

Final Verification Report

Fridley Public Safety and City Hall
Fridley, MN

**ENERGY
DESIGN
ASSISTANCE**



December 27, 2018
4016332

Xcel Energy

414 Nicollet Mall, 6th Floor | Minneapolis, MN 55401
xcelenergy.com/BusinessNewConstruction

and

CenterPoint Energy

505 Nicollet Mall, 4th Floor | Minneapolis, MN 55402
CenterPointEnergy.com

Prepared by

THE WEIDT GROUP®



theweidtgroup.com

Introduction

This report documents the results of verification for several energy conservation strategies for the Fridley Public Safety and City Hall project, and shows the results of verification as compared to the baseline model. This report serves as a final document for verifying energy savings strategies implemented at this new building located in Fridley, MN.

Xcel Energy and CenterPoint Energy offer the Energy Design Assistance to assist owners and design teams in evaluating potential energy conservation strategies for new and renovated building projects during the design and construction processes. During the design phase, the building owner selected a number of energy conservation strategies. In response, Xcel Energy and CenterPoint Energy offered an incentive for the implementation of these strategies.

For this project, the owner selected Bundle 1 for implementation. For more information about selected results, please see the Bundle Requirements Document (from April 25, 2017). Upon construction completion, The Weidt Group has verified the selected strategies via Construction Documents review, on site verification of the strategies selected (on December 5, 2018), and construction submittals. These measures provide projected energy cost savings of over \$53,800 per year, in relation to the building baseline.

The simple payback analysis shows that the Xcel Energy and CenterPoint Energy incentive has helped reduce the incremental costs associated with the energy conservation strategy investments in this building, resulting in a payback of 3.6 years.

Energy Conservation Investments - Simple Payback Analysis

Project Incremental Construction Cost	\$247,250
Final Xcel Energy and CenterPoint Energy Incentive	\$53,298
Project Adjusted Incremental Cost	\$193,952
Annual Energy Cost Savings	\$53,830
Payback, with incentive (in years)	3.6

For more information, please refer to the following report.

Process

The following list provides the process steps for this energy conservation program.

- Energy Design Assistance
 - Establish goals and intentions
 - Computer modeling of baseline, strategies, and bundles
- Bundle selection by the owner
- Bundle Requirements Document
 - Summarizes key features/verification plan for all bundle strategies
- Construction Documents review
 - Reviews drawings to locate the energy conservation measures and notify the Design Team of any changes from the selected bundle
- Verification study (following project completion and occupancy)
 - Request construction documents
 - Request submittals (e.g., glazing, insulation, cooling, heating plants)
 - Locate the energy conservation measures on site
- **Final Verification Report**
 - **Detail the findings of the verification process**
 - **Estimate of final energy savings for the building**
 - **Document final incentive**
- Xcel Energy/CenterPoint Energy incentive payment

List of Verified Strategies

The following table provides a complete list of the modeled energy conservation strategies that were selected by the project team for installation. All savings percentages in the table below are relative to the selected bundle savings.

Space Asset Area	Strategy Description	Verified as Modeled?	Portion of Total \$ Savings Verified
Mechanical			
Facility	95% efficient condensing gas boiler, moderate temperature reset	Yes	6%
Firing Range	10% increased DX cooling efficiency	Yes	1%
AHU-2: Public Safety (24/7)	10% increased DX cooling efficiency	Yes	5%
RTU-2: City Hall Offices	10% increased DX cooling efficiency	Partial	1%
Facility	VFD on building heating water pump	Yes	< 1%
AHU-2: Public Safety (24/7)	Total heat recovery	Partial	6%
RTU-2: City Hall Offices	Total heat recovery	No	0%
MAU-1: Squad Garage	CO sensor control of ventilation	Yes	14%
Apparatus Bay MAU	CO sensor control of ventilation	Yes	7%
MAU-1: Squad Garage	Direct-fired furnace	Yes	6%
Apparatus Bay MAU	Direct-fired furnace	Yes	6%
Architectural			
Training	Wall R-16	Yes	< 1%
Public Safety Offices	Wall R-16	Yes	< 1%
Apparatus Bays	Wall R-16	Yes	< 1%
City Hall Offices	Wall R-16	Yes	< 1%
Council Chambers	Wall R-16	No	0%
Bunk Rooms + Common Areas	Wall R-16	Yes	< 1%
Training	Roof R-30	Yes	< 1%
Public Safety Offices	Roof R-30	Yes	< 1%
Apparatus Bays	Roof R-30	Yes	< 1%
City Hall Offices	Roof R-30	Yes	< 1%
Council Chambers	Roof R-30	Yes	< 1%
Training	Clear low-e alum frame glazing	Partial	< 1%
Public Safety Offices	Clear low-e alum frame glazing	Partial	2%
Apparatus Bays	Clear low-e alum frame glazing	Partial	< 1%
City Hall Offices	Clear low-e alum frame glazing	Yes	3%
Bunk Rooms + Common Areas	Clear low-e alum frame glazing	Partial	< 1%
Council Chambers	Reduced SHGC low-e alum frame glazing	Yes	< 1%
Electrical			
Facility	Exterior site lighting reduced to 10.44 kW	Yes	3%
Apparatus Bays	Dimming daylighting control, 50% of space	Yes	< 1%
Public Safety Offices	Dimming daylighting control, 100% of space	Yes	3%

Space Asset Area	Strategy Description	Verified as Modeled?	Portion of Total \$ Savings Verified
City Hall Offices	Dimming daylighting control, 100% of space	Yes	3%
Council Chambers	Dimming daylighting control, 100% of space	Yes	< 1%
Apparatus Bays	Dual level occupancy sensor control, 100% of space	Yes	< 1%
Squad Garage	Dual level occupancy sensor control, 100% of space	No	0%
Public Safety Offices	Vacancy sensor controls, 100% of space	Partial	2%
Council Chambers	Vacancy sensor controls, 100% of space	Yes	< 1%
Holding + Evidence	Vacancy sensor controls, 25% of space	Yes	< 1%
Firing Range	Vacancy sensor controls	Added*	< 1%
Training	Vacancy sensor controls, 75% of space	Yes	< 1%
City Hall Offices	Vacancy sensor controls, 50% of space	Partial	< 1%
Bunk Rooms + Common Areas	Vacancy sensor controls, 50% of space	Yes	< 1%
Public Safety Offices	Lighting power in Public Safety Offices reduced to 0.54 W/ft ²	Yes	8%
City Hall Offices	Lighting power in City Hall Offices reduced to 0.54 W/ft ²	Yes	4%
Training	Lighting power in Training reduced to 0.84 W/ft ²	Yes	< 1%
Holding + Evidence	Lighting power in Holding + Evidence reduced to 0.68 W/ft ²	Yes	1%
Apparatus Bays	Lighting power in Apparatus Bays reduced to 0.39 W/ft ²	Yes	2%
Firing Range	Lighting power in Firing Range reduced to 0.57 W/ft ²	Yes	< 1%
Council Chambers	Lighting power in Council Chambers reduced to 0.86 W/ft ²	Partial	< 1%
Squad Garage	Lighting power in Squad Garage reduced to 0.39 W/ft ²	Yes	7%
Bunk Rooms + Common Areas	Lighting power in Bunk Rooms + Common Areas reduced to 0.43 W/ft ²	Partial	< 1%
Service Water Heating			
Bunk Rooms + Common Areas	WaterSense showerheads	Yes	< 1%
Facility	95% SWH efficiency	Partial	< 1%
Plug Load			
Bunk Rooms + Common Areas	ENERGY STAR refrigerator	No	0%
Bunk Rooms + Common Areas	ENERGY STAR dishwasher	Added*	< 1%
Bunk Rooms + Common Areas	ENERGY STAR clothes washer	Yes	< 1%
Total Savings			100%

**Denotes reintroduced strategy that was added during the final verification process.*

Summary

The list below details items that are different from the selected bundle.

DX Rooftop

- The verified EER is higher than expected for the Firing Range and Public Safety, while lower than expected for the City Hall Offices, resulting in variations in savings. Please see the mechanical portion of the report for additional details

Heat Recovery

- The verified sensible and latent heat recovery efficiencies are lower than expected, resulting in less savings.
- Heat recovery was not implemented in RTU-2 City Hall Offices, resulting in no savings.

Wall Assembly

- The verified wall assembly R-values are higher than expected, resulting in more savings.
- The Council Chambers curtain wall is not eligible for R-value improvement strategies, resulting in no savings.

Roof Assembly

- The verified roof assembly R-values are higher than expected, resulting in more savings.

Glazing

- The verified windows glazing solar heat gain coefficient and visible transmittance are lower than expected, resulting in variations in savings throughout the building. Please see the architectural portion of the report for additional details.

Daylighting

- The Apparatus Bays dimming daylighting control area is higher than expected, resulting in more savings.

Lighting Control

- The Squad Garage sensors do not qualify for the dual level occupancy strategy, resulting in no savings.
- The Firing Range vacancy sensor control area is higher than expected, a strategy has been added to account for these savings.
- The Public Safety Offices, Holding + Evidence, Training, City Hall Offices, and Bunk Rooms + Common Areas have a mixture of vacancy and occupancy sensors, resulting in variations in savings. Please see the electrical portion of the report for additional details.

Lighting Design

- The exterior site lighting power is lower than expected, resulting in more savings.
- The lighting power density (watt/sf) is higher than expected in the Council Chambers and Bunk Rooms + Common Areas resulting in less savings.
- The lighting power density (watt/sf) is lower than expected in the Public Safety Offices, City Hall Offices, Training, Holding + Evidence, Apparatus Bays, Firing Range, and Squad Garage resulting in more savings.

Service Water Heating

- The shower head flow rate is lower than expected, resulting in more savings.
- The water heating explicit efficiency is lower than expected, resulting in less savings.

ENERGY STAR Appliances

- The Bunk Rooms + Common Areas refrigerator is not ENERGY STAR certified, resulting in no savings.
- The Bunk Rooms + Common Areas dishwasher is ENERGY STAR certified, a strategy has been added resulting in more savings.

Further detail about these strategies may be found in the “Individual Strategy Verification Results” section of this report.

Individual Strategy Verification Results

The following table(s) provides the field verification detailed findings for the applicable strategies.

Mechanical Strategy Verification Results

Mechanical

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Facility	95% efficient condensing gas boiler, moderate temperature reset	Install a condensing gas boiler with 95% peak efficiency and specify a moderate temperature reset schedule with return water temperatures ranging from 160°F at peak winter conditions to 130°F at mild conditions.	Explicit efficiency percent: 95 % Temperature reset type Moderate	The verified value meets the strategy requirements.
Firing Range	10% increased DX cooling efficiency	Improve cooling efficiency to 10.78 EER	DX unit improved cooling efficiency: 11.20 EER	The verified value resulted in more savings than planned.
AHU-2: Public Safety (24/7)	10% increased DX cooling efficiency	Improve cooling efficiency to 10.78 EER	DX unit improved cooling efficiency: 11.40 EER	The verified value resulted in more savings than planned.
RTU-2: City Hall Offices	10% increased DX cooling efficiency	Improve cooling efficiency to 10.78 EER	DX unit improved cooling efficiency: 10.30 EER	The verified value resulted in less savings than planned.
Facility	VFD on building heating water pump	Install VFD control rather than constant speed drives on the loop pump motors. This strategy assumes two-way valves on applicable hydronic system coils to reduce flow rate (modeled to minimum 30% flow) during periods of low load.	Implemented	The verified value meets the strategy requirements.
MAU-1: Squad Garage	Direct-fired furnace	Provide direct fired gas furnaces for garage heating. Direct fired furnaces vent their exhaust air directly into the space.	Implemented	The verified furnaces meet the strategy requirements.
Apparatus Bay MAU	Direct-fired furnace	Provide direct fired gas furnaces for garage heating. Direct fired furnaces vent their exhaust air directly into the space.	Implemented	The verified furnaces meet the strategy requirements.

Conditioning of Outside Air

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
AHU-2: Public Safety (24/7)	Total heat recovery	Provide 75% effective sensible and latent heat recovery on 90% of the building exhaust air	Summer/winter effectiveness: 71 % Latent effectiveness: 62 %	The verified value resulted in less savings than planned.
RTU-2: City Hall Offices	Total heat recovery	Provide 75% effective sensible and latent heat recovery on 90% of the building exhaust air	Not Implemented	Heat recovery was not implemented in the City Hall Offices, resulting in no savings
MAU-1: Squad Garage	CO sensor control of ventilation	Provide carbon monoxide sensors that control the garage ventilation rates so that ventilation is reduced during times of low occupancy.	Implemented	The verified sensors meet the strategy requirements.
Apparatus Bay MAU	CO sensor control of ventilation	Provide carbon monoxide sensors that control the garage ventilation rates so that ventilation is reduced during times of low occupancy.	Implemented	The verified sensors meet the strategy requirements.

Site Photos



Image of pump VFDs



Image of boilers

Architectural Strategy Verification Results

Wall

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Training	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	R-value: R-21.3	The verified value resulted in more savings than planned.
Public Safety Offices	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	R-value: R-20.7	The verified value resulted in more savings than planned.
Apparatus Bays	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	R-value: R-20.8	The verified value resulted in more savings than planned.
City Hall Offices	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	R-value: R-23.4	The verified value resulted in more savings than planned.
Council Chambers	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	Not applicable	Curtain wall is not eligible for R-value improvement strategies, resulting in no savings.
Bunk Rooms + Common Areas	Wall R-16	Install a wall with a total R-value, including thermal bridging of R-16 (U-0.063)	R-value: R-18.9	The verified value resulted in more savings than planned.

Roof

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Training	Roof R-30	Install a roof with a total assembly value, including thermal bridging of R-30 (U-0.033)	R-value: R-43.2	The verified value resulted in more savings than planned.
Public Safety Offices	Roof R-30	Install a roof with a total assembly value, including thermal bridging of R-30 (U-0.033)	R-value: R-39.8	The verified value resulted in more savings than planned.

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Apparatus Bays	Roof R-30	Install a roof with a total assembly value, including thermal bridging of R-30 (U-0.033)	R-value: R-35.3	The verified value resulted in more savings than planned.
City Hall Offices	Roof R-30	Install a roof with a total assembly value, including thermal bridging of R-30 (U-0.033)	R-value: R-36.6	The verified value resulted in more savings than planned.
Council Chambers	Roof R-30	Install a roof with a total assembly value, including thermal bridging of R-30 (U-0.033)	R-value: R-59.7	The verified value resulted in more savings than planned.

Glazing

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Training Public Safety Offices Apparatus Bays Bunk Rooms + Common Areas	Clear low-e alum frame glazing	Unit U-value 0.42 Center of Glass U-value 0.29 SHGC 0.38 VT 0.70	Unit U-value: 0.42 Center of glass U-value: 0.29 Solar heat gain coefficient: 0.27 Visible transmittance: 0.61	The verified value resulted in less savings than planned.
City Hall Offices	Clear low-e alum frame glazing	Unit U-value 0.42 Center of Glass U-value 0.29 SHGC 0.38 VT 0.70	Unit U-value: 0.42 Center of glass U-value: 0.29 Solar heat gain coefficient: 0.27 Visible transmittance: 0.61	The verified value resulted in more savings than planned.
Council Chambers	Reduced SHGC low-e alum frame glazing	Unit U-value 0.42 Center of Glass U-value 0.29 SHGC 0.29 VT 0.62	Unit U-value: 0.42 Center of glass U-value: 0.29 Solar heat gain coefficient: 0.27 Visible transmittance: 0.61	The verified value meets the strategy requirements.

Electrical Strategy Verification Results

Daylighting Control

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Apparatus Bays	Dimming daylighting control, 50% of space	Provide automatic dimming (down to 10%) daylighting controls for 50% of the area with daylight harvesting potential. Dimming daylighting controls are assumed to control the area within the first 15 feet from the perimeter walls or two window head heights, whichever is smaller.	100% of applicable area	The verified sensors resulted in more savings than planned.
Public Safety Offices City Hall Offices Council Chambers	Dimming daylighting control, 100% of space	Provide automatic dimming (down to 10%) daylighting controls for 100% of the area with daylight harvesting potential. Dimming daylighting controls are assumed to control the area within the first 15 feet from the perimeter walls or two window head heights, whichever is smaller.	100% of applicable area	The verified sensors meet the strategy requirements.

Lighting Controls

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Apparatus Bays	Dual level occupancy sensor control, 100% of space	Provide dual level occupancy sensors in all applicable enclosed spaces such as private offices that only provide 2/3 light level unless a switch or button is pressed.	100% of applicable area	The verified sensors meet the strategy requirements.
Squad Garage	Dual level occupancy sensor control, 100% of space	Provide dual level occupancy sensors in all applicable enclosed spaces such as private offices that only provide 2/3 light level unless a switch or button is pressed.	Not Implemented	The verified sensors do not meet the strategy requirements, resulting in no savings.
Public Safety Offices	Vacancy sensor controls, 100% of space	Provide vacancy sensors in 100% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	Area covered: 44% Vacancy sensors 33% Occupancy sensors	The verified sensors resulted in less savings than planned.

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Council Chambers	Vacancy sensor controls, 100% of space	Provide vacancy sensors in 100% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	100% of applicable area	The verified sensors meet the strategy requirements.
Holding + Evidence	Vacancy sensor controls, 25% of space	Provide vacancy sensors in 25% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	Area covered: 44% Vacancy sensors 48% Occupancy sensors	The verified sensors resulted in more savings than planned.
Firing Range	Vacancy sensor controls	Provide vacancy sensors in the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	100% of applicable area	The added strategy resulted in more savings than planned.
Training	Vacancy sensor controls, 75% of space	Provide vacancy sensors in 75% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	Area covered: 77% Vacancy sensors 13% Occupancy sensors	The verified sensors resulted in more savings than planned.
City Hall Offices	Vacancy sensor controls, 50% of space	Provide vacancy sensors in 50% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	Area covered: 42% Vacancy sensors 9% Occupancy sensors	The verified sensors resulted in less savings than planned.
Bunk Rooms + Common Areas	Vacancy sensor controls, 50% of space	Provide vacancy sensors in 50% of the applicable spaces throughout the building such that manual switches are used to turn lights on and the sensors automatically turn lights off when the space is unoccupied.	Area covered: 47% Vacancy sensors 20% Occupancy sensors	The verified sensors resulted in more savings than planned.

Lighting Power Density

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Facility	Exterior site lighting reduced to 10.44 kW	Reduce exterior site lighting power by 30% below the baseline allowance	Exterior lighting load: 7.28 Kilowatts	The verified value resulted in more savings than planned.
Public Safety Offices	Lighting power in Public Safety Offices reduced to 0.54 W/ft ²	Reduce lighting power density by 40% below the Baseline specified by building allowances	Improved power density: 0.50 W/ft ²	The verified value resulted in more savings than planned.
City Hall Offices	Lighting power in City Hall Offices reduced to 0.54 W/ft ²	Reduce lighting power density by 40% below the Baseline specified by building allowances	Improved power density: 0.52 W/ft ²	The verified value resulted in more savings than planned.
Training	Lighting power in Training reduced to 0.84 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.49 W/ft ²	The verified value resulted in more savings than planned.
Holding + Evidence	Lighting power in Holding + Evidence reduced to 0.68 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.39 W/ft ²	The verified value resulted in more savings than planned.
Apparatus Bays	Lighting power in Apparatus Bays reduced to 0.39 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.27 W/ft ²	The verified value resulted in more savings than planned.
Firing Range	Lighting power in Firing Range reduced to 0.57 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.48 W/ft ²	The verified value resulted in more savings than planned.
Council Chambers	Lighting power in Council Chambers reduced to 0.86 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.96 W/ft ²	The verified value resulted in less savings than planned.
Squad Garage	Lighting power in Squad Garage reduced to 0.39 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.14 W/ft ²	The verified value resulted in more savings than planned.
Bunk Rooms + Common Areas	Lighting power in Bunk Rooms + Common Areas reduced to 0.43 W/ft ²	Reduce lighting power density by 30% below the Baseline specified by building allowances	Improved power density: 0.46 W/ft ²	The verified value resulted in less savings than planned.

Site Photos



Image of City Council Room lighting



Image of Apparatus Bay lighting

Other Strategy Verification Results

Service Water Heating

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Bunk Rooms + Common Areas	WaterSense showerheads	Install WaterSense showerheads with 2.0 gpm or less	WaterSense shower flow rate: 1.50 gpm	The verified value resulted in more savings than planned.
Facility	95% SWH efficiency	Install an 95% efficient natural gas service hot water heater	Explicit efficiency percent: 94 %	The verified value resulted in less savings than planned.

Plug Load

Space Asset Area	Strategy Description	Strategy Requirements	Verification Review	Verification Findings
Bunk Rooms + Common Areas	ENERGY STAR refrigerator	Provide ENERGY STAR rated refrigerator(s)	Not Implemented	The verified units resulted in no savings.
Bunk Rooms + Common Areas	ENERGY STAR dishwasher	Provide ENERGY STAR rated dishwasher(s)	ENERGY STAR	The added strategy resulted in more savings than planned.
Bunk Rooms + Common Areas	ENERGY STAR clothes washer	Provide ENERGY STAR rated clothes washer(s)	ENERGY STAR	The verified units meet the strategy requirements.

Verified Bundle Results and Incentive

The tables on the next pages show the calculated energy cost savings for these energy investments with the included Xcel Energy and CenterPoint Energy incentive. The table also provides payback analysis of the verified bundle.

Energy Parameter	Bundle 1, As Built*
Energy Cost Savings	\$53,830
Percent Energy Cost Savings	32%
Electric Demand Savings	73 kW
Percent Electric Demand Savings	26%
Electric Consumption Savings	273,895 kWh
Percent Electric Consumption Savings	27%
Gas Consumption Savings	3,755 dekatherm
Percent Gas Consumption Savings	40%
Total Incremental First Cost	\$247,250
Xcel Energy Electric Incentive	\$40,156
Custom CenterPoint Energy Gas Incentive	\$13,142
Total Incentive	\$53,298
Simple Payback with Incentive	3.6

**The surface parking area was updated in the verification model, as a result the Bundle 1 savings listed in prior reports are no longer a valid reference.*

Energy Parameter	Baseline	Bundle 1, As Built
Building Results		
Energy Use Intensity (EUI)	124.2 KBtu/ft ² /yr	79.0 KBtu/ft ² /yr
EUI Savings		45.2 KBtu/ft ² /yr
Percent EUI Savings		36%

Note: Subject to the following qualifications, the computer model offers sophisticated predictions of energy savings with estimations as good as any other means available for a building that has not been built.

The strategy and bundle results compare relative differences in net energy use for design alternatives. The results are not appropriate for system design and/or equipment selection; these are responsibilities of the registered design professionals of record.

The actual energy use of this building will be different from simulated results. Building systems and other operating parameters provided by the design team and modeled by The Weidt Group approximate actual conditions, but differences in weather, operating parameters, occupancy level, and changes that occur through the bidding and construction process will result in annual energy costs that will be different from what is predicted here. However, when a bundle of strategies is selected relative to other alternatives, its energy (and dollar) conserving value can be expected to remain constant relative to the other alternatives, and the magnitude of the cost should be approximately as predicted.

Thus, implementation of a bundle of strategies offers the opportunity for energy savings, but the realization of those savings is the responsibility of the owner/operator of the building – not Xcel Energy and CenterPoint Energy or The Weidt Group. Savings are not guaranteed.

Appendix A. Project Information

Building Summary		
Location	Fridley, MN	
Space Asset Areas	Area	Number of Stories
City Hall Offices	24,421 ft ²	2
Council Chambers	1,996 ft ²	1
Public Safety Offices	25,727 ft ²	2
Bunk Rooms + Common Areas	3,878 ft ²	1
Holding + Evidence	5,459 ft ²	1
Apparatus Bays	10,880 ft ²	1
Training	5,570 ft ²	2
Squad Garage	21,962 ft ²	1
Firing Range	3,861 ft ²	1
Total	103,754 ft²	3
Utilities		
Electric Utility	Xcel Energy	
Gas Utility	CenterPoint Energy	
Schedule		
Construction Documents Complete	03/30/2017	
Construction Start	05/15/2017	
Occupancy	11/07/2018	
Baseline Reference	ASHRAE 90.1-2010	
Other Notes		

Systems Summary	
Selected HVAC	<p>Squad Garage: Direct-fired gas makeup air unit with overhead gas-fired infrared heaters and variable speed exhaust; Apparatus Bays: Direct-fired gas makeup air unit with perimeter hot water radiation and variable speed exhaust; City Hall Offices, Council Chambers: Variable air volume with DX cooling and hot water heat; Public Safety Offices, Bunk Rooms + Common Areas, Holding + Evidence, Training: 24/7 variable air volume with DX cooling and hot water heat; Firing Range: single zone with DX cooling and hot water heat; Heating hot water plant: gas-fired condensing boiler.</p>

Appendix B. Verified Isolated Strategy Results

The table below includes detailed results modified based on verification findings shown earlier in this report.

Space Asset Area	Strategy Description	Peak kW Savings	kWh Savings	Gas Savings (Therm)	Energy Cost Savings	Inc. Cost
Training	Clear low-e alum frame glazing	0	1	10	\$10	\$1,542
Public Safety Offices	Clear low-e alum frame glazing	4	1,072	377	\$892	\$29,999
Apparatus Bays	Clear low-e alum frame glazing	0	46	14	\$11	\$3,584
City Hall Offices	Clear low-e alum frame glazing	7	4,874	338	\$1,562	\$29,649
Bunk Rooms + Common Areas	Clear low-e alum frame glazing	1	79	21	\$143	\$6,662
Bunk Rooms + Common Areas	WaterSense showerheads	0	0	388	\$275	\$80
Apparatus Bays	Dimming daylighting control, 50% of space	0	1,996	-67	\$146	\$162
Apparatus Bays	Dual level occupancy sensor control, 100% of space	0	2,117	-73	\$116	\$762
Training	Wall R-16	0	38	96	\$75	\$357
Public Safety Offices	Wall R-16	0	70	371	\$309	\$665
Apparatus Bays	Wall R-16	0	2	443	\$312	\$830
City Hall Offices	Wall R-16	0	215	423	\$381	\$658
Bunk Rooms + Common Areas	Wall R-16	0	11	72	\$56	\$191

Space Asset Area	Strategy Description	Peak kW Savings	kWh Savings	Gas Savings (Therm)	Energy Cost Savings	Inc. Cost
Facility	95% efficient condensing gas boiler, moderate temperature reset	0	292	4,871	\$3,440	\$11,062
MAU-1: Squad Garage	CO sensor control of ventilation	0	11,944	9,377	\$7,319	\$1,758
Apparatus Bay MAU	CO sensor control of ventilation	0	4,671	5,234	\$3,966	\$870
Public Safety Offices	Vacancy sensor controls, 100% of space	1	14,680	-238	\$949	\$4,502
Council Chambers	Vacancy sensor controls, 100% of space	0	162	-4	\$22	\$499
MAU-1: Squad Garage	Direct-fired furnace	0	0	4,354	\$3,060	\$2,458
Apparatus Bay MAU	Direct-fired furnace	0	0	4,613	\$3,242	\$1,217
Council Chambers	Reduced SHGC low-e alum frame glazing	1	-120	6	\$111	\$2,798
AHU-2: Public Safety (24/7)	Total heat recovery	5	-3,127	3,815	\$3,264	\$34,051
Public Safety Offices	Lighting power in Public Safety Offices reduced to 0.54 W/ft ²	9	59,811	-715	\$4,497	\$7,156
City Hall Offices	Lighting power in City Hall Offices reduced to 0.54 W/ft ²	8	20,620	-235	\$2,342	\$6,793
Facility	95% SWH efficiency	0	0	511	\$361	\$4,046
Training	Roof R-30	0	31	84	\$67	\$2,553
Public Safety Offices	Roof R-30	1	-1,252	614	\$455	\$11,792
Apparatus Bays	Roof R-30	0	1	596	\$420	\$9,973
City Hall Offices	Roof R-30	0	-947	409	\$313	\$10,530

Space Asset Area	Strategy Description	Peak kW Savings	kWh Savings	Gas Savings (Therm)	Energy Cost Savings	Inc. Cost Savings
Council Chambers	Roof R-30	0	-76	133	\$119	\$1,761
Firing Range	10% increased DX cooling efficiency	4	157	0	\$596	\$1,448
AHU-2: Public Safety (24/7)	10% increased DX cooling efficiency	10	21,195	0	\$2,715	\$15,238
RTU-2: City Hall Offices	10% increased DX cooling efficiency	2	3,215	0	\$562	\$9,906
Holding + Evidence	Vacancy sensor controls, 25% of space	0	1,851	-59	\$93	\$341
Firing Range	Vacancy sensor controls	0	587	-16	\$41	\$965
Bunk Rooms + Common Areas	ENERGY STAR dishwasher	0	16	0	\$0	\$300
Training	Lighting power in Training reduced to 0.84 W/ft ²	1	3,940	-59	\$295	\$680
Holding + Evidence	Lighting power in Holding + Evidence reduced to 0.68 W/ft ²	1	10,420	-316	\$529	\$666
Apparatus Bays	Lighting power in Apparatus Bays reduced to 0.39 W/ft ²	2	16,452	-579	\$911	\$1,328
Firing Range	Lighting power in Firing Range reduced to 0.57 W/ft ²	0	826	-22	\$51	\$471
Council Chambers	Lighting power in Council Chambers reduced to 0.86 W/ft ²	0	496	-12	\$66	\$244
Squad Garage	Lighting power in Squad Garage reduced to 0.39 W/ft ²	7	55,552	-975	\$3,727	\$2,680
Bunk Rooms + Common Areas	Lighting power in Bunk Rooms + Common Areas reduced to 0.43 W/ft ²	0	1,675	-62	\$68	\$473

Space Asset Area	Strategy Description	Peak kW Savings	kWh Savings	Gas Savings (Therm)	Energy Cost Savings	Inc. Cost
Bunk Rooms + Common Areas	ENERGY STAR clothes washer	0	1,198	-44	\$67	\$600
Training	Vacancy sensor controls, 75% of space	0	1,947	-29	\$156	\$1,044
Facility	Exterior site lighting reduced to 10.44 kW	0	28,388	0	\$1,733	\$2,089
Facility	VFD on building heating water pump	0	3,781	-68	\$182	\$2,306
Public Safety Offices	Dimming daylighting control, 100% of space	7	17,476	-544	\$1,677	\$7,482
City Hall Offices	Dimming daylighting control, 100% of space	7	12,854	-373	\$1,553	\$7,375
Council Chambers	Dimming daylighting control, 100% of space	1	633	-19	\$115	\$948
City Hall Offices	Vacancy sensor controls, 50% of space	1	2,640	-31	\$252	\$1,221
Bunk Rooms + Common Areas	Vacancy sensor controls, 50% of space	0	875	-32	\$32	\$485

Appendix C. Project Participants

Name	Company	Email	Phone
Scott Hickok	City of Fridley	Scott.Hickok@fridleymn.gov	763-572-3590
Jim Kosluchar	City of Fridley	Jim.Kosluchar@fridleymn.gov	
Wally Wysopal	City of Fridley	Wally.Wysopal@fridleymn.gov	
Jeannie Benson	City of Fridley	Jeannie.Benson@fridleymn.gov	
Rachel Workin	City of Fridley	Rachel.Workin@fridleymn.gov	
Andrew Cooper	Oertel Architects	acooper@oertelarchitects.com	651-696-5186
Mike Healy	BKV Group	mhealy@bkvgroup.com	612-373-9514
Chris Hutton	BKV Group	chutton@bkvgroup.com	612-339-3752
DuWayne Jones	BKV Group	djones@bkvgroup.com	612-373-9117
Chad Kurdi	BKV Group	ckurdi@bkvgroup.com	612-373-9129
Josh Ortmann	BKV Group	jortmann@bkvgroup.com	612-339-3752
Bruce Schwartzman	BKV Group	bschwartzman@bkvgroup.com	612.373.9104
Michael Dugan	BKV Group	mdugan@bkvgroup.com	612-373-9142
Joy Jayaram	McGough Companies	joy.jayaram@mcgough.com	651-634-4673
Kris Kohls	Xcel Energy	kris.kohls@xcelenergy.com	612-330-5504
Nathan Klimek	Xcel Energy	Nathan.T.Klimek@xcelenergy.com	800-328-8226
Jennifer Abbott	Xcel Energy	jennifer.m.abbott@xcelenergy.com	612-630-4207
Tom Dolan	CenterPoint Energy	thomas.dolan@centerpointenergy.com	612-321-4398
Ryan Setterholm	CenterPoint Energy	ryan.setterholm@centerpointenergy.com	612-321-4482
Alison Decker	The Weidt Group	alisond@twgi.com	952-938-1588
Wade Cooper	The Weidt Group	wadec@twgi.com	952-938-1588
Jonathan Leitzke	The Weidt Group	jonathanl@twgi.com	952-938-1588