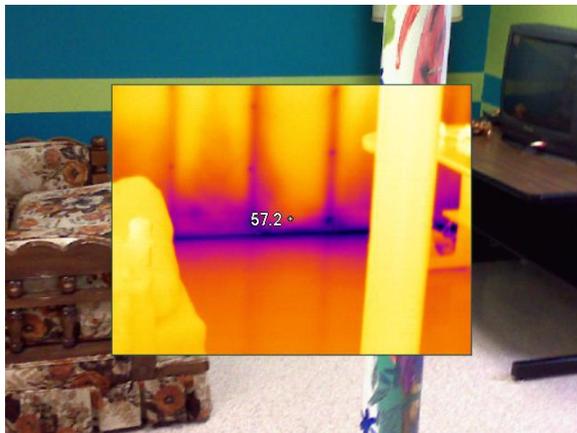
Settling batt

IR000995.IS2

2/24/2011 1:39:13 PM

Image Info

Average Temperature	63.0°F
Image Range	55.3°F to 68.8°F
Image Time	2/24/2011 1:39:13 PM



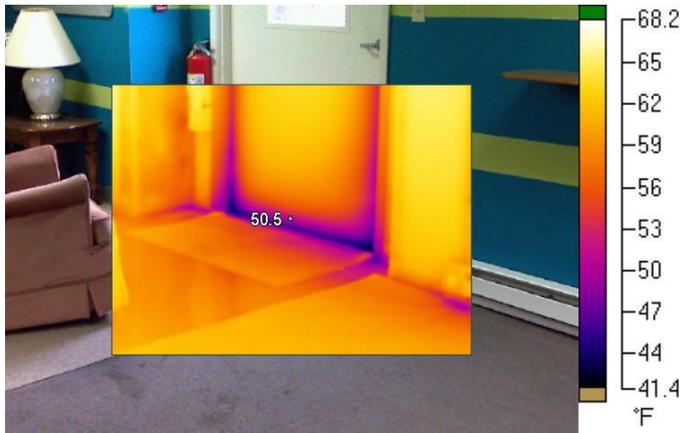
Lower portion of a wall. The cold is likely do to the slab conducting the cold up to the bottom of the wall where the un-insulated sill plate is located.

IR000996.IS2

2/24/2011 1:39:29 PM

Image Info

Average Temperature	61.5°F
Image Range	47.7°F to 68.1°F
Image Time	2/24/2011 1:39:29 PM



Side entrance door to the Teen Center. Around the door there is cold air infiltration.

IR000997.IS2

2/24/2011 1:39:38 PM

Image Info

Average Temperature	59.0°F
Image Range	42.6°F to 66.0°F
Image Time	2/24/2011 1:39:38 PM



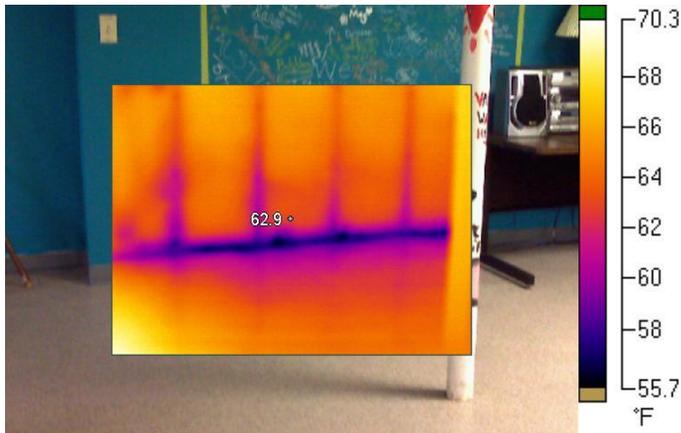
Another image of the cold wall to floor connection and poorly performing batt insulation.

IR001003.IS2

2/24/2011 1:41:17 PM

Image Info

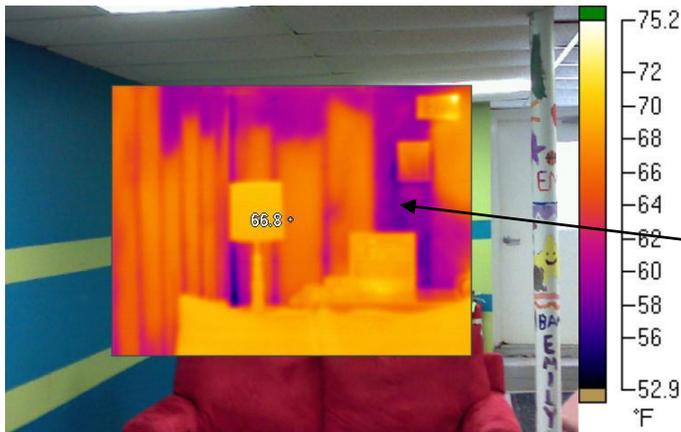
Average Temperature	63.8°F
Image Range	53.0°F to 69.9°F
Image Time	2/24/2011 1:41:17 PM



IR001005.IS2
2/24/2011 1:41:37 PM

Image Info

Average Temperature	63.7°F
Image Range	56.0°F to 69.9°F
Image Time	2/24/2011 1:41:37 PM



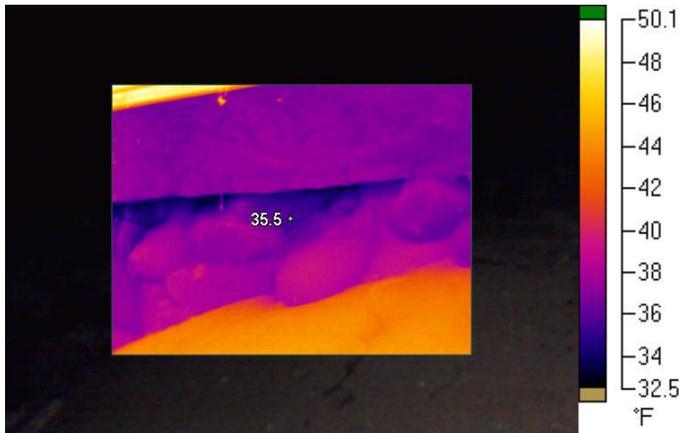
More evidence of settling fiberglass batt insulation. Again, the cold (purple) areas are without insulation or the insulation is pushed back.

Potential empty bay

IR001006.IS2
2/24/2011 1:49:23 PM

Image Info

Average Temperature	65.2°F
Image Range	54.5°F to 74.9°F
Image Time	2/24/2011 1:49:23 PM

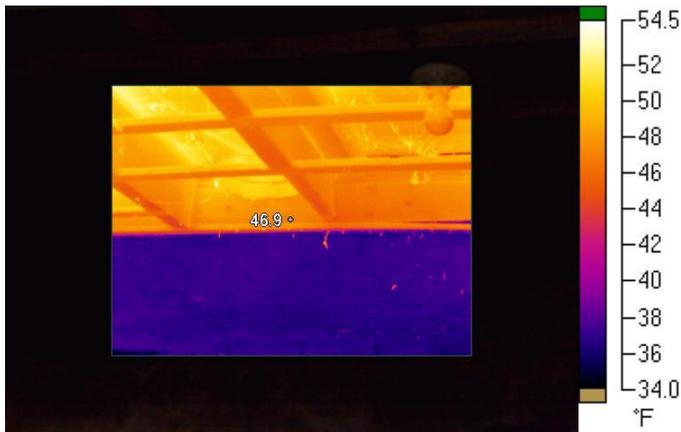


Behind the closet in the Teen Center is a dirt floor crawlspace. It is not conditioned, and it is the same as the outdoor temperature. The floor above is un-insulated (main floor of the Community Center) and there are vents venting the crawlspace to the main floor of the Community Center above. This crawlspace should be insulated and vents from this space should be closed off to prevent heat loss to this unconditioned space.

IR001008.IS2
2/24/2011 1:51:29 PM

Image Info

Average Temperature	38.6°F
Image Range	32.5°F to 49.8°F
Image Time	2/24/2011 1:51:29 PM

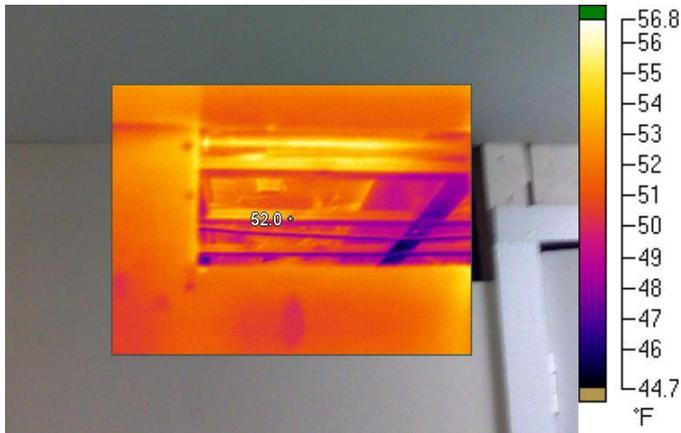


View inside of crawlspace. This shows heat loss occurring from the community space above- large source of wasted heat.

IR001009.IS2
2/24/2011 1:51:42 PM

Image Info

Average Temperature	42.9°F
Image Range	34.4°F to 54.1°F
Image Time	2/24/2011 1:51:42 PM

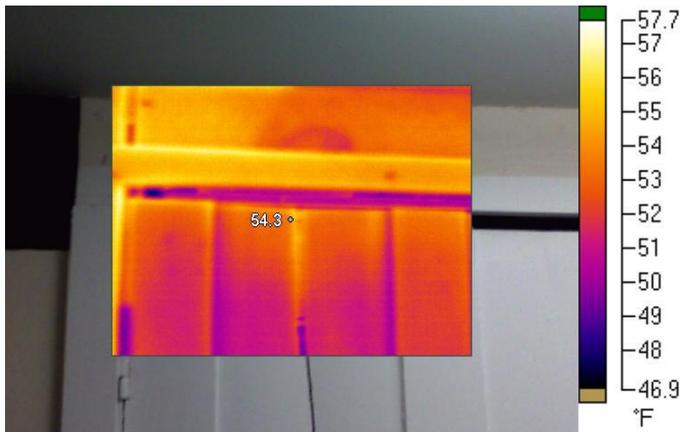


Hole in closet wall leading to crawlspace. This space should also be closed off and any necessary venting of the crawlspace should be to the outdoors.

IR001010.IS2
2/24/2011 1:51:59 PM

Image Info

Average Temperature	51.5°F
Image Range	45.1°F to 56.4°F
Image Time	2/24/2011 1:51:59 PM

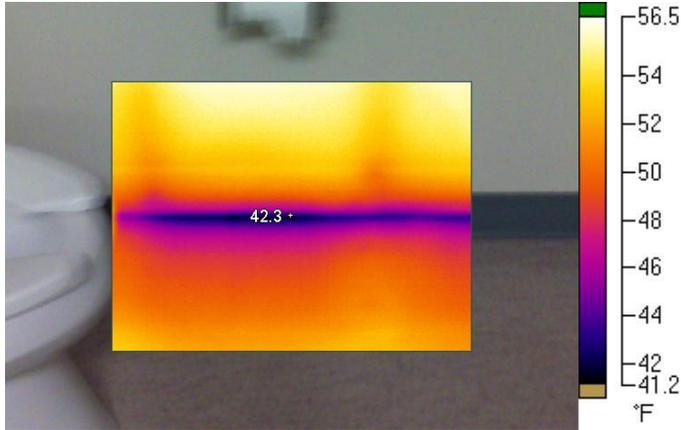


Door that leads to crawlspace. Cold is entering the closet space through this poorly constructed wood door, this should be replaced with an insulated door with weather stripping.

IR001011.IS2
2/24/2011 1:52:25 PM

Image Info

Average Temperature	52.9°F
Image Range	47.4°F to 57.1°F
Image Time	2/24/2011 1:52:25 PM

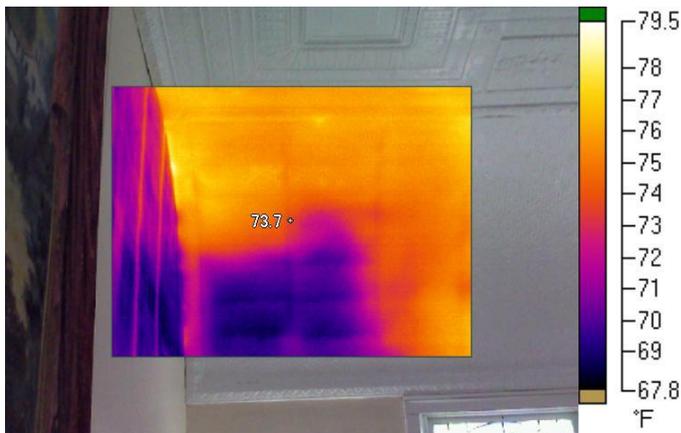


Main floor bathroom. Cold is being conducted inward by the slab.

IR001020.IS2
2/24/2011 1:57:42 PM

Image Info

Average Temperature	50.8°F
Image Range	41.5°F to 56.2°F
Image Time	2/24/2011 1:57:42 PM

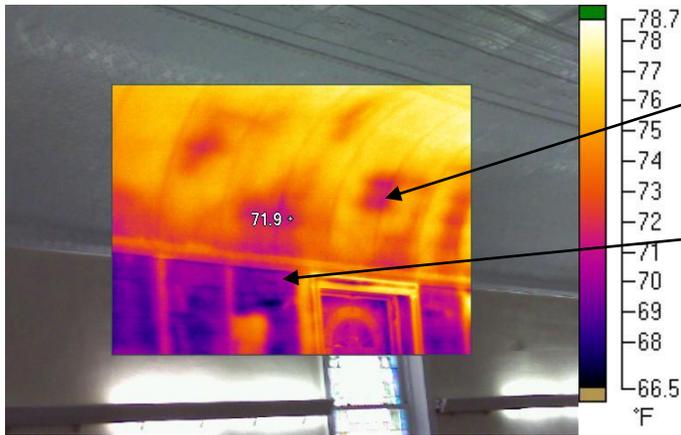


View of the wall to ceiling connection in the main community space. It seems that the blown in insulation previously done did not make it to this area, resulting in heat loss at this area.

IR001024.IS2
2/24/2011 1:58:55 PM

Image Info

Average Temperature	73.5°F
Image Range	68.0°F to 79.4°F
Image Time	2/24/2011 1:58:55 PM



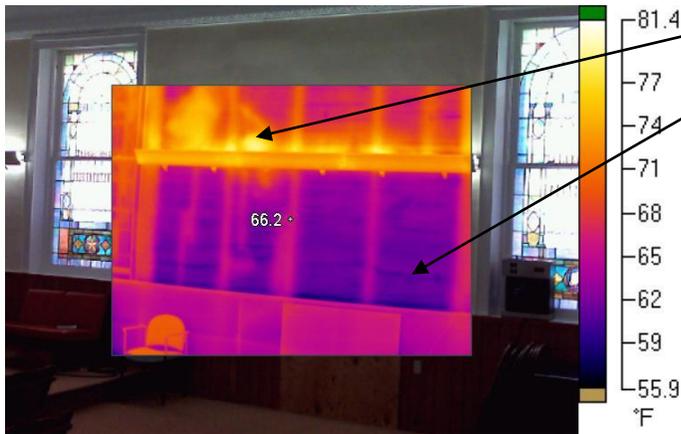
Note the spotty insulation along the curved area of the ceiling.

The dark areas indicated there is no insulation in the walls.

IR001026.IS2
2/24/2011 1:59:12 PM

Image Info

Average Temperature	73.5°F
Image Range	66.8°F to 78.4°F
Image Time	2/24/2011 1:59:12 PM

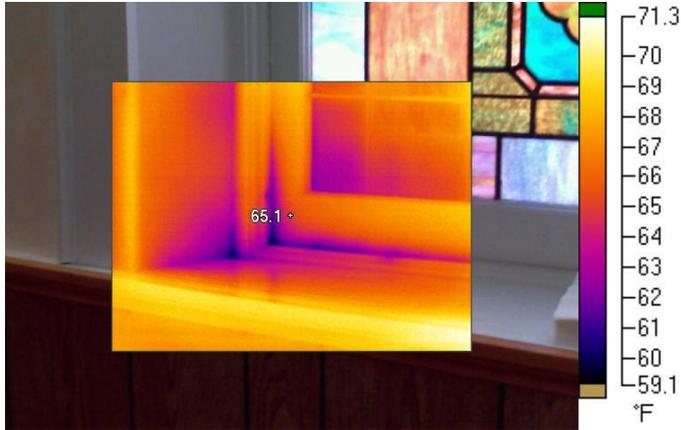


The yellow shows a lighting fixture giving off heat. The dark purple shows heat loss at the walls which are un-insulated.

IR001030.IS2
2/24/2011 2:00:12 PM

Image Info

Average Temperature	66.3°F
Image Range	57.9°F to 79.2°F
Image Time	2/24/2011 2:00:12 PM

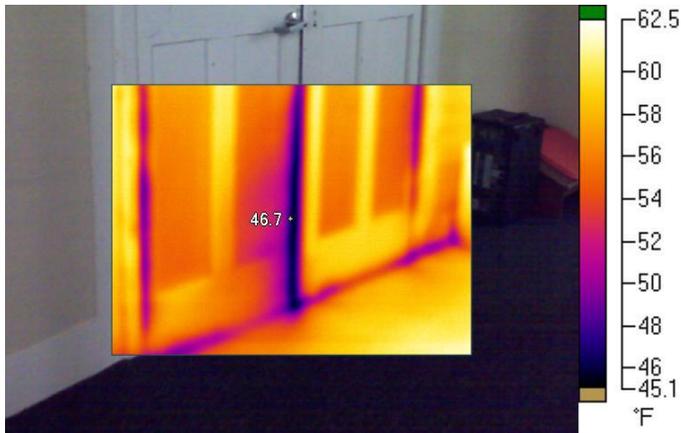


View of a window corner. Cold air is entering. The windows are not air tight.

IR001033.IS2
2/24/2011 2:00:43 PM

Image Info

Average Temperature	66.2°F
Image Range	59.4°F to 71.2°F
Image Time	2/24/2011 2:00:43 PM

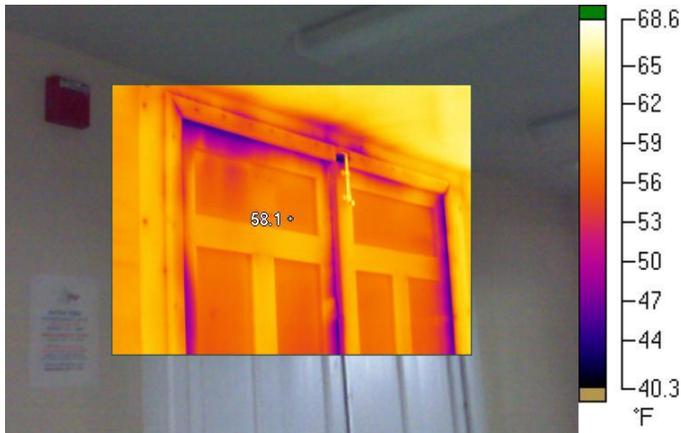


Double doors to the main entrance (up the granite staircase). Daylight was visible from the inside and cold air was infiltrating from the outside, both from between the doors and around the edges.

IR001038.IS2
2/24/2011 2:02:04 PM

Image Info

Average Temperature	56.1°F
Image Range	45.2°F to 62.3°F
Image Time	2/24/2011 2:02:04 PM



Top of the double doors to the main entrance. Note the cold behind the trim. This means it is not air sealed or insulated well behind the trim.

IR001039.IS2

2/24/2011 2:02:14 PM

Image Info

Average Temperature	58.3°F
Image Range	42.5°F to 66.7°F
Image Time	2/24/2011 2:02:14 PM

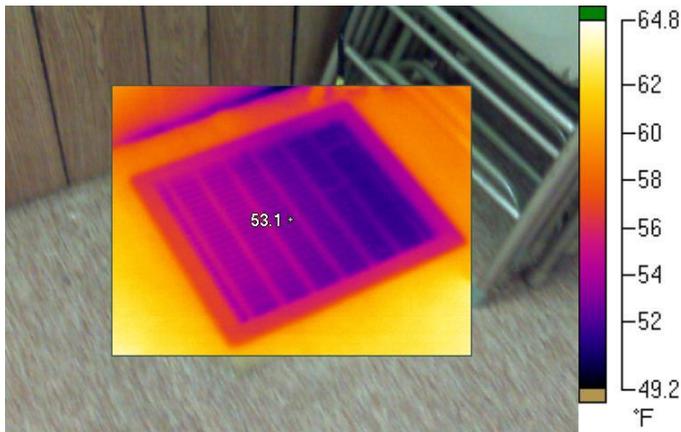


Image of the vent that is over the crawlspace in the basement. The air coming out of here is very cold. Note the high indoor temp of 64 degrees (indicated on scale to the right) and the 50 degree temperature coming from the vent with the damper **closed** on the vent.

IR001043.IS2

2/24/2011 2:05:13 PM

Image Info

Average Temperature	57.1°F
Image Range	49.5°F to 64.4°F
Image Time	2/24/2011 2:05:13 PM



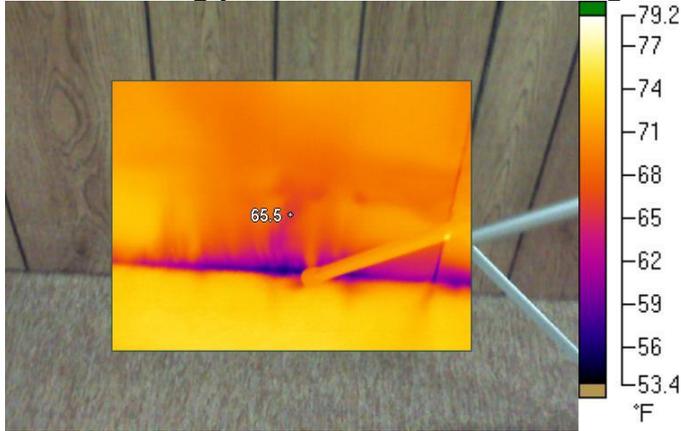
Blower door testing set up.

IR001050.IS2
2/24/2011 3:26:53 PM

Image Info

Average Temperature	71.0°F
Image Range	62.9°F to 96.1°F
Image Time	2/24/2011 3:26:53 PM

The following pictures were taken during blower door testing.

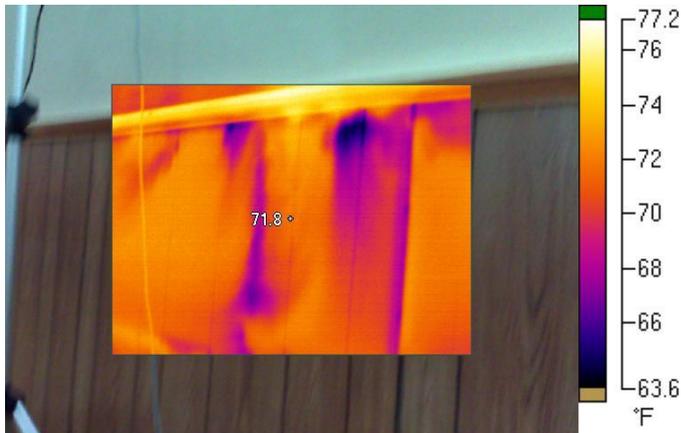


Air movement is visible along the floor to wall connections. Meaning air is able to move up from the space below.

IR001054.IS2
2/24/2011 3:27:31 PM

Image Info

Average Temperature	70.4°F
Image Range	55.9°F to 76.3°F
Image Time	2/24/2011 3:27:31 PM



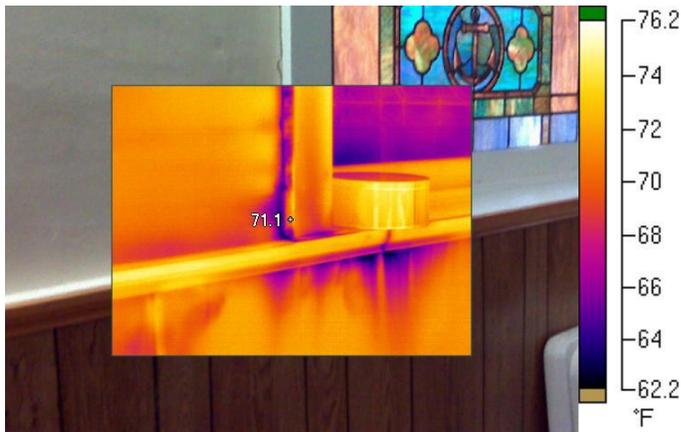
One surprising area we found a large amount of air movement was through and around the wood paneling on the walls.

IR001055.IS2

2/24/2011 3:27:45 PM

Image Info

Average Temperature	71.2°F
Image Range	63.8°F to 76.8°F
Image Time	2/24/2011 3:27:45 PM



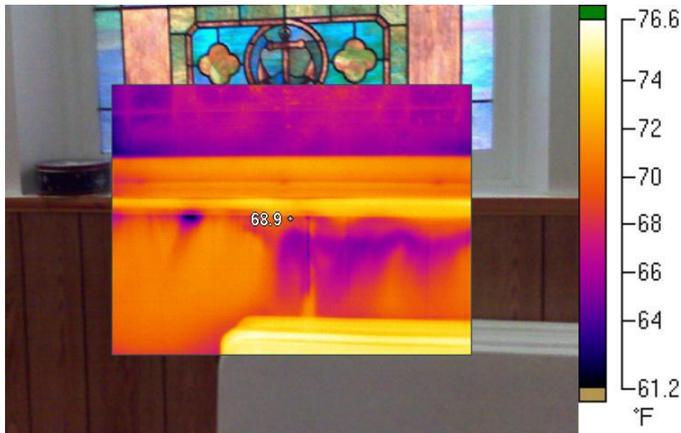
Air movement is now more visible around the window trim and below the window sill.

IR001057.IS2

2/24/2011 3:28:20 PM

Image Info

Average Temperature	70.4°F
Image Range	62.2°F to 75.8°F
Image Time	2/24/2011 3:28:20 PM

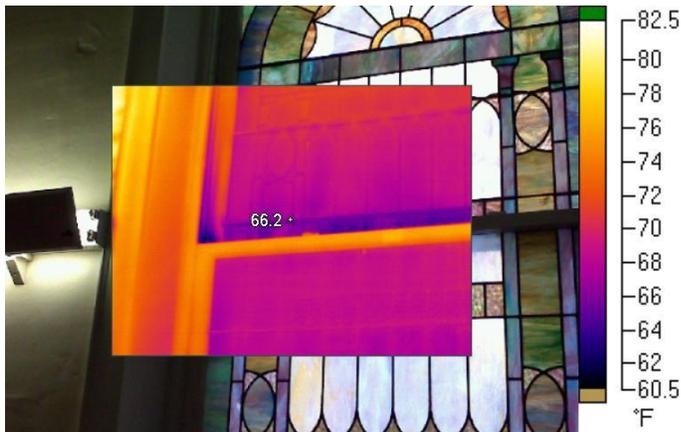


More air movement around the wood paneling from the window.

IR001059.IS2
2/24/2011 3:28:57 PM

Image Info

Average Temperature	69.2°F
Image Range	61.5°F to 76.2°F
Image Time	2/24/2011 3:28:57 PM

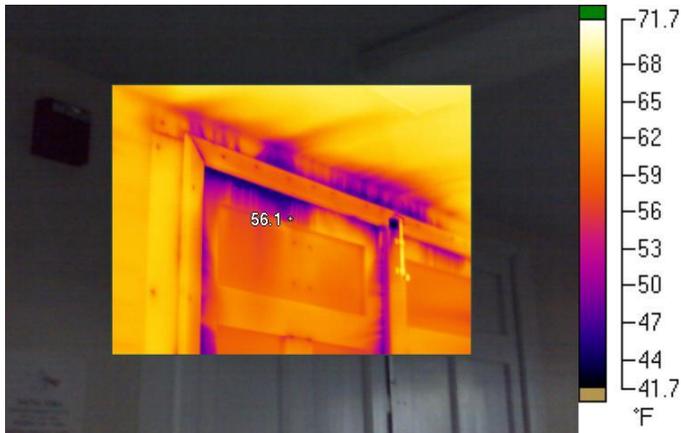


The window sash also shows air infiltration moving up the pane.

IR001060.IS2
2/24/2011 3:29:25 PM

Image Info

Average Temperature	70.8°F
Image Range	61.6°F to 82.1°F
Image Time	2/24/2011 3:29:25 PM

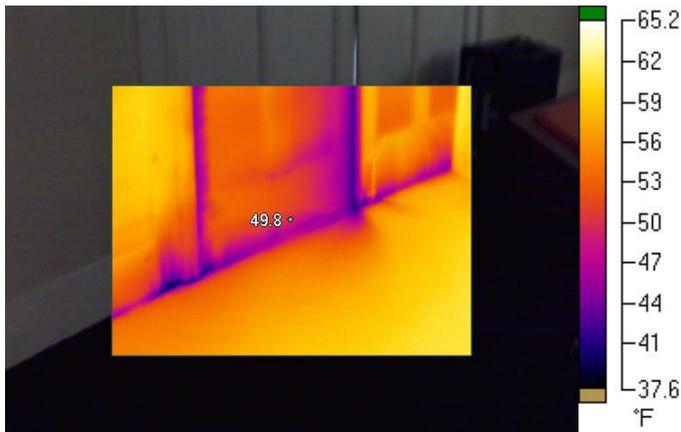


Main entrance double doors. The leaks that were visible before are now intensified by the blower door testing.

IR001062.IS2
2/24/2011 3:30:19 PM

Image Info

Average Temperature	60.7°F
Image Range	43.0°F to 68.9°F
Image Time	2/24/2011 3:30:19 PM

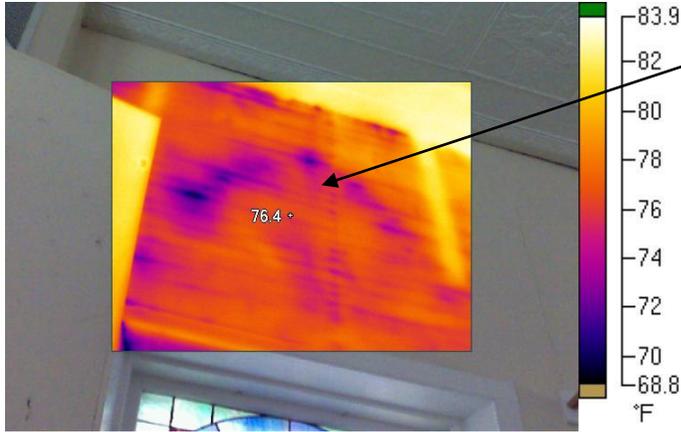


More air infiltration at the main entry double doors.

IR001063.IS2
2/24/2011 3:30:25 PM

Image Info

Average Temperature	55.1°F
Image Range	39.2°F to 62.5°F
Image Time	2/24/2011 3:30:25 PM



The arches above the windows are visible from the interior.

IR001065.IS2
2/24/2011 3:30:52 PM

Image Info

Average Temperature	77.3°F
Image Range	69.2°F to 83.5°F
Image Time	2/24/2011 3:30:52 PM

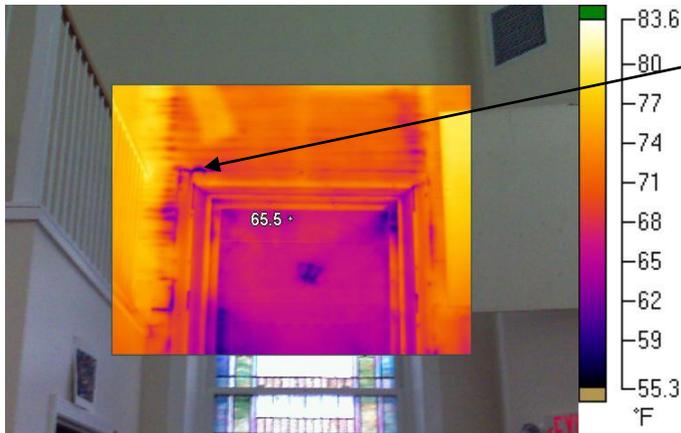


Cold air is able to move from the cold attic via the attic hatch that is not sealed.

IR001066.IS2
2/24/2011 3:31:15 PM

Image Info

Average Temperature	79.2°F
Image Range	51.7°F to 84.6°F
Image Time	2/24/2011 3:31:15 PM

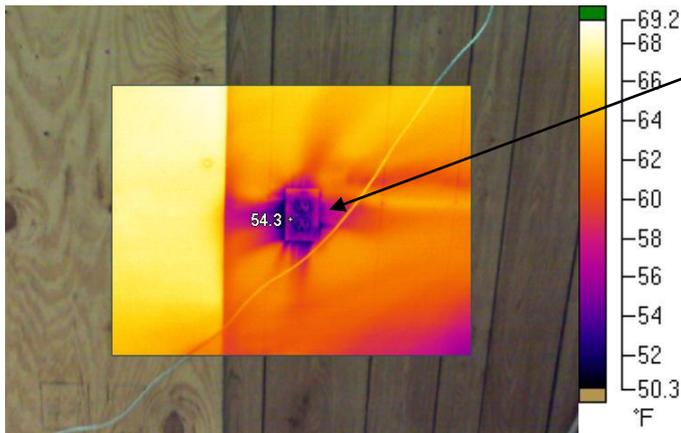


Cold air is behind the trim around the windows.

IR001067.IS2
2/24/2011 3:31:46 PM

Image Info

Average Temperature	71.1°F
Image Range	57.4°F to 82.3°F
Image Time	2/24/2011 3:31:46 PM

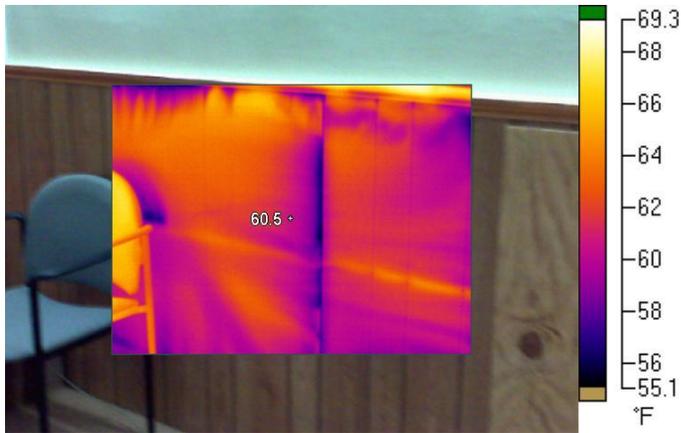


Evidence of cold air movement within the walls shows at the electrical sockets.

IR001070.IS2
2/24/2011 3:33:16 PM

Image Info

Average Temperature	63.2°F
Image Range	50.6°F to 69.1°F
Image Time	2/24/2011 3:33:16 PM

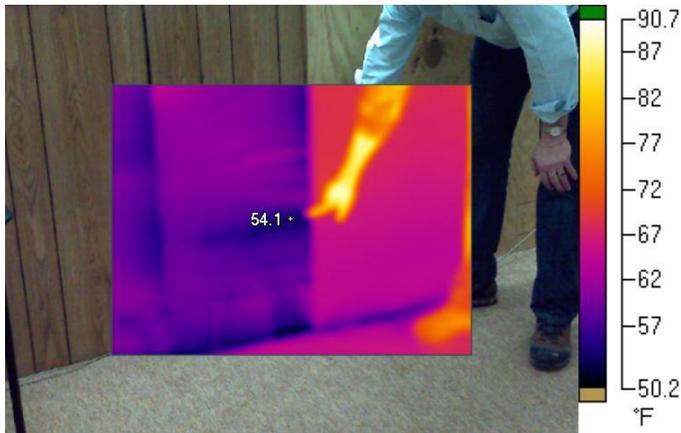


More cold air movement behind the wood paneling.

IR001072.IS2
2/24/2011 3:33:59 PM

Image Info

Average Temperature	61.5°F
Image Range	55.3°F to 68.9°F
Image Time	2/24/2011 3:33:59 PM



There was a part of the wall that was boarded up and during the blower door test air movement was felt around that boarded up area.

IR001073.IS2
2/24/2011 3:37:15 PM

Image Info

Average Temperature	62.7°F
Image Range	51.7°F to 89.0°F
Image Time	2/24/2011 3:37:15 PM



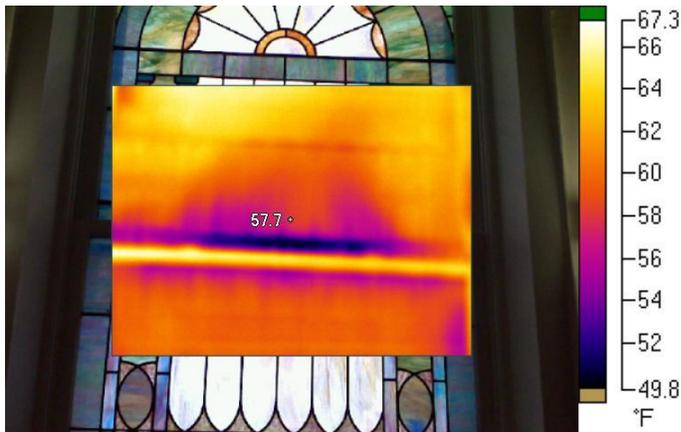
A window with cold air infiltration at the window edges.

IR001074.IS2

2/24/2011 3:37:49 PM

Image Info

Average Temperature	60.1°F
Image Range	49.3°F to 68.1°F
Image Time	2/24/2011 3:37:49 PM



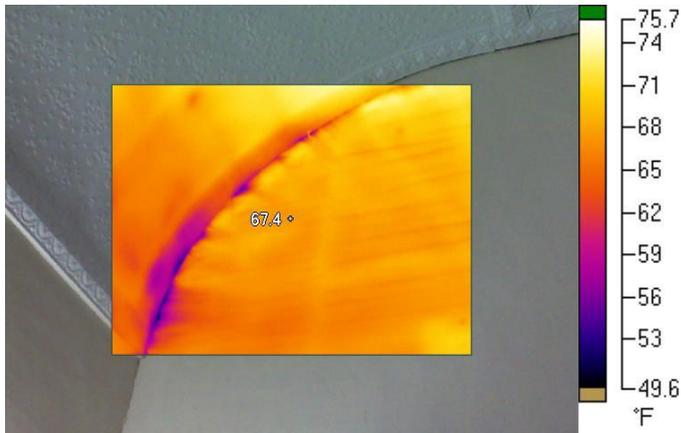
Another window sash allowing a lot of cold air movement coming inside.

IR001075.IS2

2/24/2011 3:38:01 PM

Image Info

Average Temperature	60.2°F
Image Range	50.1°F to 67.0°F
Image Time	2/24/2011 3:38:01 PM



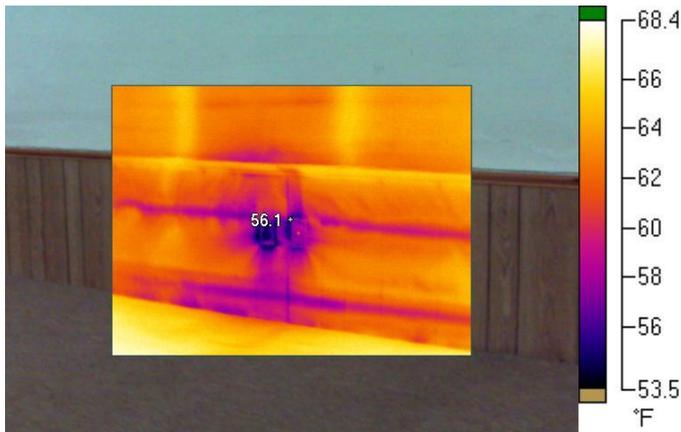
Wall to ceiling connection along the tin ceiling. Air movement was present here.

IR001077.IS2

2/24/2011 3:38:43 PM

Image Info

Average Temperature	67.1°F
Image Range	51.5°F to 73.8°F
Image Time	2/24/2011 3:38:43 PM



Very leaky electrical sockets indicating air movement in the walls.

IR001078.IS2

2/24/2011 3:40:24 PM

Image Info

Average Temperature	62.4°F
Image Range	53.8°F to 68.1°F
Image Time	2/24/2011 3:40:24 PM

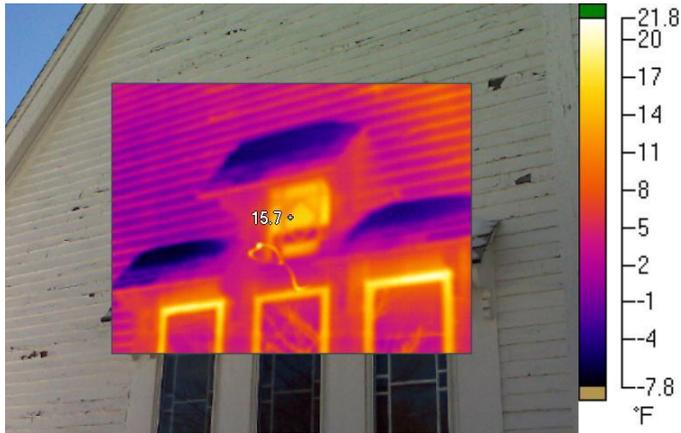
The Jordan Institute

49 North Main Street
Concord, NH 03303
(603) 226 -1009

Grange Building IR Report

*As part of the Level II Energy Audit for the
Town of Henniker*



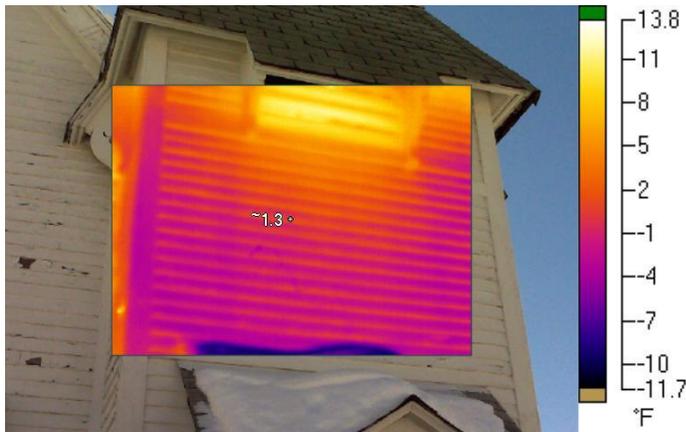


A view of the outside of the Grange Building shows where heat is loss is occurring at the windows.

IR001258.IS2
3/3/2011 11:23:14 AM

Image Info

Average Temperature	~4.5°F
Image Range	~-7.4°F to 21.4°F
Image Time	3/3/2011 11:23:14 AM

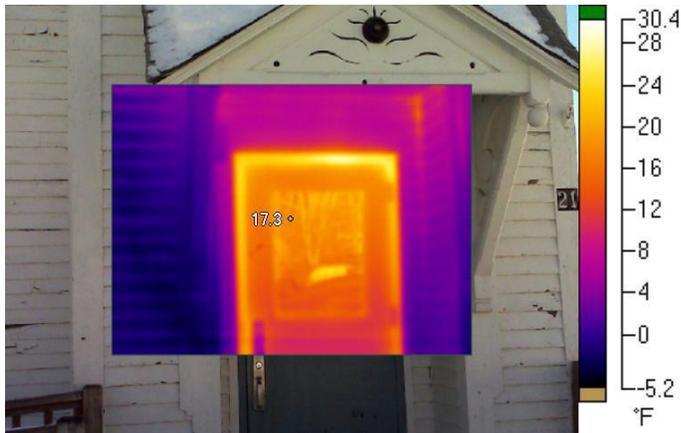


A Vent above the front entryway where heat is escaping meaning that heat is making its way into the attic.

IR001261.IS2
3/3/2011 11:23:42 AM

Image Info

Average Temperature	~0.7°F
Image Range	~-9.7°F to ~11.9°F
Image Time	3/3/2011 11:23:42 AM

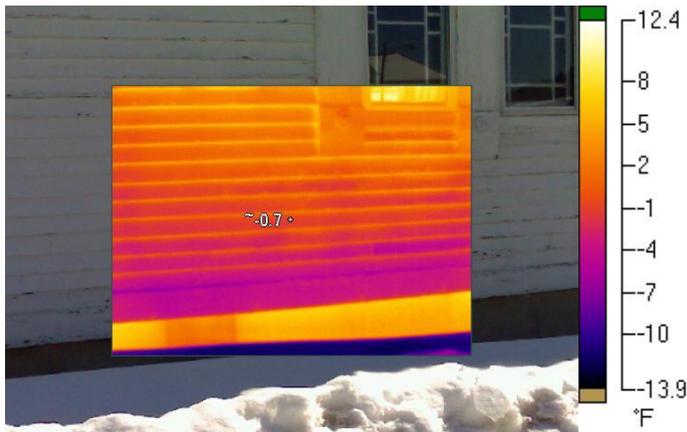


There is a lot of heat loss through and around the front door of the Grange Building.

IR001262.IS2
3/3/2011 11:23:47 AM

Image Info

Average Temperature	~7.5°F
Image Range	~-4.0°F to 28.3°F
Image Time	3/3/2011 11:23:47 AM

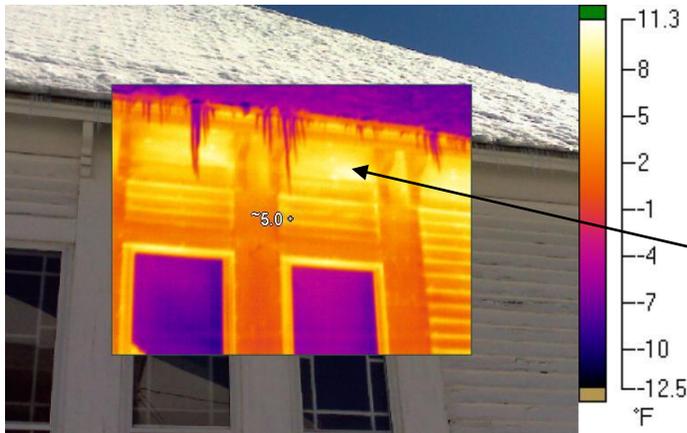


A side view of the western façade of the Grange Building shows heat is being conducted out through the foundation wall, which is un-insulated.

IR001266.IS2
3/3/2011 11:24:24 AM

Image Info

Average Temperature	~0.0°F
Image Range	~-12.9°F to ~10.8°F
Image Time	3/3/2011 11:24:24 AM



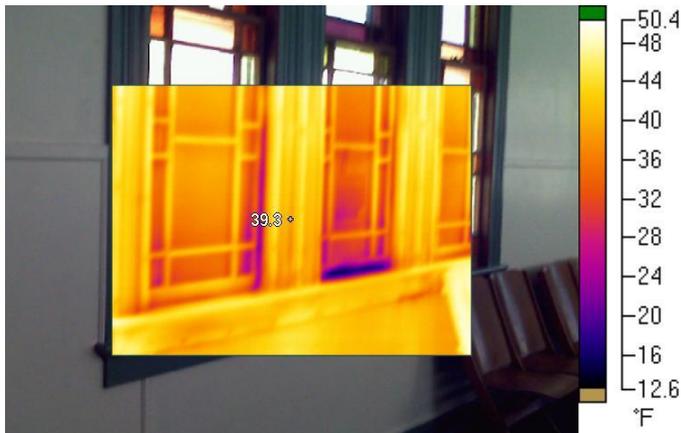
Heat loss is occurring at the top of the wall. Note the white areas.

IR001267.IS2

3/3/2011 11:24:34 AM

Image Info

Average Temperature	~1.2°F
Image Range	~-10.2°F to ~10.8°F
Image Time	3/3/2011 11:24:34 AM



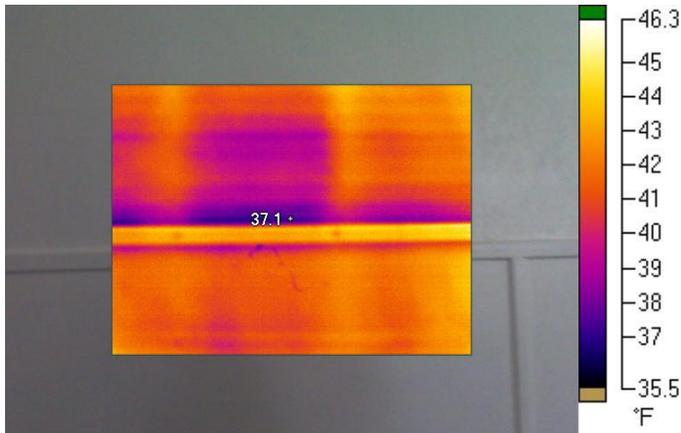
A view of three windows from inside. The middle window does not close properly. It shows cold air entering around the base. We have been informed that due to the moving of the building, many of the windows do not properly function in the Grange Building.

IR001269.IS2

3/3/2011 11:25:00 AM

Image Info

Average Temperature	39.4°F
Image Range	15.7°F to 49.5°F
Image Time	3/3/2011 11:25:00 AM



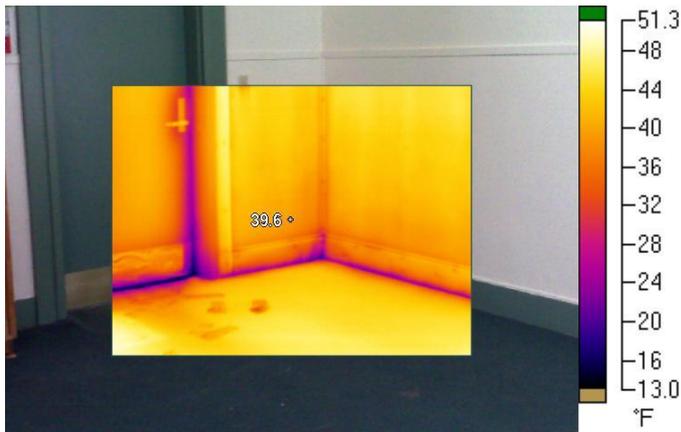
We found that there is no insulation in the walls here, the lathe and plaster is visible.

IR001270.IS2

3/3/2011 11:25:06 AM

Image Info

Average Temperature	41.2°F
Image Range	36.3°F to 45.4°F
Image Time	3/3/2011 11:25:06 AM



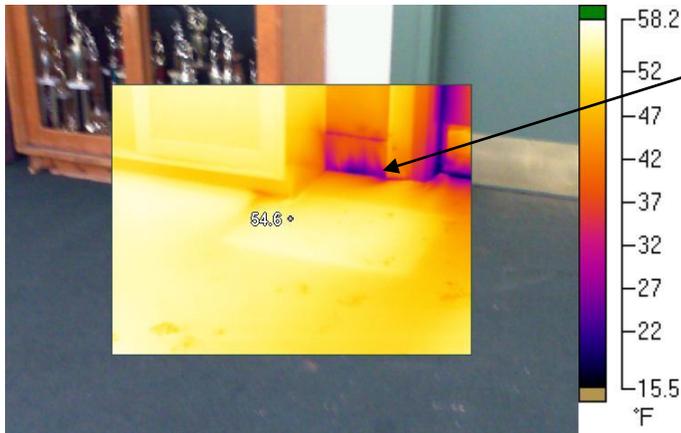
Back door of the Grange Building. The door is allowing cold air inside, and the floor to wall connection is appearing cold, likely due to the foundation wall conducting cold to the inside.

IR001271.IS2

3/3/2011 11:25:14 AM

Image Info

Average Temperature	40.5°F
Image Range	~13.6°F to 50.1°F
Image Time	3/3/2011 11:25:14 AM



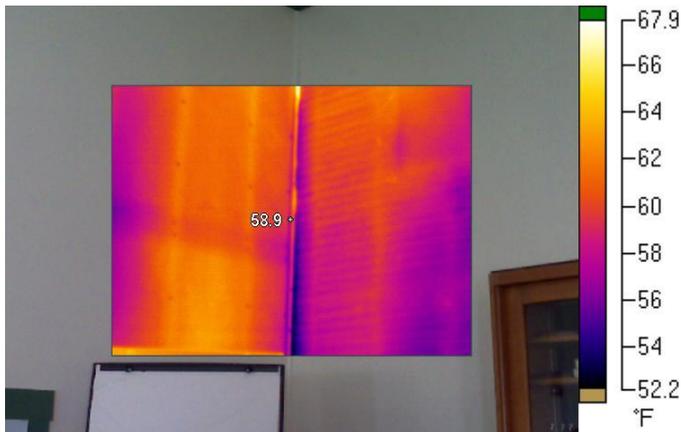
Note cold air at the base of the wall, cold air is moving up from the space below.

IR001273.IS2

3/3/2011 11:27:05 AM

Image Info

Average Temperature	50.6°F
Image Range	16.8°F to 57.4°F
Image Time	3/3/2011 11:27:05 AM



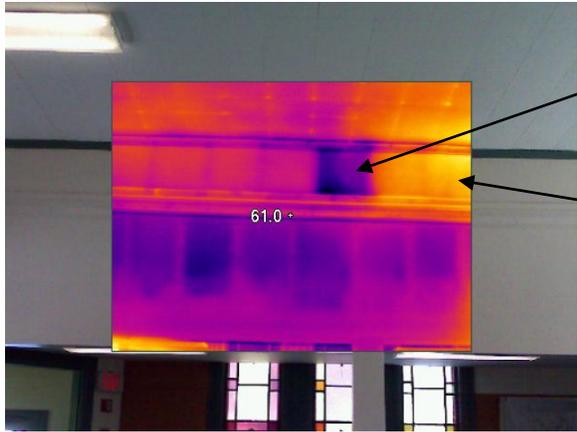
Joining of an exterior wall and a newer built interior wall. The interior wall on the left is to an office space. Note the pattern of the lathe that is visible, indicating there is no insulation in the exterior walls. The exterior wall is showing warm here because the sun was shining on this side of the building at the time the photo was taken.

IR001274.IS2

3/3/2011 11:27:14 AM

Image Info

Average Temperature	59.5°F
Image Range	52.6°F to 67.5°F
Image Time	3/3/2011 11:27:14 AM



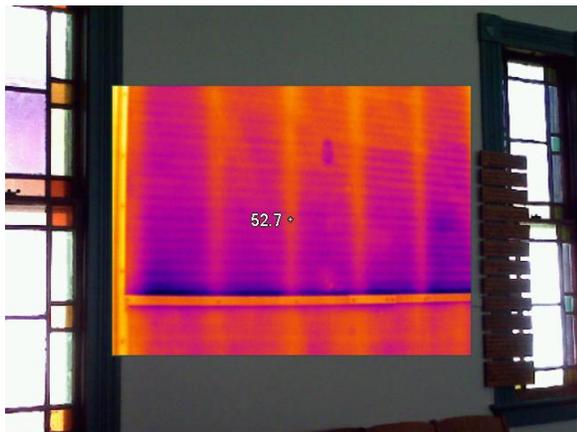
Area where cold air from attic is able to move.

Area heated from FHA Register on floor below.

IR001277.IS2
3/3/2011 11:28:15 AM

Image Info

Average Temperature	61.9°F
Image Range	55.6°F to 72.2°F
Image Time	3/3/2011 11:28:15 AM

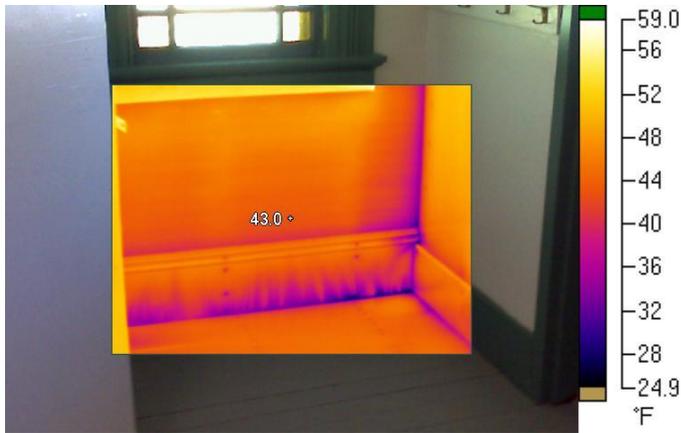


The area above the chair rail along the wall is showing much colder than the rest of the wall because the added wood of the chair rail adds slightly to the R-Value of that wall area.

IR001279.IS2
3/3/2011 11:28:30 AM

Image Info

Average Temperature	51.7°F
Image Range	46.0°F to 59.2°F
Image Time	3/3/2011 11:28:30 AM

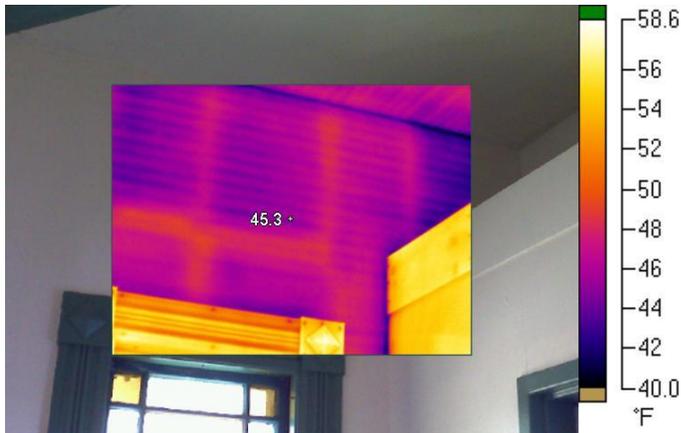


This image along the floorboards shows air movement from below.

IR001285.IS2
3/3/2011 11:29:38 AM

Image Info

Average Temperature	44.3°F
Image Range	26.9°F to 57.4°F
Image Time	3/3/2011 11:29:38 AM

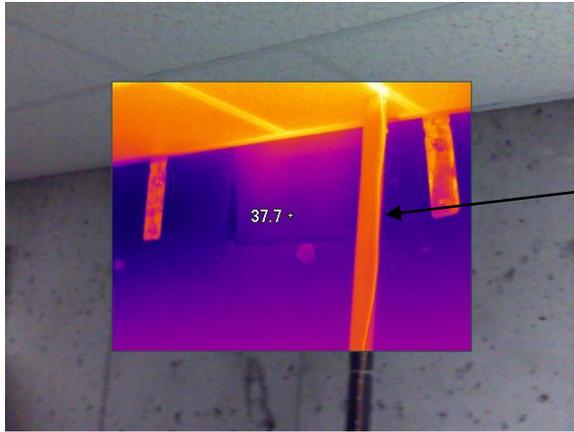


Here the framing structure is very visible. The wood framing has a higher R-value than the lathe and plaster.

IR001286.IS2
3/3/2011 11:29:44 AM

Image Info

Average Temperature	47.8°F
Image Range	40.1°F to 58.3°F



Basement foundation wall and drop ceiling. Ceiling is warm due to heat loss from room above.

Hot water pipe coming off of the hot water heater.

IR001296.IS2

3/3/2011 11:38:15 AM

Image Info

Average Temperature	41.8°F
Image Range	33.9°F to 61.4°F
Image Time	3/3/2011 11:38:15 AM



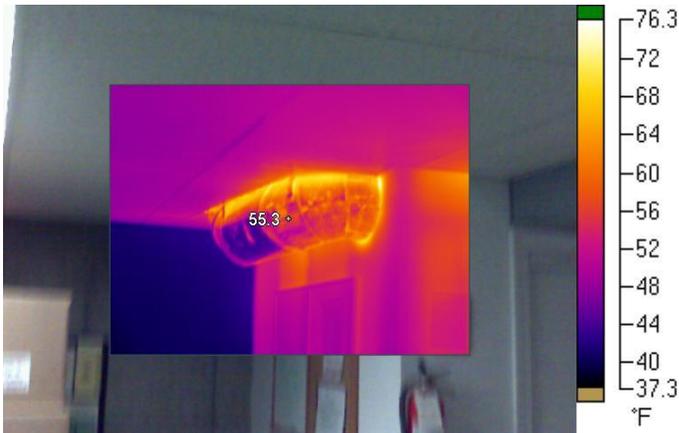
Un-insulated duct work is unintentionally heating the basement space and losing efficiency along the way.

IR001299.IS2

3/3/2011 11:38:46 AM

Image Info

Average Temperature	54.6°F
Image Range	36.9°F to 80.8°F
Image Time	3/3/2011 11:38:46 AM



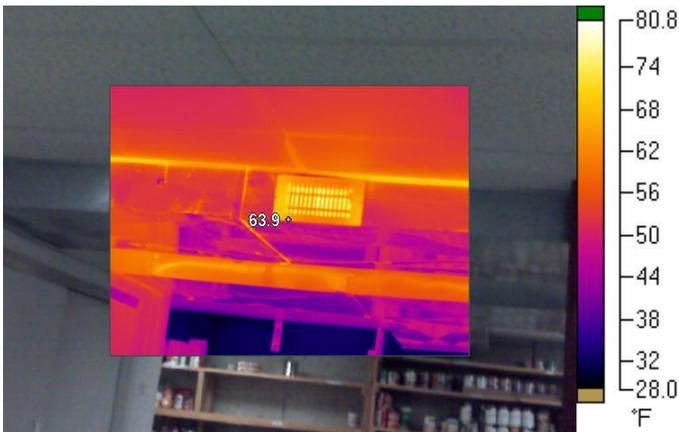
More un-insulated duct work.

IR001300.IS2

3/3/2011 11:42:11 AM

Image Info

Average Temperature	50.7°F
Image Range	38.7°F to 75.0°F
Image Time	3/3/2011 11:42:11 AM



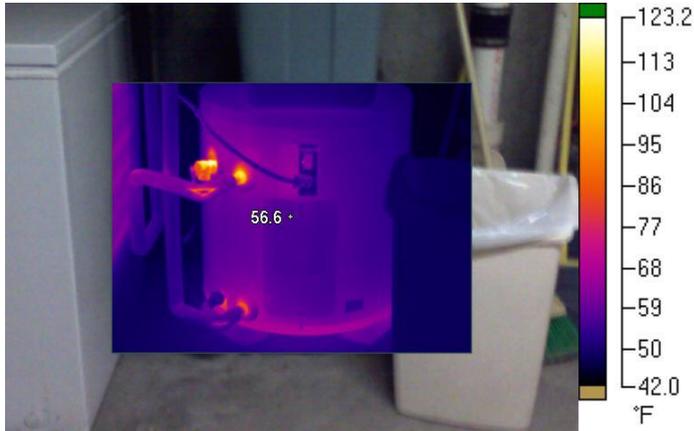
More un-insulated duct work and the vent used to heat the food pantry.

IR001301.IS2

3/3/2011 11:42:20 AM

Image Info

Average Temperature	51.3°F
Image Range	28.1°F to 80.0°F
Image Time	3/3/2011 11:42:20 AM



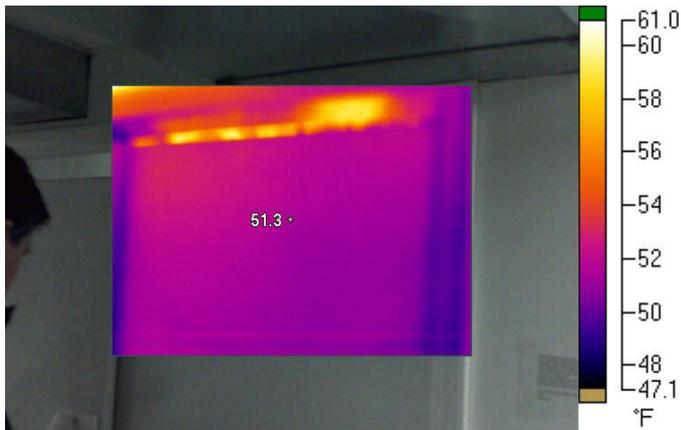
Hot water tank. It is well insulated and properly sized.

IR001302.IS2

3/3/2011 11:42:56 AM

Image Info

Average Temperature	53.9°F
Image Range	43.5°F to 122.0°F
Image Time	3/3/2011 11:42:56 AM



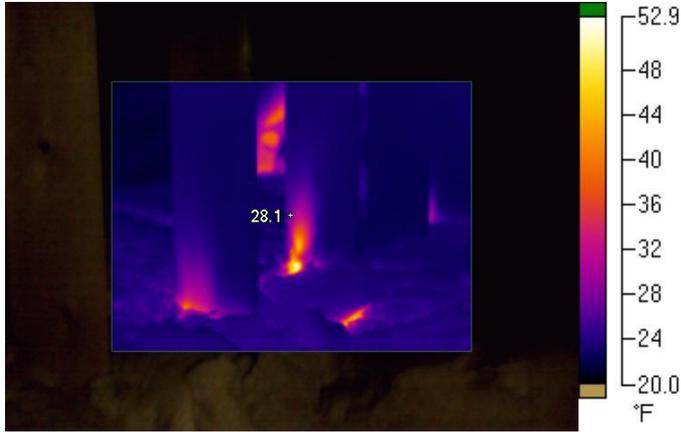
Above the door to the mechanical equipment is allowing heat to escape the mechanical closet, acting as additional heat for the food storage area.

IR001303.IS2

3/3/2011 11:45:09 AM

Image Info

Average Temperature	51.8°F
Image Range	48.6°F to 60.6°F
Image Time	3/3/2011 11:45:09 AM



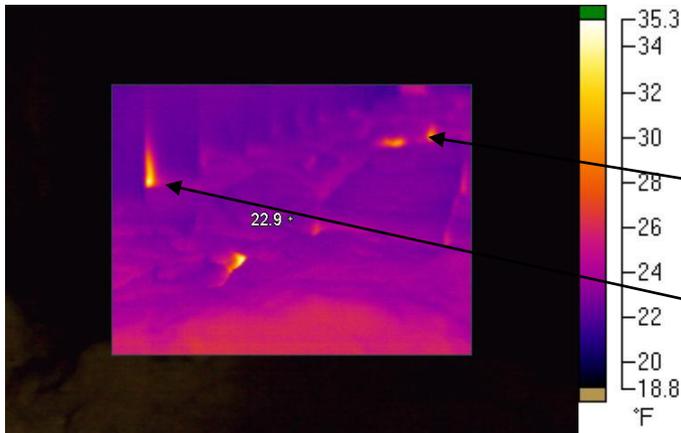
Inside the attic space not being used as storage. We found 8 to 10 inch bats of fiberglass placed in the attic. The framing members are conducting heat up into the attic and gaps in the insulation are also letting heat into the attic.

IR001315.IS2

3/3/2011 11:58:34 AM

Image Info

Average Temperature	23.7°F
Image Range	20.4°F to 51.9°F
Image Time	3/3/2011 11:58:34 AM



Another view of the attic and heat loss areas caused by the gaps between the bats of insulation and the framing conducting heat into the attic.

Gaps in insulation

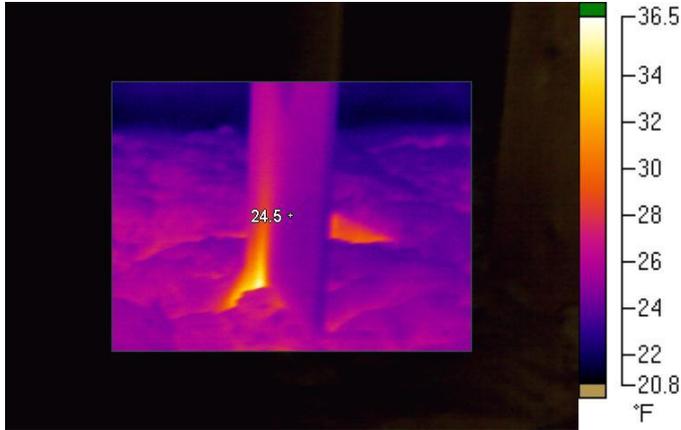
Framing members

IR001316.IS2

3/3/2011 11:58:41 AM

Image Info

Average Temperature	23.5°F
Image Range	21.2°F to 34.9°F
Image Time	3/3/2011 11:58:41 AM

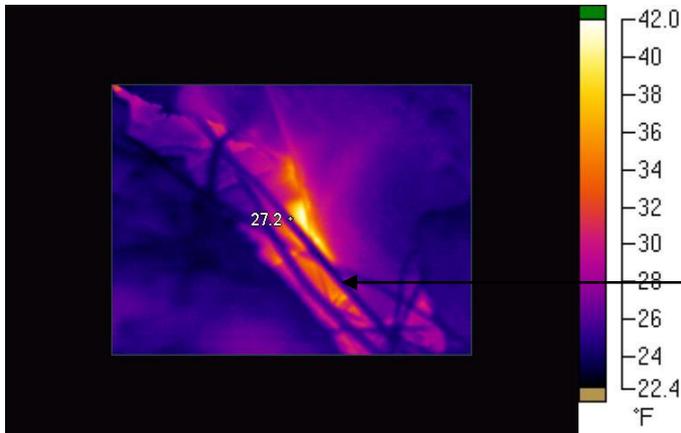


Heat being conducted up into the attic space via the framing members and gaps in insulation around the framing members.

IR001319.IS2
3/3/2011 11:58:58 AM

Image Info

Average Temperature	24.7°F
Image Range	21.0°F to 36.1°F
Image Time	3/3/2011 11:58:58 AM



Looking down onto the floor of the attic at a gap between batts, 20 degrees difference leads to a great deal of heat loss.

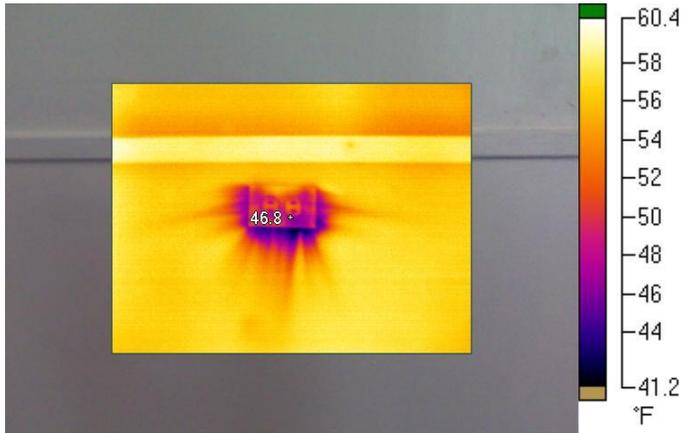
Also this wiring should be checked to ensure it is not a fire hazard.

IR001321.IS2
3/3/2011 11:59:14 AM

Image Info

Average Temperature	25.9°F
Image Range	22.5°F to 41.8°F
Image Time	3/3/2011 11:59:14 AM

The following images were taken during blower door testing.



This image was taken during blower door testing. It is apparent that there is air movement within the wall.

IR001323.IS2
3/3/2011 12:28:24 PM

Image Info

Average Temperature	55.9°F
Image Range	41.3°F to 60.1°F
Image Time	3/3/2011 12:28:24 PM

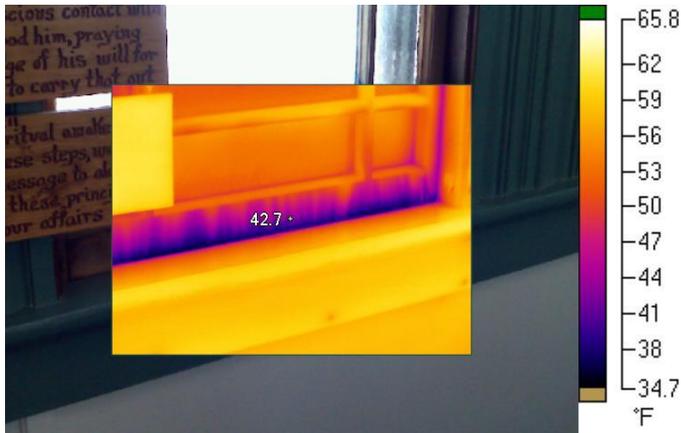


Corner view of a window where cold air is coming in.

IR001324.IS2
3/3/2011 12:28:30 PM

Image Info

Average Temperature	50.4°F
Image Range	29.8°F to 61.0°F
Image Time	3/3/2011 12:28:30 PM



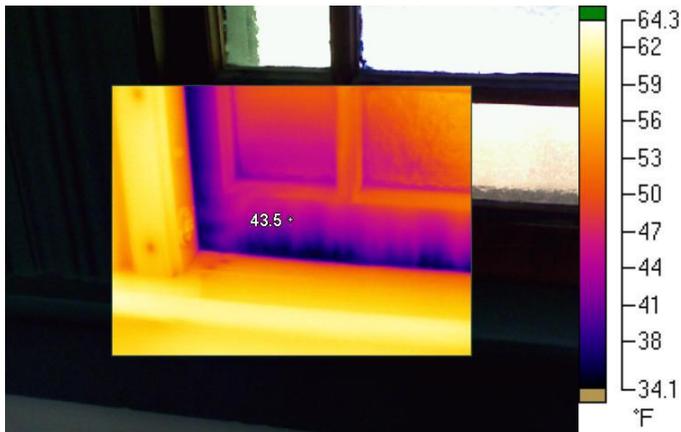
This is a different window showing a great deal of air movement around the bottom. It is likely one of the windows that does not properly open and close.

IR001325.IS2

3/3/2011 12:28:40 PM

Image Info

Average Temperature	55.8°F
Image Range	36.1°F to 63.3°F
Image Time	3/3/2011 12:28:40 PM



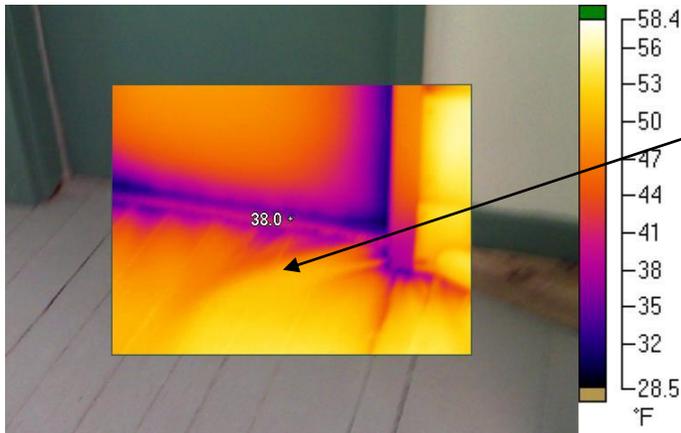
Another corner of a window, also showing a high level of cold air infiltration.

IR001326.IS2

3/3/2011 12:28:46 PM

Image Info

Average Temperature	51.9°F
Image Range	34.9°F to 62.9°F
Image Time	3/3/2011 12:28:46 PM



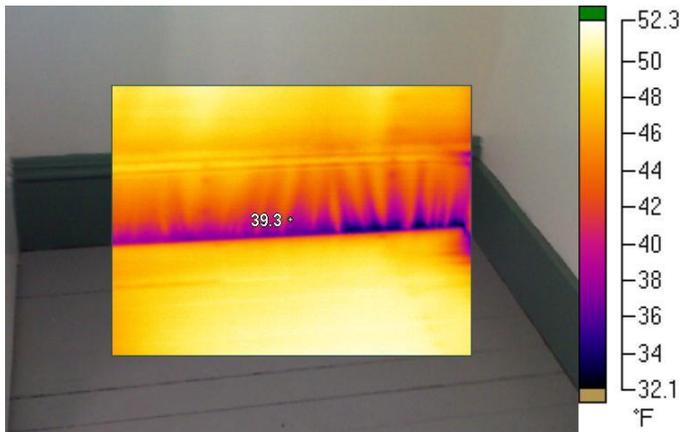
Front entrance door to the building. Air movement is visible across the floor.

IR001327.IS2

3/3/2011 12:28:58 PM

Image Info

Average Temperature	46.1°F
Image Range	30.4°F to 56.5°F
Image Time	3/3/2011 12:28:58 PM



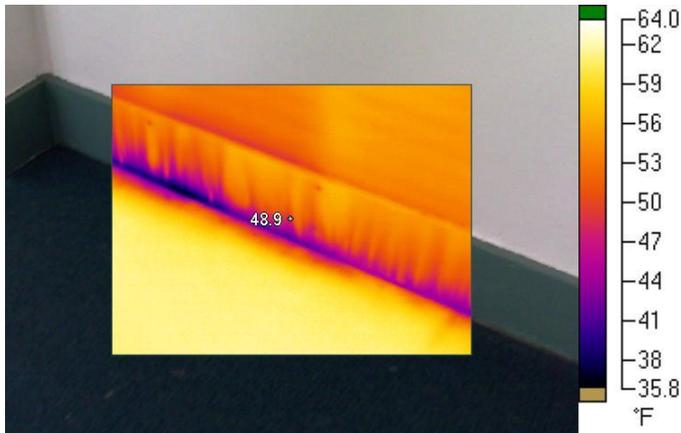
Air movement along the floorboards was present during testing. This is caused by air moving up from the basement / food pantry.

IR001328.IS2

3/3/2011 12:29:02 PM

Image Info

Average Temperature	46.8°F
Image Range	32.4°F to 51.9°F
Image Time	3/3/2011 12:29:02 PM



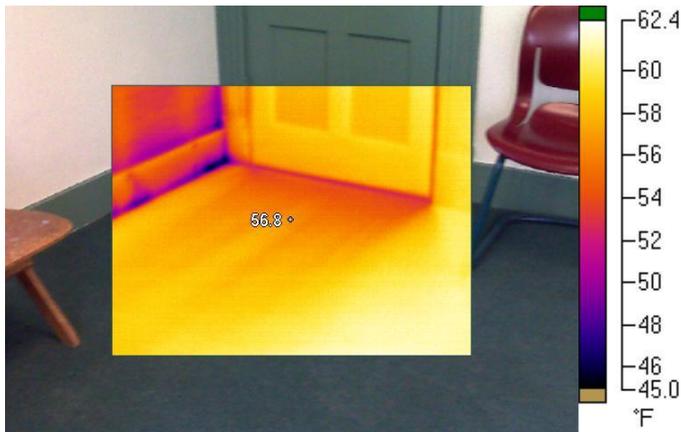
Another view of the base board.

IR001329.IS2

3/3/2011 12:29:07 PM

Image Info

Average Temperature	55.2°F
Image Range	36.3°F to 62.2°F
Image Time	3/3/2011 12:29:07 PM



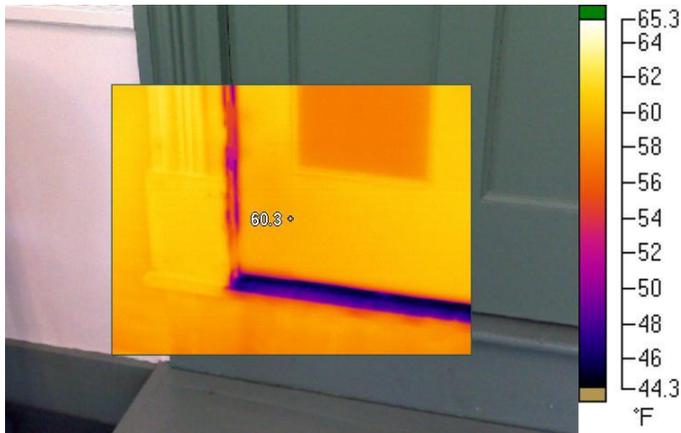
Door leading to the basement. While there is a bit of cooler air coming in from the basement, the door to the attic space poses more of an issue.

IR001330.IS2

3/3/2011 12:29:11 PM

Image Info

Average Temperature	57.6°F
Image Range	45.3°F to 62.0°F
Image Time	3/3/2011 12:29:11 PM



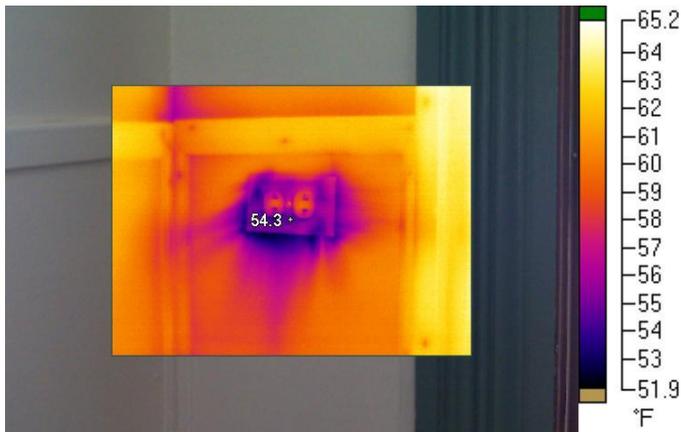
Door leading to the attic. This door is allowing more cold air through than the door to the basement. The air coming from the basement is also colder than the air coming from the basement.

IR001332.IS2

3/3/2011 12:29:23 PM

Image Info

Average Temperature	59.6°F
Image Range	44.6°F to 63.5°F
Image Time	3/3/2011 12:29:23 PM



Another very leaky electrical socket indicating air movement within the walls. This is typical especially of un-insulated spaces.

IR001333.IS2

3/3/2011 12:29:37 PM

Image Info

Average Temperature	59.9°F
Image Range	52.3°F to 64.8°F
Image Time	3/3/2011 12:29:37 PM



Cold infiltration at window.

IR001334.IS2

3/3/2011 12:29:51 PM

Image Info

Average Temperature	60.1°F
Image Range	46.3°F to 66.0°F
Image Time	3/3/2011 12:29:51 PM



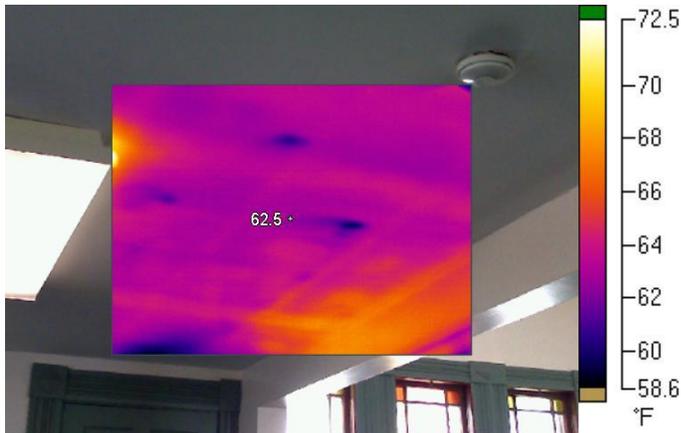
Cold spots on ceiling where there are gaps in the attic insulation.

IR001340.IS2

3/3/2011 12:31:02 PM

Image Info

Average Temperature	63.4°F
Image Range	52.8°F to 66.8°F
Image Time	3/3/2011 12:31:02 PM



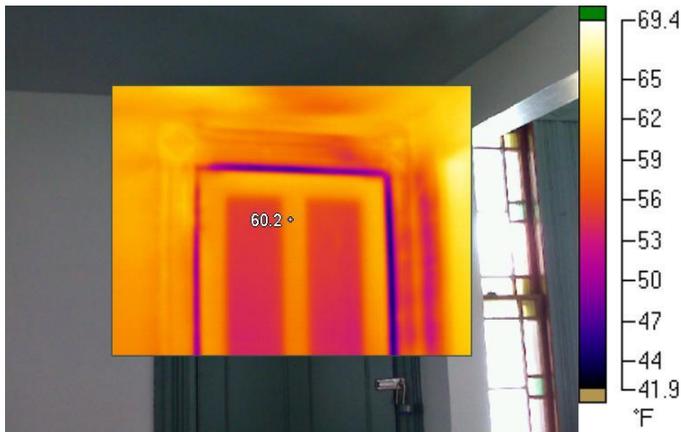
Ceiling shot below the storage area holding sports equipment. Some cooler spots are present on the ceiling.

IR001342.IS2

3/3/2011 12:32:03 PM

Image Info

Average Temperature	63.7°F
Image Range	58.9°F to 72.1°F
Image Time	3/3/2011 12:32:03 PM



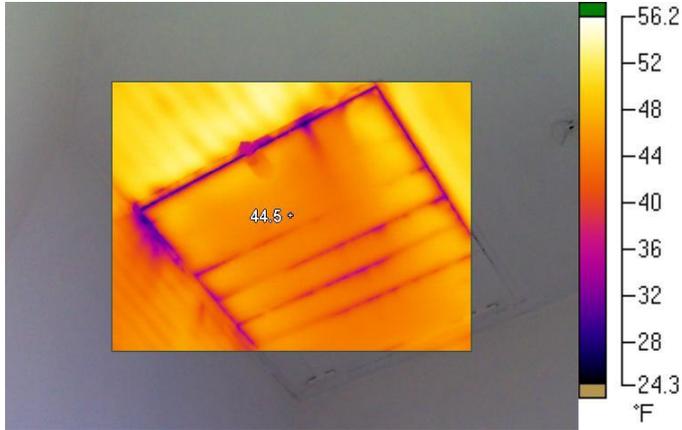
The door to the attic. Around the door there is cold air moving from the attic into the main floor.

IR001343.IS2

3/3/2011 12:32:16 PM

Image Info

Average Temperature	58.9°F
Image Range	43.9°F to 67.7°F
Image Time	3/3/2011 12:32:16 PM



Hatch in the front entrance area of the Grange Building. Cold is entering the building.

IR001346.IS2
3/3/2011 12:32:35 PM

Image Info

Average Temperature	45.6°F
Image Range	25.9°F to 54.3°F
Image Time	3/3/2011 12:32:35 PM