FARRIS ENGINEERING

HEMINGFORD PUBLIC SCHOOLS

HEMINGFORD, NEBRASKA

FE #24100012

AUGUST 22, 2024

FACILITY ASSESSMENT & ENERGY AUDIT

MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION & TECHNOLOGY SYSTEMS

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PART 1 - PROJECT DESCRIPTION

1.1 PURPOSE

A. The purpose of this study is to survey and assess the mechanical, electrical, plumbing, and fire protection systems infrastructure for the Hemingford Public Schools facilities. Included in the scope of the assessment is to identify deficiencies within the building, improve efficiency for staff, assist with forecasting major system replacements before equipment reaches end of life, and building project planning to support growth or improvements to the facility.

B. Data was obtained through visual observation of the various systems, components, and elements within the building along with a review of existing facility drawings. In addition, interviews with maintenance and management personnel were conducted. A thorough observation of the systems was provided but some components and elements could not be observed without the destruction of ceilings, walls, etc.

C. The analysis of mechanical equipment focused on primary heating and cooling components, major air handling and ventilation equipment, temperature controls, plumbing piping and water heating and treatment equipment, and fire protection systems.

D. The analysis of electrical equipment focused on the main electrical service, electrical distribution, life safety equipment, and communication systems.

1.2 ABOUT FARRIS ENGINEERING

A. Farris Engineering's mechanical and electrical professionals listen to client needs and focus on cost, safety, reliability, and impact. The result, since 1967: Engineering excellence. Other firm services include fire protection, lighting design, technology, and commissioning, with offices in Omaha, NE, Lincoln, NE, Sidney, NE, Colorado Springs, CO, and Kansas City, MO. Project categories include K-12, healthcare, higher education, military, government, industrial and commercial.

B. Farris Engineering performed this facility assessment as an engineering consultant to JEO (Scottsbluff, Nebraska).

PART 2 - BUILDING DESCRIPTION

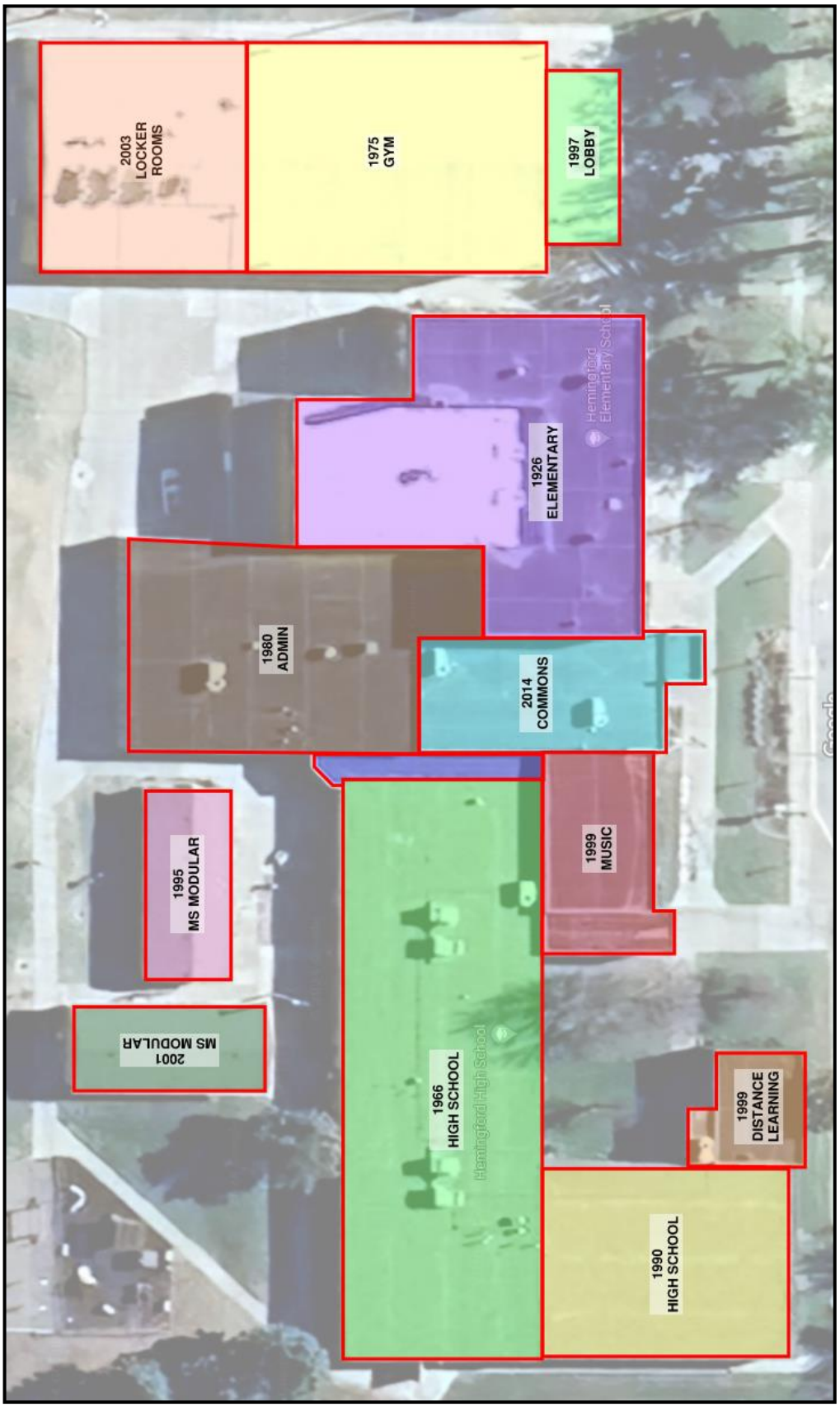
A. The facilities included in this assessment are the Hemingford Public School facilities located in Hemingford, Nebraska.

B. The original school building shown in purple in the image below was built in 1926 but has had multiple major additions. The primary areas of the facility are separated as follows:

1. Main School Building
    a. 1926 Elementary
    b. 1966 High School
    c. 1980 Administration
    d. 1990 High School Addition
    e. 1999 Music
    f. 1999 Distance Learning
    g. 2014 Commons

C. Additional campus buildings include the following:

1. Gymnasium
    a. Original 1975 Building
    b. 1997 Lobby Addition
    c. 2003 Locker Room Addition
2. 1995 Middle School Modular
3. 2001 Middle School Modular
4. Ag Shop
5. Maintenance Shop
6. Greenhouse
7. Football/Crow's Nest
8. Concessions Building
9. Bus Barn
10. Multipurpose Room
11. South Campus Building


2003
LOCKER
ROOMS
1975
GYM
1997
LOBBY
1926
ELEMENTARY
1980
ADMIN
2014
COMMONS
1999
MUSIC
1995
MS MODULAR
2001
MS MODULAR
1966
HIGH SCHOOL
1999
DISTANCE
LEARNING
1990
HIGH SCHOOL
Hemingford
Elementary School
Hemingford High School
Google

PART 3 - MECHANICAL SYSTEMS

3.1 CENTRAL UTILITY PLANT

A. General:

1. The central utility plant only serves the original 1926 Elementary School portion of Main School Building and is configured as a two-pipe changeover system. It is capable of either heating or cooling, but simultaneous heating and cooling are not possible, and the system cannot be changed between modes of operation quickly due to the potential for thermal shock and damage to the system.

2. Two (2) constant volume vertical inline pumps installed in parallel configuration circulate the hot/chilled water through the facility. Each pump is rated at 2 hp. The pumps appeared to be in marginal condition and have exceeded their expected 10-year service life.

B. Chilled Water:

1. A Daikin air-cooled chiller installed circa 2018 provides chilled water for the facility. The chiller has two (2) 15-ton sealed hermetic, scroll type compressors for a nominal cooling capacity of 30 tons.

2. The chiller has a constant volume vertical inline pump rated at 2 hp. The pump appeared to be in marginal condition and has exceeded its expected 10-year service life.

C. Hot Water:

1. Heating hot water for the facility is generated by two (2) Peerless natural gas fired cast iron boilers with a maximum input of 840 MBH with a 2:1 turndown capability and an 80% thermal efficiency rating. The boilers were installed circa 2000. The boilers appear to be in acceptable condition with occasional maintenance issues but are at the end of their expected 25-year service life. Each boiler has a constant volume inline circulator pump.

3.2 AIR HANDLING & TERMINAL EQUIPMENT

A. Main School Building:

1. 1926 Elementary: This area is served by 2-pipe floor console style fan coil units (FCUs). The FCUs are relatively simple and reliable. However, they do not provide uniform air distribution through the space served which results in poor occupant thermal

comfort. Additionally, floor console style FCUs generally output higher noise levels which can interrupt teaching activities as compared to traditional ducted HVAC systems.

2. 1966 High School: This area is served by four (4) packaged rooftop units (RTUs) with direct expansion (DX) cooling and natural gas heat exchangers. The RTUs were installed circa 2001 and have exceeded their expected 15-year service life.

3. 1980 Administration: This area is served by a combination of a packaged RTU and two (2) vertical FCUs with DX cooling, remote air-cooled condensing units (ACCUs), and natural gas heat exchangers. The RTU was installed circa 2001 as has exceeded its expected 15-year service life. The blower/furnace sections of the FCUs appear to have been installed circa 2001. One of the DX coils and remote ACCUs was installed circa 2003 and the other in 2021. While the equipment is aged, maintenance staff have done an excellent job of repairing and replacing components as necessary for proper operation.

4. 1990 High School Addition: This area is served by one (1) ductless split system and two (2) vertical FCUs with DX cooling, remote air-cooled condensing units (ACCUs), and natural gas heat exchangers. The blower/furnace sections of the FCUs appear to have been installed circa 2001. One of the DX coils and remote ACCUs was installed in 2022 and the other in 2023. While the equipment is aged, maintenance staff have done an excellent job of repairing and replacing components as necessary for proper operation. The ductless split system serves Classroom/Computer Lab 420. While the exact age is unknown, it appears to be in marginal condition and has likely exceeded or is nearing its expected 15-year service life.

5. 1999 Music: This area is served by a packaged rooftop unit (RTU) with direct expansion (DX) cooling and a natural gas heat exchanger. The RTU was installed circa 1999 and has exceeded its expected 15-year service life.

6. 1999 Distance Learning: This area is served by a packaged rooftop unit (RTU) with direct expansion (DX) cooling and a natural gas heat exchanger. The RTU was installed circa 1999 and has exceeded its expected 15-year service life.

7. 2014 Commons: This area is served by two (2) packaged rooftop units (RTUs) with direct expansion (DX) cooling and natural gas heat exchangers. The RTUs were installed in 2014 and appear to be in acceptable condition.

B. Gymnasium:

1. Original 1975 Building: This area is served by four (4) gas fired unit heaters. There is no means of mechanical cooling for the gym. Ventilation is provided by a sidewall propellor exhaust fan and makeup louver.

2. 1997 Lobby Addition: The lobby and concessions areas are served by a vertical FCU with a natural gas heat exchanger installed in 2020. There are no means of mechanical cooling in these areas.

3. 2003 Locker Room Addition: This area of the building is served by a packaged RTU with DX cooling and natural gas heating for the stage and three (3) heating only makeup air units (MAUs) to serve the locker rooms and wrestling room. All equipment was installed in 2003 and has exceeded its expected 15-year service life.

C. 1995 Middle School Modular: This building is served by a wall mount packaged terminal air conditioner (PTAC) that appears to be original to the manufactured building.

D. 2001 Middle School Modular: This building is served by a vertical FCU with DX cooling, remote ACCU, and a natural gas heat exchanger. The FCU and ACCU appear to be original to the manufactured building.

E. Ag Shop: This building is served by a vertical FCU with natural gas heat and multiple natural gas fired radiant tube heaters. All equipment appears to be in fair condition. There is no means of mechanical cooling in this building.

F. Maintenance Shop: This shop is heated by a single natural gas fired unit heater that appears to be in good condition. There is no means of mechanical cooling in this building.

G. Greenhouse: This building is served by a gas fired unit heater. There is no means of mechanical cooling for the greenhouse. Ventilation is provided by a sidewall propellor exhaust fan and makeup louver.

H. Football/Crow's Nest: There is no HVAC system present in this building.

I. Concessions Building: This building is heated by multiple electric unit heaters that appear to be in good condition. An electric cove heater has been provided in the plumbing chase area.

J. Bus Barn: There is no HVAC system present in this building.

K. Multipurpose Room: The main portion of this building is heated by multiple natural gas fired radiant tube heaters. There is no means of mechanical cooling in this building.

L. South Campus Building: This building is served by a vertical FCU with DX cooling, remote ACCU, and a natural gas heat exchanger along with a ductless split system. The ductless split system was installed circa 2020 and is in good condition. The vertical FCU and ACCU were installed circa 2007 and have exceeded their expected 15-year service life.

3.3 DISTRIBUTION

A. It appears that some pipe and equipment insulation present in the facility may have asbestos containing materials. Asbestos is a silicate mineral that can cause serious and fatal illnesses such as lung cancer and mesothelioma after prolonged inhalation. Further investigation by professionals trained in the detection and abatement of asbestos is recommended.

3.4 TEMPERATURE CONTROL SYSTEM

A. There is not a building management and control system present at this facility. Temperature control is provided via local thermostats.

3.5 MISCELLANEOUS

A. Radon Gas: Based on the age and condition of the facility, there is a possibility that excessive radon gas levels exist in certain areas of the building. Radon is a colorless, odorless, tasteless gas that increases the risk of lung cancer after prolonged inhalation of high concentrations. Further investigation by professionals trained in the detection and mitigation of radon gas is recommended.

PART 4 - ELECTRICAL SYSTEMS

4.1 POWER SERVICE

A. Main School Building:

1. The existing main school building is served by three utility services installed at varying times as additions and expansion of the facilities occurred. The utility services are located on the north side of the building, at varying locations.

2. 1926 Elementary: This area of the building is served by an overhead electrical service, via weatherhead. The electrical service is 400 amp, 120/208 volt, three phase, four wire electrical service via a 400 amp Siemens S3 panelboard, manufactured in 2001. This panelboard is located on the exterior of the building and is not original to the elementary building. The panelboard does have existing space, but limited, for future electrical connections.

3. 1966 High School: This area of the building is served by an underground electrical service, via a pad mount transformer, located adjacent to the main distribution panel. The electrical service is 1200 amp, 120/208 volt, three phase, four wire electrical service via a 1200 amp Cutler Hammer PRL4 distribution panelboard, manufactured in 2001. The panelboard does have existing breakers indicated as spare, but limited, for future electrical connections.

4. 1980 Administration: This area of the building is served by an overhead electrical service, that is routed below ground. The electrical service is 400 amp, 120/208 volt, three phase, four wire electrical service via a 400 amp Gould ITE general duty safety switch. The existing equipment appears to be original to the 1980 addition and is reaching end of life.

5. 1990 High School Addition: This area of the building is served by the 1966 High School electrical service.

6. 1999 Music Addition: This area of the building is served by the 1966 High School electrical service.

7. 1999 Distance Learning Addition: This area of the building is served by the 1966 High School electrical service.

8. 2014 Commons: This area of the building is served by the 1966 High School electrical service.

B. Gymnasium: The existing building is served by an overhead electrical service on the east side of the building

via pole mounted transformers and weatherhead. The electrical service is 600 amp, 120/240 volt, single phase, three wire via an electrical gutter box with three 200 amp Square D fusible disconnect switches. The equipment doesn't appear to be from the original 1975 building, but perhaps from an addition project in 1997 and is reaching end of life.

C. 1995 Middle School Modular: The existing building is served by a 200 amp breaker in the exterior main distribution panel serving the 1966 high school. The electrical service is 200 amp, 120/240 volt, single phase, three wire via a Westinghouse Load Center. The equipment appears to be from the original construction.

D. 2001 Middle School Modular: The existing building is served by a 200 amp breaker in the exterior main distribution panel serving the 1966 high school. The electrical service is 200 amp, 120/240 volt, single phase, three wire via a GE Load Center. The equipment appears to be from the original construction.

E. Ag Shop: The existing building is served by an overhead electrical service on the east side of the building via pole mounted transformer and weatherhead. The electrical service is 200 amp, 120/208 volt, three phase, four wire electrical service via a 225 amp Square D NQOD panelboard which appears to be original to the building. This panelboard is located in the interior of the building in a storage room. The panel does not appear to have any spare or future capacity available.

F. Maintenance Shop: The existing building is served by an overhead electrical service on the north side of the building via pole mounted transformer and weatherhead. The electrical service is 200 amp, 120/240 volt, single phase, three wire via a Siemens Load Center. The equipment appears to be from the original construction. The load center does have spare breakers and capacity for future electrical connections.

G. Greenhouse: The existing building is served by the same overhead electrical service that is on the maintenance shop by an underground conduit into a load center within a storage shed. The electrical service is 100 amp, 120/240 volt, single phase, three wire via a Square D Load Center. The equipment appears to be from the original construction. The load center does have capacity for future electrical connections.

H. Football/Crow's Nest: The existing field and crow's nest is served by an overhead electrical service on the south side of the field via pole mounted transformer. The electrical service is 400 amp, 120/208 volt, three phase, four wire via a Siemens S3 panelboard, manufactured in 2001. This panelboard is located adjacent to the pole with the electrical service. The panelboard does have existing space, but limited, for future connections. The crow's nest is served by the same panelboard serving the field lighting by a 100 amp breaker. There is a load center located within the first level of the crow's nest that is served by this breaker. The electrical service to the crow's nest is 100 amp, 120/208 volt, single phase, three wire via a 100 amp Square D QO Load Center. The equipment appears to be from the original construction. The load center has existing space, but limited, for future electrical connections.

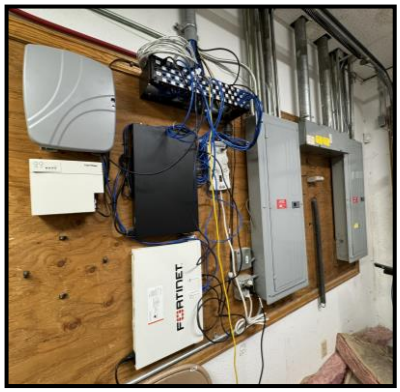
I. Concessions Building: The existing building is served from a sub-panel that is located at the northwest field lighting pole by a 100 amp breaker. There is a load center within the

concessions building that is served by this breaker. The electrical service is 100 amp, 120/208 volt, three phase, four wire via a Siemens Load Center. The equipment appears to be from the original construction. The load center does not have any space for future electrical connections.

J. Bus Barn: The existing building is served by an overhead electrical service on the north side of the building via pole mounted transformer and weatherhead. The electrical service is 200 amp, 120/240 volt, single phase three wire electrical service via a 200 amp Square D NQOD panelboard which appears to be original to the building. This panelboard is located in the interior of the building along the north wall.

K. Multipurpose Room: The existing building is served by an overhead electrical service on the south side of the building via pole mounted transformer and weatherhead. The electrical service is 200 amp, 120/240 volt, single phase, three wire via a 200 amp Square D QO Load Center. The equipment appears to be from the original construction. The load center has existing space, but limited, for future electrical connections.

L. South Campus Building: The existing building is served by an overhead electrical service on the south side of the building via pole mounted transformer and weatherhead. The electrical service is 400 amp, 120/240 volt, single phase, three wire via two 200 amp Siemens S3 panelboards. The equipment appears to be from the original construction. The two panelboards have existing space for future electrical connections.



4.2 POWER DISTRIBUTION

A. Main School Building:

1. The existing main school building has electrical power distributed throughout at 120/208 volt. The facility has a mix of panel manufacturers and years of installation,

2. 1926 Elementary: This area of the building is served by 120/208 volt panels. The panels are Siemens ITE Load Centers that have been installed in the corridors within older existing panelboard enclosures. They appear in newer condition and have space capacity for future electrical connections. However, since they are recessed in corridor walls, being able to add additional loads will be dependant on gaining access to interior walls above panels. The elementary also has a newer Square D QC Load Center that was installed more recently in the basement area and has spare capacity for future electrical loads.

3. 1966 High School: This area of the building is served by 120/208 volt panels. The panels are a mixture of electrical panel manufacturers and years of installation. It is believed that the original panels were replaced around 2001 when the electrical service was revised, and new Cutler Hammer panelboards were installed. These panels are either full or have very limited spare capacity for any future electrical connections. There is also a Square D load center that has very limited space capacity for any future electrical connections.

4. 1980 Administration: This area of the building is served by 120/208 volt panels. The panels are a mixture of panel manufacturers and years of installation. The original panels, from 1980, are Gould ITE series 8 panelboards and have no existing space capacity for future electrical connections. This equipment is reaching end of life. A newer

Square D load center and Siemens panels have been added over time for additional air conditioning equipment and technology needs. These panels appear to be in newer condition and have space capacity for future electrical connections.

5. 1990 High School: This area of the building is served by 120/208 volt panels. The panels are a Siemens ITE Load Center, that was installed during the construction of the addition and a Siemens Load Center that was installed more recently. The older load center has no spare capacity, while the new load center does have space capacity, but due to load serves would need additional confirmation to determine if there is amperage capacity on the panel.

6. 1999 Music Addition: This area of the building is served by the load centers that were installed in the 1966 High School.

7. 1999 Distance Learning Addition: This area of the building is served by the load centers that were installed in the 1990 High School.

8. 2014 Commons: This area of the building is served by a 120/208 volt panel. The panel is a Siemens Load Center. This panel is in newer condition but does not have space capacity and is not installed to meet NEC code required working clearances.

B. Gymnasium: The existing building has a mixture of electrical panel manufacturers and years of installation. The manufacturers (and the areas of the building they are found in) include:

1. Square D (Original 1975 building, replaced in 1997 with lobby addition)

2. Siemens (2003 Locker room addition)

3. Cutler Hammer (2003 locker room addition)

C. 1995 Middle School Modular. The modular building has one electrical load center which serves the entire building and is manufactured by Westinghouse.

D. 2001 Middle School Modular: The modular building has only one electrical load center which serves the entire building and is manufactured by GE.

E. Ag Shop: The building has one main electrical panelboard which serves the entire building and then a sub-panel load center located within the shop area that serves the larger shop equipment. All equipment is manufactured by Square D.

F. Maintenance Shop: The building has one electrical load center which serves the entire building and is manufactured by Siemens.

G. Greenhouse: The building has only one electrical load center, located within a storage shed, which serves the structure. The load center is manufactured by Square D.

H. Football/Crow's Nest: The existing field and crow's nest is served by 120/208 volt panels. The panels are a mixture of panel manufacturers and potential years of installation. The base of each field lighting pole has another load center that serves the lights for the pole. The main service panel is manufactured by Siemens, the panels at the base of the field light poles and the load center within the crow's nest are manufactured by Square D.

I. Concessions Building: The building has one electrical load center, located within the concessions room. The load center is manufactured by Siemens.

J. Bus Barn: The building has one electrical load center, located along the north wall of the interior of the building.

K. Multipurpose Room: The building has one main electrical load center which serves the entire building and then a sub-panel load center located at the stage portion of the building which serves stage loads. Both load centers are manufactured by Square D.

L. South Campus Building: The building has two services, one for each 200 amp 120/240 volt panel where the service comes into a shared electrical gutter box. Both panelboards are manufactured by Siemens.

4.3 LIGHTING

A. Main School Building

1. The existing main school building lighting throughout is a mix of LED, fluorescent, incandescent lamps, and metal halide. Some of the buildings have had automatic lighting controls provided but many areas do not have automatic lighting controls and do not meet current energy code requirements for lighting controls.

2. 1926 Elementary: The existing lighting in the corridors is recessed lensed LED troffers. The corridors utilize the troffers for night lighting. The existing lighting in the classrooms is either recessed lensed LED troffers or recessed architectural volumetric LED troffers. Some of the classrooms have ceiling mounted occupancy sensors for automatic lighting controls. The gymnasium lighting consists of suspended high bay fluorescent lighting with surface conduit from what appears to be original lighting locations that were replaced by the high bays. The basement areas of the elementary school are lensed fluorescent wrap that are surface mounted and screw base incandescent lamp sockets. Storage, mechanical, and electrical rooms have fluorescent strip lighting. The exterior lighting appears to be metal halide. Other than the few classrooms, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control. Some of the lighting had fabric draped over the lighting to help soften the output of the lighting.

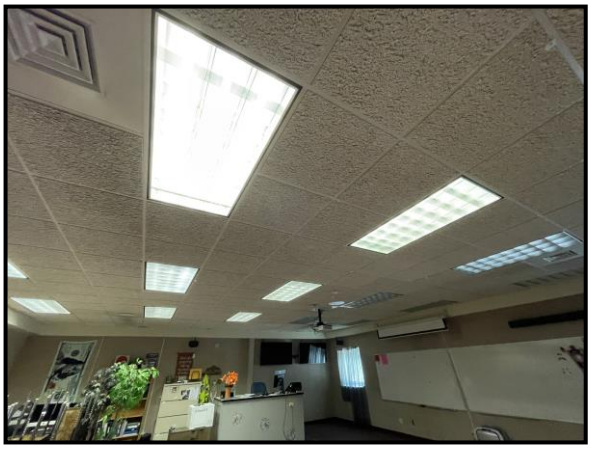
3. 1966 High School: The existing lighting in the corridors is lensed fluorescent wraps that are surface mounted. The restrooms have been remodeled and have recessed architectural volumetric LED troffers and ceiling mounted occupancy sensor. The existing lighting in the classrooms are architecturally lensed fluorescent wraps that are surface mounted. The classrooms have multizone manual switching and some have ceiling mounted occupancy sensors. The mechanical and electrical rooms have screw based incandescent lamp sockets. The exterior lighting appears to be metal halide. Other than the few classrooms and restrooms, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.

4. 1980 Administration: The existing lighting in the cafeteria is recessed lensed fluorescent troffers and lensed fluorescent wraps that are surface mounted. The kitchen has recessed sealed fluorescent troffers for the existing lighting. The existing lighting in the corridors, classrooms, restrooms, and tech work rooms are recessed lensed fluorescent troffers. The mechanical and electrical rooms have screw based incandescent lamp sockets. The exterior lighting appears to be metal halide. Other than the computer classroom, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.

5. 1990 High School: The existing lighting in the corridors and the classrooms are recessed lensed fluorescent troffers. Some of the classrooms have ceiling mounted occupancy sensors. The mechanical and electrical rooms have screw based incandescent lamp sockets. The exterior lighting appears to be metal halide. Other than the few classrooms, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.

6. 1999 Music Addition: The existing lighting in the corridors is recessed lensed fluorescent troffers. The music classroom existing lighting is comprised of suspended linear fluorescent lighting and does have ceiling mounted occupancy sensor. The existing lighting in the office consists of recessed parabolic fluorescent troffers. Other than the music classroom, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.

7. 1999 Distance Learning Addition: The existing lighting in the distance learning classroom and work room consists of recessed parabolic fluorescent troffers. The distance learning classroom has a ceiling mounted occupancy sensor. The existing lighting in the storage and restroom consists of recessed fluorescent troffers. Other than the distance learning classroom, no other areas appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.



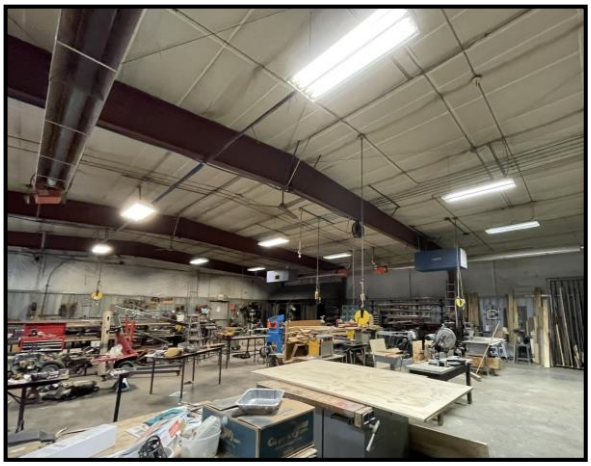
8. 2014 Commons: The existing lighting in the commons area is suspended linear LED lighting. The offices, work areas, and corridors are architectural volumetric LED troffers. The exterior lighting appears to be metal halide. These areas do not appear that the lighting controls within the area meet current energy code requirements for automatic lighting control.

B. Gymnasium: The existing lighting throughout the facility is comprised of a mix of fluorescent, incandescent lamps, and metal halide. The lobby, locker rooms, concessions, restrooms, corridors, wrestling room, gymnasium, janitor closet, and weightlifting room are fluorescent lighting. The storage, mechanical, and electrical rooms are screw base incandescent lamp sockets. The exterior wall packs appear to be metal halide and controlled via local photocell. It does not appear that the lighting controls within the facility meet current energy code requirements for automatic lighting control.

C. 1995 Middle School Modular: The existing lighting within the classroom area is a lensed fluorescent wrap that is surface mounted. The teacher's work room consists of fluorescent troffers and the restroom is compact fluorescent downlight. The exterior lighting is comprised of wall packs that appear to be metal halide and socket type jelly jar lights. The exterior lighting appears to be controlled via local photocell. It does not appear that the lighting controls within the building meet current energy code requirements for automatic lighting control.

D. 2001 Middle School Modular: The existing lighting within the classroom area and restroom is a lensed fluorescent wrap that is surface mounted. The exterior wall packs appear to be metal halide and controlled via local photocell. It does not appear that the lighting controls within the building meet current energy code requirement for automatic lighting control.

E. Ag Shop: The existing lighting throughout the building is fluorescent. The large shop area consists of suspended high bay fixtures. It does not appear that the lighting controls within the building meet current energy code requirements for automatic lighting control.



F. Maintenance Shop: The existing lighting throughout the building is linear fluorescent strip lights that are surface mounted. It appears that the lighting controls would comply with current energy code requirements due to the electrical load center being located within the room.

G. Greenhouse: The existing lighting within the structure consists of a couple lensed enclosed lamp sockets mounted to structure.

H. Football/Crow's Nest: The existing field lighting are floodlight type metal halide fixtures clustered at four poles, two poles are located on the north side and two poles on the south side of the field. The crow's nest has incandescent lamp type sockets. It does not appear that the lighting controls for the crow's nest meet current energy code requirements for automatic lighting control.

I. Concessions Building: The existing building lighting consists of linear fully enclosed/gasketed

fluorescent fixtures that are surface mounted.

J. Bus Barn: The existing building lighting consists of fluorescent high bays surface mounted to the roof structure. It does not appear that the lighting controls meet current energy code requirements for automatic lighting control.

K. Multipurpose Room: The existing lighting throughout the building is linear fluorescent strip lights that are surface mounted to gypsum ceiling or roof structure. It does not appear that the lighting controls meet current energy code requirements for automatic lighting control.

L. South Campus Building: The existing lighting throughout the building appears to have been recently upgraded to LED. The main meeting room, facility storage and mechanical rooms have LED flat panels, and the restrooms have LED downlights. The exterior wall packs appear to be upgraded to LED and are controlled via local photocell.

4.4 EMERGENCY LIGHTING

A. Main School Building: Throughout all areas the emergency lighting is made up of a mixture of emergency battery backup ballasts/drivers and standalone wall and ceiling mounted emergency battery lighting units. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle. No exterior emergency lighting was found to provide the code required exterior egress lighting.

B. Gymnasium: The emergency lighting throughout the facility is comprised of selected lighting fixtures with emergency battery backup ballasts. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

C. 1995 Middle School Modular: The emergency lighting throughout the modular building is comprised of selected fixtures with emergency battery backup ballasts. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

D. 2001 Middle School Modular: The emergency lighting throughout the modular building is comprised of standalone wall mounted emergency battery lighting units. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

E. Ag Shop: The emergency lighting throughout the building is comprised of standalone wall mounted emergency battery lighting units. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

F. Maintenance Shop: It appears that the building does not have any emergency lighting.

G. Greenhouse: It appears that the structure does not have any emergency lighting.

H. Football/Crow's Nest: It appears that the field or the crow's nest does not have any emergency lighting.

I. Concessions Building: It appears that the building does not have any emergency lighting.

J. Bus Barn: The emergency lighting throughout the building is comprised of standalone wall

mounted emergency battery lighting units. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

K. Multipurpose Room: It appears that the building does not have any emergency lighting.

L. South Campus Building: The emergency lighting throughout the facility is comprised of selected lighting fixtures with emergency battery backup. No issues with coverage were reported by maintenance staff during site walkthrough. It is assumed that the existing emergency lighting meets the code required minimum 1 footcandle.

4.5 FIRE ALARM

A. Main School Building: The existing main school building has a range of existing fire alarm system equipment. Complete coverage for code minimum requirements for detection and notification was not done in detail. Without reviewing the system in an activated state, it was not able to determine how the different areas of the building interact or are connected together or if they operate separately. The existing fire alarm system consists of combination horn/strobes, horns, strobes, and bell notification devices, smoke detectors, and manual pull stations throughout the facility. Facility staff did not indicate any issues with the devices during the site walkthrough. Current codes would require a facility with an education occupancy to have a voice notification fire alarm system in lieu of a horn notification fire alarm system.

1. 1926 Elementary: This area of the building has a newer Notifier by Honeywell NFW2-100 fire alarm system panel. This area of the building still has what appears to be an original Notifier fire alarm panel. If the panel is inactive, it should be removed.

2. 1966 High School: This area of the building has a Fire Lite Alarms Miniscan 4024 fire alarm control panel. This area of the building still has what appears to be an original Notifier fire alarm panel. If the panel is inactive, it should be removed.

3. 1980 Administration: This area of the building has a Fire Lite Alarms Miniscan 4012 fire alarm control panel and a Honeywell fire alarm box. This area of the building has a fire sprinkler system that is connected to the fire alarm system.

4. 1990 High School Addition: The fire alarm devices for this area of the school were shown to be served by the fire alarm panel in the 1966 High School.

5. 1999 Music Addition: The fire alarm devices for this area of the school were shown to be served by the fire alarm panel in the 1966 High School.

6. 1999 Distance Learning Addition: The fire alarm devices for this area of the school were shown to be served by the fire alarm panel in the 1966 High School.

7. 2014 Commons: The fire alarm devices for this area of the school were shown to be served by the fire alarm panels in the 1980 Administration. This area of the building has a fire sprinkler system that is connected to the fire alarm system.

B. Gymnasium: The existing facility is served by a Silent Knight conventional zoned system. The zones include gym north, sprinkler, and lobby pull stations. The Fire Alarm Control Panel (FACP) is located within the lobby. The date of installation of the FACP is unknown, but it appears to be functioning normally with no fault or trouble alarms present. There appears to be no exterior weatherproof horn/strobe above the Fire Department Connection (FDC).

C. 1995 Middle School Modular: The existing modular building is served by the main school building. The fire alarm horn strobe and pull stations appear to be original to the construction. Facility staff did not indicate any issues with the devices during the site walkthrough.

D. 2001 Middle School Modular: The existing modular building is served by the main school building. The fire alarm horn strobe and pull stations appear to be original to the construction. Facility staff did not indicate any issues with the devices during the site walkthrough.

E. Ag Shop: The existing building is served by a conventional zoned system. The date of installation of the FACP is unknown, but it appears to be functioning normally with no fault or trouble alarms present.

F. Maintenance Shop: The structure does not have a fire alarm system.

G. Greenhouse: The structure does not have a fire alarm system.

H. Football/Crow's Nest: The crow's nest does not have a fire alarm system.

I. Concessions Building: The structure does not have a fire alarm system.

J. Bus Barn: The structure does not have a fire alarm system.

K. Multipurpose Room: The structure does not have a fire alarm system.

L. South Campus Building: The existing facility is served by a Notifier addressable system. The FACP is located in the back storage room near the panelboards. There is a Fire Alarm Annunciator Panel (FAAP) adjacent to the main building entry. The fire alarm system is not original to the building, but the date of installation is unknown.

4.6 SECURITY

A. Main School Building: The existing facility utilizes DMP security with alarm keypads at several locations including the 1926 Elementary main entry area and the 1980 Administration old main entrance. The main head end equipment for security is located in the 1980 Administration tech work room. This equipment includes DMP, Brivo, and Altronix equipment and has monitoring equipment to monitor the security cameras. Security cameras are located to provide coverage of the exterior of the building, some main entry and lobbies, and gym. Card access-controlled doors include accessible exterior entrances.

B. Gymnasium: The existing facility has card reader access at accessible exterior entrances. There is an exterior corner mounted camera and an interior mounted camera within the gymnasium. The headend equipment for these systems is located within the stage storage room. Brivo is used for the security system.

C. 1995 Middle School Modular: The existing facility does not have any security or camera system.

D. 2001 Middle School Modular: The existing facility does not have any security or camera system.

E. Ag Shop: The existing facility does not have any security or camera system.

F. Maintenance Shop: The existing facility does not have any security or camera system.

G. Greenhouse: The existing structure does not have any security or camera system.

H. Football/Crow's Nest: The crow's nest has an exterior mounted camera on the west and east side of the building. The headend equipment connection for the security system is located adjacent to the load center within a storage room and it appears that this system is connected back to the main school building system.

I. Concessions Building: The existing facility does not have any security or camera system.

J. Bus Barn: The existing facility has an exterior mounted camera along the east side of the building. It appears that the system is connected back to the main school building system.

K. Multipurpose Room: The existing facility has a wireless Ring combination camera and flood light above the main building entrance. No other security or camera system appears to be present for the building.

L. South Campus Building: The existing facility has a card reader system at the main entrance. There are multiple exterior mounted cameras that cover the front parking lot, the front canopy/walkway, and the overhead rolling door. Brivo is used for the security system and appears to be connected back to the main school building system.

4.7 INTERCOM PAGING/BELLS/CLOCKS

A. Main School Building: The main intercom paging microphone control station is located in the administrative offices that were added in the 2014 Commons addition. The system is a Bogen system. The speakers throughout the building vary in style. Some areas, in particular newer construction, have ceiling mounted paging speakers. This

is found in some corridors, classrooms, and restrooms. Other older areas of the building have wall mounted speakers in combination with clocks. Some areas, like the elementary school, still have bells in the corridors. Classrooms with speakers do have wall intercom call stations. The elementary school has a Viking CTG-2A networked clock-controlled tone equipment.

B. Gymnasium: Existing facility has a paging speaker system that connects back to the main school building headend system.

C. 1995 Middle School Modular: Existing modular building has a paging speaker system with local call switch within classroom. The existing system is Bogen and connects back to the main school building headend system.

D. 2001 Middle School Modular: Existing modular building has a paging speaker system with local call switch within classroom. The existing system is Bogen.

E. Ag Shop: The existing facility does not have any paging speaker or bell systems.

F. Maintenance Shop: The existing facility does not have any paging speaker or bell systems. The facility has an antennae system with headened equipment located along the interior north wall, which then has a pole mounted antennae located northeast of the building.

G. Greenhouse: The existing structure does not have any paging speaker or bell systems.

H. Football/Crow's Nest: The field has a broadcasting speaker system where speakers are mounted on the crow's nest building and on the field lighting poles. Headend equipment is located within the crow's nest announcement room. The facility staff did not indicate any issues with this system during site walkthrough.

I. Concessions Building: The existing structure does not have any paging speaker or bell systems.

J. Bus Barn: The existing structure does not have any paging speaker or bell systems.

K. Multipurpose Room: The existing building has a sound system for the stage, the headend equipment is located within the storage room. The manufacturer of the system is Bogen.

L. South Campus Building: The existing facility has a classroom sound system that is also interconnected to the main school building paging system.

4.8 TELECOMMUNICATION

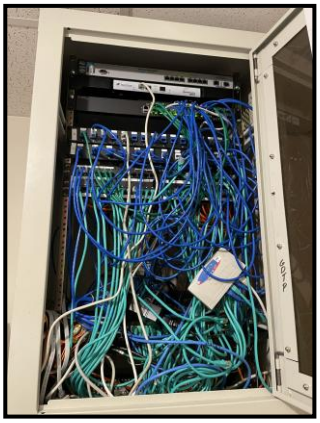
A. Main School Building:

1. The main school building's classrooms communication equipment includes both ceiling mounted projectors and short throw wall mounted projectors. Classrooms with ceiling mounted projectors primarily have manual pull down projector screens. The majority of classrooms also have a wireless access point (WAP) located in each room. Common spaces, such as cafeteria, commons, lobbies, and workout spaces have television monitors. A lot of the spaces have utilized surface mounted raceway for adding both telecommunication cabling and power throughout the building.

2. 1926 Elementary: This area of the building has a wall mounted enclosed data rack and telephone terminal blocks located on the second floor office area to serve the rooms. The

building has an exterior telephone box to serve the building, that due to the 2014 Commons addition, is now in the main lobby of the commons area.

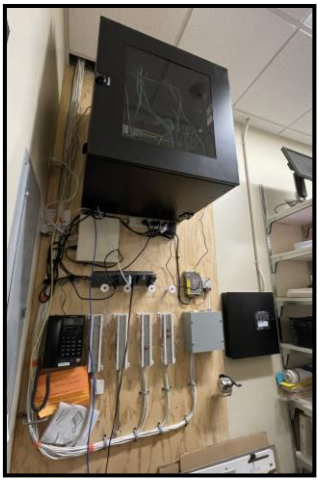
3. 1966 High School: This area of the building has exterior telecommunication pedestals and boxes by the main electrical service to bring in telecommunication services to the building. This area of the building has telephone terminal blocks and telecommunication equipment in the main mechanical/electrical room.



4. 1980 Administration: This area of the building has exterior telecommunication pedestals and boxes by the main electrical service to bring in telecommunication services to the building. The tech work room in this area of the building contains the main IT servers in an enclosed data rack. There is also a wall mounted enclosed data rack located off the nurse area to serve this area.

5. 1990 High School Addition: This area of the building is served by the 1966 High Schol area.

6. 1999 Music Addition: This area of the building is served by the 1966 High Schol area.



7. 1999 Distance Learning Addition: This area of the building is served by a dedicated wall mounted enclosed data rack for the distance learning equipment. The distance learning equipment includes projectors, television monitors, cameras, speakers, microphones, and computer equipment.

8. 2014 Commons: This area of the building has a wall mounted enclosed data rack and telephone terminal blocks located in storage room off the main office.

B. Gymnasium: The building has an enclosed telecommunication cabinet in the storage room near the stage area to bring in telecommunication services to the building.

C. 1995 Middle School Modular: The existing modular building has an enclosed telecommunication cabinet in the teacher's work room which is believed to be served by the nearest telecommunication room of the main school building.

D. 2001 Middle School Modular: The existing modular building has an enclosed telecommunication cabinet in the teacher's work room which is believed to be served by the nearest telecommunication room of the main school building.

E. Ag Shop: The existing facility does not have a telecommunication system.

F. Maintenance Shop: The existing facility does not have a telecommunication system.

G. Greenhouse: The existing facility does not have a telecommunication system.

H. Football/Crow's Nest: The existing crow's nest building has a fiber entrance within the storage room, adjacent to the load center. A small patch panel is mounted above the fiber entrance that serves as the telecommunication system for the building. The fiber entrance also has a connection to the concessions stand.

I. Concessions Building: The existing building has a fiber entrance within the plumbing chase/storage room of the building to serve the telecommunication system for the building. The fiber entrance also has a connection to the crow's nest.

J. Bus Barn: The existing facility does not have a telecommunication system.

K. Multipurpose Room: The existing building has wall mounted telecommunication equipment in the storage room, adjacent to the electrical load center, which brings in telecommunication services to the building.

L. South Campus Building: The telecommunication demarcation and patch panel are located in the storage room, adjacent to the electrical panelboards, which serve the building.

PART 5 - PLUMBING SYSTEMS

5.1 SERVICES

A. Main School Building:

1. Domestic Water:

a. A 1-1/2” domestic water service with a meter and backflow preventer is located in the 1980 Admin mechanical room and serves the entire main school building, except for the 1926 Elementary portion. The capacity and pressure of the service appear to be adequate for the existing facility.

b. A 2” domestic water service with a meter and backflow preventer is located in the 1926 Elementary basement mechanical room. The capacity and pressure of the service appear to be adequate for the existing facility.

c. Any substantial expansion would require investigation into an additional service and analysis of the available water pressure.

2. Sanitary Sewer: The facility has multiple sanitary sewer services with minimal documentation regarding routing and depth. Maintenance personnel reported significant concerns with the location, condition, and depth of the sanitary sewer piping.

3. Natural Gas:

a. A natural gas service with a meter and pressure regulators is located on the east side of the 1926 Elementary Building and serves the entire main campus. The capacity and pressure of the service appears to be adequate for the existing facility.

b. Downstream of the meter, the piping is routed underground to the various buildings requiring natural gas service on the campus, including the following:

(1) 1966 High School

(2) 1980 Administration

(3) Gymnasium

(4) 2001 Middle School Modular

(5) Ag Shop

(6) Maintenance Shop

(7) Greenhouse

B. Gymnasium:

1. Domestic Water: A 1-1/2" domestic water service provides water for the entire facility. The capacity and pressure of the service appear to be adequate for the existing facility.

2. Sanitary Sewer: Similar to the Main School Building, the Gym has multiple sanitary sewer services with minimal documentation regarding routing and depth. Maintenance personnel reported significant concerns with the location, condition, and depth of the sanitary sewer piping.

3. Natural Gas: The building is served by the gas service located at the 1926 Elementary Building.

C. 1995 Middle School Modular:

1. Domestic Water: The building is served by the water service located at the 2001 Modular Building.

2. Sanitary Sewer: The sanitary sewer leaves the building to the south and then heads east and is routed below the 2014 Commons Building.

3. Natural Gas: There is not a natural gas service to this building.

D. 2001 Middle School Modular:

1. Domestic Water: A domestic water service is located on the west side of the facility with a meter installed in a pit and serves the 2001 Middle School Modular, 1995 Middle School Modular, and the Greenhouse.

2. Sanitary Sewer: The sanitary sewer leaves the building to the south and then heads east and is routed below the 2014 Commons Building.

3. Natural Gas: The building is served by the gas service located at the 1926 Elementary Building.

E. Ag Shop:

1. Domestic Water: A domestic water service with a meter is in the mechanical room. A backflow preventer is not present.

2. Sanitary Sewer: The sanitary sewer leaves the building to the east.

3. Natural Gas: The building is served by the gas service located at the 1926 Elementary Building.

F. Maintenance Shop:

1. Domestic Water: There is not a domestic water service to this building.

2. Sanitary Sewer: There is not a sanitary sewer service to this building.

3. Natural Gas: The building is served by the gas service located at the 1926 Elementary Building.

G. Greenhouse:

1. Domestic Water: The building is served by the water service located at the 2001 Modular Building.

2. Sanitary Sewer: The drains in the Greenhouse are discharged into a drainage ditch north of the building.

3. Natural Gas: The building is served by the gas service located at the 1926 Elementary Building.

H. Football/Crow's Nest: There are no plumbing services for this building.

I. Concessions Building:

1. Domestic Water: A 3/4" domestic water service enters the mechanical chase between the restrooms at this facility and is served by a meter and backflow preventer south of the building.

2. Sanitary Sewer: A 1,500 gallon sanitary sewer holding tank northwest of the facility accommodates drainage from this building. The tank must be manually pumped out when required.

3. Natural Gas: There is not a natural gas service to this building.

J. Bus Barn: There are no plumbing services for this building.

K. Multipurpose Room:

1. Domestic Water: A domestic water service is located in the northwest corner of the building with a meter and backflow preventer.

2. Sanitary Sewer: The sanitary sewer service exits the north side of the building.

3. Natural Gas: A natural gas meter and regulator are located on the south side of the building. The capacity and pressure of the service appear to be adequate for the existing facility.

L. South Campus Building

1. Domestic Water: A 3/4" domestic water service with a meter and backflow preventer is located in the

mechanical room. The capacity and pressure of the service appear to be adequate for the existing facility.

2. Sanitary Sewer: A 4" sanitary sewer service exits the south side of the building to the alley.

3. Natural Gas: A natural gas meter and regulator are located on the south side of the building. The capacity and pressure of the service appear to be adequate for the existing facility.

5.2 TREATMENT SYSTEMS

A. Main School Building:

1. A simplex Culligan water softener treats the cold water inlet to the water heater in the 1966 High School mechanical room. The softener appears to be in acceptable condition.

2. A simplex Culligan water softener treats the cold water inlet to the water heater in the 1980 Admin mechanical room. The softener appears to be in acceptable condition.

B. Gymnasium: A simplex Culligan water softener treats the cold water inlet to the water heaters. The softener appears to be in acceptable condition.

C. 1995 Middle School Modular: There are no water treatment systems at this building.

D. 2001 Middle School Modular: There are no water treatment systems at this building.

E. Ag Shop: There are no water treatment systems at this building.

F. Greenhouse: There are no water treatment systems at this building.

G. Concessions Building: There are no water treatment systems at this building.

H. Multipurpose Room: There are no water treatment systems at this building.

I. South Campus Building: There are no water treatment systems at this building.

5.3 HOT WATER GENERATION

A. Main School Building: The building is served by multiple water heaters of varying type and age throughout the facility, as listed below:

1. 1926 Elementary: Natural gas fired, tank style, installed 2021.

2. 1966 High School: Natural gas fired, tank style, installed 2022.

3. 1980 Admin:

    a. Kitchen: Electric, tank style, installed 2015.

    b. Mechanical Room: Natural gas fired, tank style, installed 2004.

4. 1990 High School: Electric, tank style, installed 1990.

5. 1999 Distance Learning: Electric, tank style, installed 2023.

B. Gymnasium: The building is served by two natural gas fired, tank style water heaters that were installed in 2019.

C. 1995 Middle School Modular: The building is served by an electric, tank style water heater that was installed in 2018.

D. 2001 Middle School Modular: The building is served by an electric, tank style water heater that was installed in 2006.

E. Ag Shop: The building is served by a natural gas fired, tank style water heater that was installed in 1990.

F. Concessions Building: The building is served by an electric, tank style water heater that was installed in 2016.

G. Multipurpose Room: A gas fired water heater serving the kitchen and restrooms is located in the northwest corner of the facility.

H. South Campus Building: The building is served by an electric, tank style water heater located in the mechanical room and was installed in 2020.

5.4 DISTRIBUTION

A. In general, the water piping in the facility did not appear to be a significant item of concern. However, there are areas that appear to have minor leaks and corrosion, and any galvanized water piping should be replaced with copper. Waste and vent piping were generally in acceptable condition but instances of poor to marginal conditions exist, especially in the older portions of the facility.

B. Although not specifically reported by maintenance staff, based on the age of the facility, it is expected that many piping branches either do not have any means of isolation or the isolation valves leak which prevent area shutdowns.

C. Damaged or missing piping insulation was identified during the assessment and was more prevalent in mechanical rooms. It is recommended that all damaged or missing pipe insulation is replaced.

5.5 FIXTURES

A. Plumbing fixtures throughout the facilities that have not been replaced in recent years are

generally in marginal to poor condition, do not meet current ADA standards, and are high consumption units. This statement generally applies to areas of the facility that have not been renovated or constructed in the last 20 years. However, in many of the public restrooms, the fixtures have been replaced during remodels and meet current ADA standards.

B. For any fixtures that may be in acceptable condition but are over 20 years old, it is recommended to replace accessories such as isolation valves, flexible piping, flush valves, trap insulation, etc.

PART 6 - FIRE PROTECTION SYSTEMS

6.1 SERVICES

A. A 4” fire protection water service is located in the 1980 Administration portion of the Main School Building. The service, backflow preventer, and appurtenances appear to be in acceptable condition.

B. A fire protection water service is located in the 2003 Locker Room portion of the Gymnasium building. Access to the fire riser room was not possible due to a broken door lock.

6.2 DISTRIBUTION

A. The Main School Building is equipped with a dry pipe automatic fire sprinkler system that appears to be designed in accordance with NFPA 13 but only serves a limited portion of the facility (1980 Administration and 2014 Commons). All other areas of the building are unprotected.

B. The Gymnasium is equipped with an automatic fire sprinkler system that appears to be designed in accordance with NFPA 13 and provides protection for the entire facility.

C. None of the other buildings were equipped with a fire protection system.

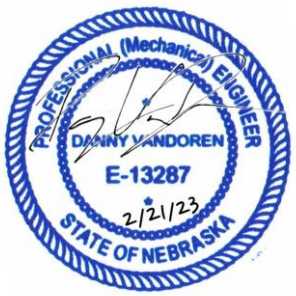
PART 7 - ENERGY AUDIT

7.1 AUDIT SCOPE AND METHODOLOGY

A. The scope of the energy audit consisted approximately of an ASHRAE Level 2 energy audit. The effort involved an analysis of the existing building construction and a non-destructive visual site investigation of the major building systems. Energy conservation measures (ECM) have been proposed to potentially reduce the current energy consumption of the building. An energy audit analysis has been prepared detailing each ECM.

7.2 ENERGY AUDITOR EXPERIENCE

A. The energy audit and associated calculations and report were performed by Danny VanDoren with Farris Engineering. Danny VanDoren is a registered mechanical engineer in the State of Nebraska and has performed over 25 similar energy audits over the last 10 years.



7.3 ENERGY AUDIT SUMMARY

A. Farris was able to determine that there are several ECMs that could be enacted to reduce the energy usage/costs. Farris has analyzed three major ECMs that could achieve a potential total annual energy savings of 165,237 kWh and 3.966 therms, at an annual cost savings of $25,258. Some of these ECMs may have overlapping effects, so the total savings of enacting all ECMs would likely not be as high as the sum of their individual savings.

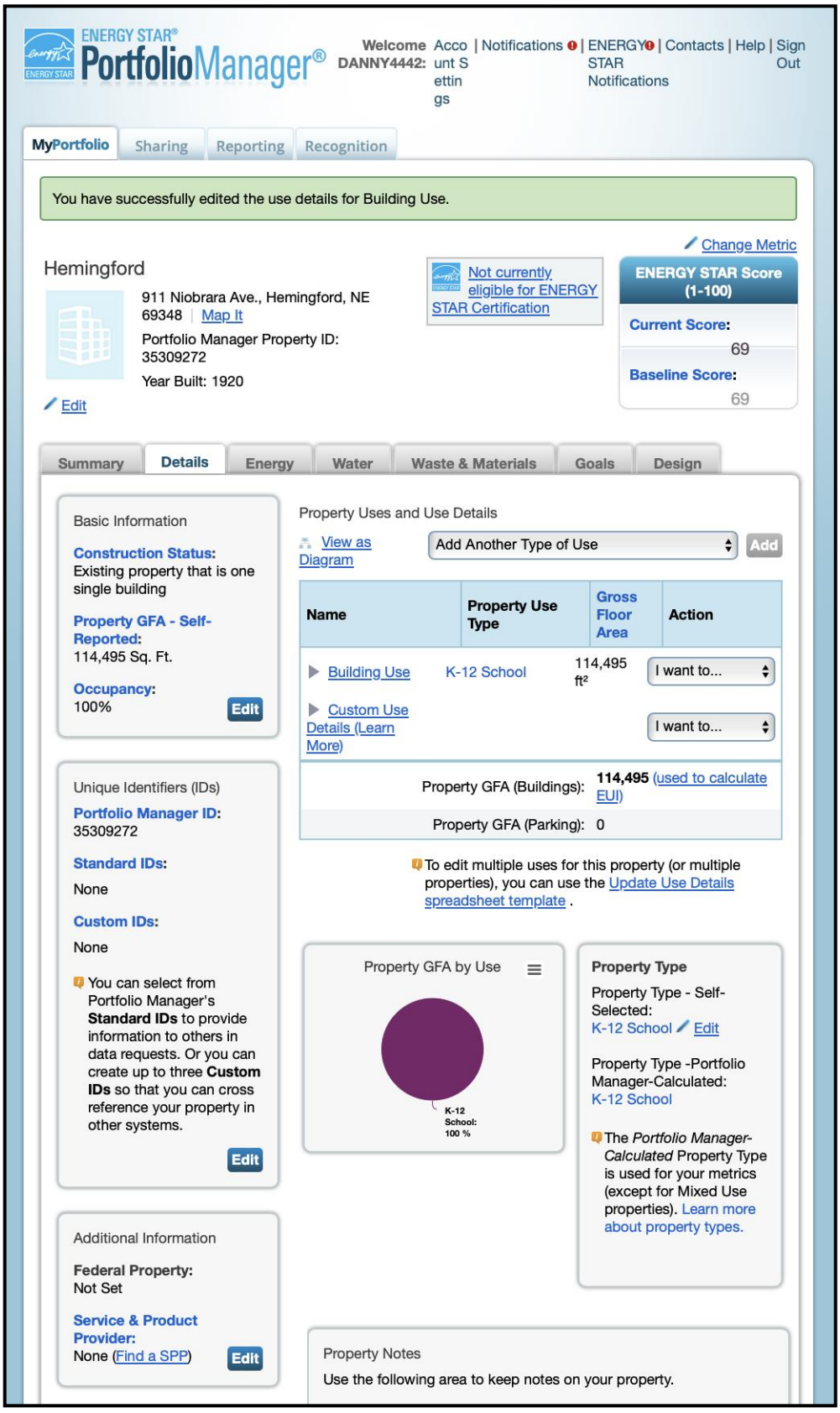
7.4 ECM SUMMARY TABLE

A. Section 8.7 of this report will go into further detail on each of these ECMs.

Energy Conservation Measures		Utility Rate Info			Estimated Annual Savings					Payback		
		Electric:	$0.127	/kWh	Energy Savings (kWh)	Gas Savings (therms)	Electric Costs Savings	Gas Cost Savings	Total Savings	First Costs	Simple Payback (years)	SIR
		Demand:	$0.000	/kW								
		Gas:	$1.08	/therm								
		Utility Taxes:	0.00%									
ECM-1	Vacancy Sensors				28,054	-	$3,563	$0	$3,563	$5,850	1.6	9.1
ECM-2	Conversion to LED Lighting				77,521	-	$9,845	$0	$9,845	$92,918	9.4	1.6
ECM-3	Building Automation System				59,662	3,966	$7,577	$4,273	$11,850	$143,119	12.1	1.2

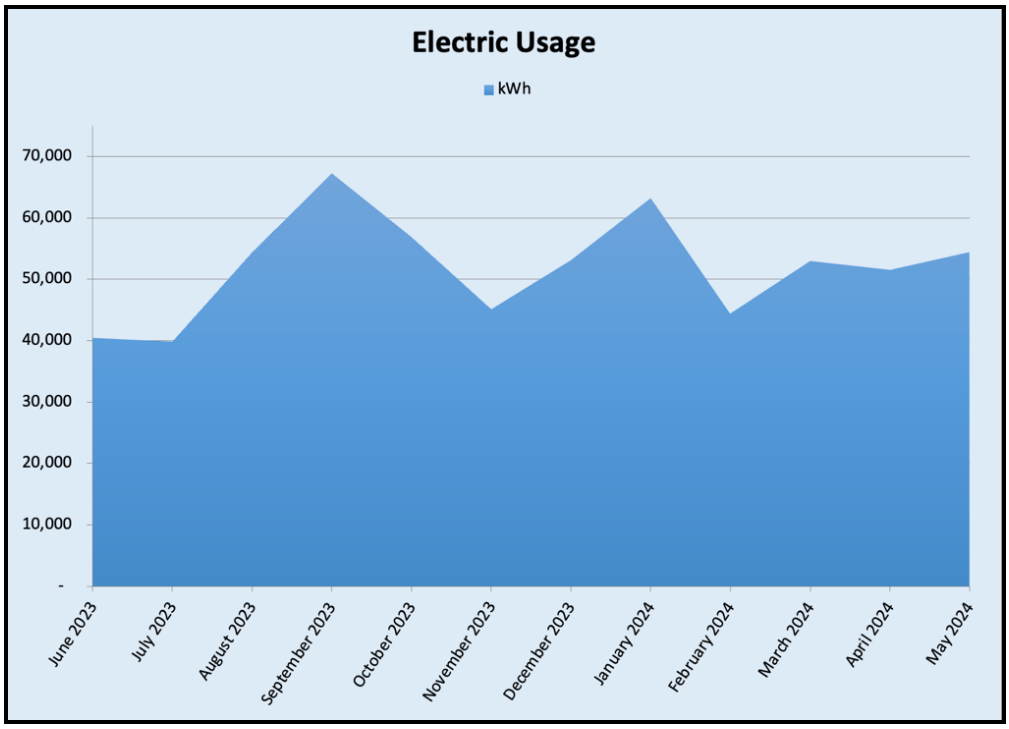
7.5 SUMMARY OF BENCHMARKING RESULTS

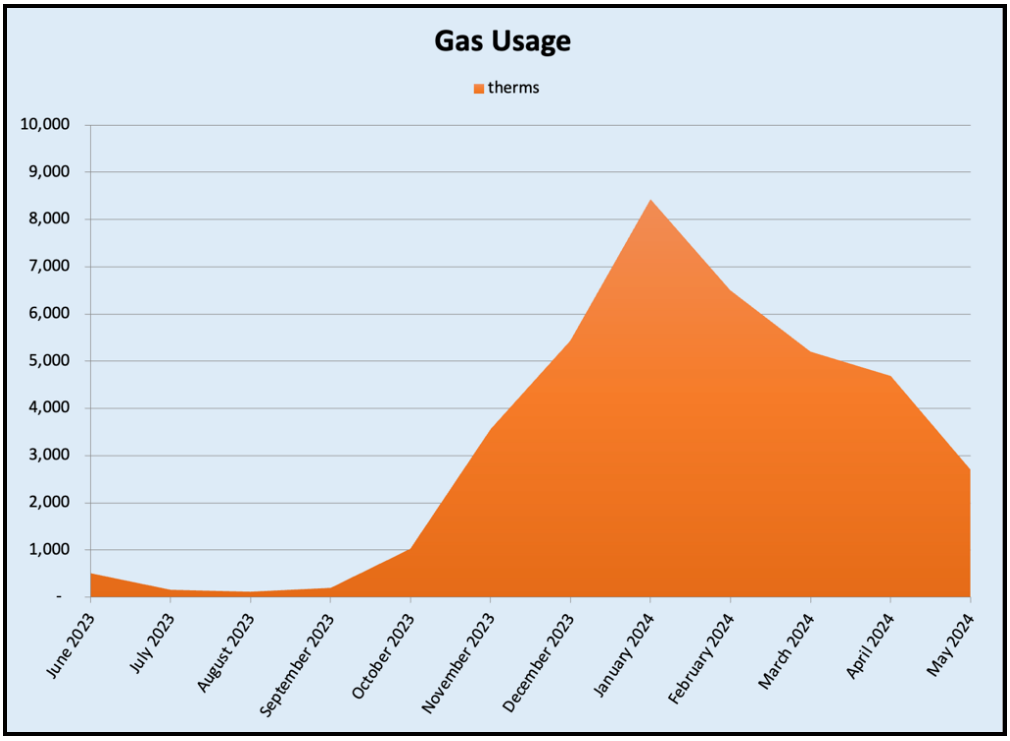
A. Typically, for energy audits, it is helpful to compare the building in question to other buildings of similar size and occupancy to gauge the efficiency of the building. Farris Engineering performed an analysis using ENERGY STAR's Target Finder program and determined that this building is in the 69th percentile of buildings of similar sizes and occupancy. Below is the output from the Target Finder website.


ENERGY STAR® PortfolioManager®
Welcome DANNY4442:
Account Settings | Notifications | ENERGY STAR Notifications | Contacts | Help | Sign Out
MyPortfolio
Sharing
Reporting
Recognition
You have successfully edited the use details for Building Use.
Change Metric
Hemingford
911 Niobrara Ave., Hemingford, NE 69348 | Map It
Portfolio Manager Property ID: 35309272
Year Built: 1920
Edit
Not currently eligible for ENERGY STAR Certification
ENERGY STAR Score (1-100)
Current Score: 69
Baseline Score: 69
Summary
Details
Energy
Water
Waste & Materials
Goals
Design
Basic Information
Construction Status: Existing property that is one single building
Property GFA - Self-Reported: 114,495 Sq. Ft.
Occupancy: 100%
Edit
Unique Identifiers (IDs)
Portfolio Manager ID: 35309272
Standard IDs: None
Custom IDs: None
You can select from Portfolio Manager's Standard IDs to provide information to others in data requests. Or you can create up to three Custom IDs so that you can cross reference your property in other systems.
Edit
Additional Information
Federal Property: Not Set
Service & Product Provider: None (Find a SPP)
Edit
Property Uses and Use Details
View as Diagram
Add Another Type of Use
Add
Name
Property Use Type
Gross Floor Area
Action
Building Use
K-12 School
114,495 ft²
I want to...
Custom Use Details (Learn More)
I want to...
Property GFA (Buildings): 114,495 (used to calculate EUI)
Property GFA (Parking): 0
To edit multiple uses for this property (or multiple properties), you can use the Update Use Details spreadsheet template .
Property GFA by Use
K-12 School: 100 %
Property Type
Property Type - Self-Selected: K-12 School Edit
Property Type -Portfolio Manager-Calculated: K-12 School
The Portfolio Manager-Calculated Property Type is used for your metrics (except for Mixed Use properties). Learn more about property types.
Property Notes
Use the following area to keep notes on your property.

7.6 HISTORICAL ENERGY CONSUMPTION AND COSTS

A. See below for charts that show the electric and gas usage from June 2023 to May 2024.





7.7 ENERGY CONSERVATION MEASURES

A. ECM-1: Vacancy Sensors

1. Most of the spaces in this facility currently use standard light switches. During energy audits, it is common to find many spaces that have lights on even though no one is in the room. These existing light switches could relatively easily be changed out with vacancy sensors. Similar to occupancy sensors, vacancy sensors require the person to actively turn the lights on when entering the room, and then automatically turn them off after a time-delay once the person leaves the room. This enables the occupant to more easily leave the lights off if the ambient lighting in the space is high enough. It is estimated that vacancy sensors can save around 30% of the building's lighting energy usage. The cost to replace the existing light switches with vacancy sensors is estimated to be around $5,850 with an estimated annual energy savings of $3,563.

ECM-1	Estimated Annual Savings				Payback Info		
	Energy Savings (kWh)	Demand Savings (kW)	Gas Savings (therms)	Annual Cost Savings	First Costs	Simple Payback (years)	SIR
Vacancy Sensors	28,054	-	-	$3,563	$5,850	1.6	9.1

* First costs for ECM-1 are estimated costs and include an estimate of material and labor costs.

B. ECM-2: Conversion to LED Lighting

1. A portion of these buildings have already undergone LED lighting retrofits. The remaining lighting in these buildings is mostly made up of fluorescent fixtures. There could be significant energy savings if the remaining light fixtures were converted to LED. While there would be a significant first cost associated with this effort, it is estimated that there could be annual savings of approximately $9,485.

ECM-2	Estimated Annual Savings				Payback Info		
	Energy Savings (kWh)	Demand Savings (kW)	Gas Savings (therms)	Annual Cost Savings	First Costs	Simple Payback (years)	SIR
Conversion to LED Lighting	77,521	37.2	-	$9,845	$92,918	9.4	1.6

* First costs for ECM-2 are estimated costs and include an estimate of material and labor costs.

C. ECM-3: Building Automation System

1. These buildings currently do not have a building automation system (BAS). These systems are often provided on buildings of this nature in order to control the mechanical systems, allowing greater control of the systems, providing historical data, and helping to troubleshoot any issues that may arise. Many times, inefficiencies in the building are hard to find, unless the information provided by a BAS is available. While these systems are expensive, they can offer quite a bit of energy savings. The payback on a BAS is over 10 years, but other factors such as the complexity of the mechanical systems and the benefit of maintenance troubleshooting should also be considered when making a decision on whether to utilize a BAS at a building. While the first cost of a BAS is estimated to be around $143,119, it would be beneficial to get an actual quote from a temperature controls vendor. The estimated annual energy savings would be $11,850.

ECM-3	Estimated Annual Savings				Payback Info		
	Energy Savings (kWh)	Demand Savings (kW)	Gas Savings (therms)	Annual Cost Savings	First Costs	Simple Payback (years)	SIR
Building Automation System	59,662	-	3,966	$11,850	$143,119	12.1	1.2

* First costs for ECM-3 are estimated costs and include an estimate of material and labor costs.

7.8 MISCELLANEOUS AND MINOR ITEMS

A. The following items are energy conservation measures that would not have a quick enough payback to likely warrant consideration for energy-saving purposes alone but should be taken into consideration when master planning or replacing equipment at the end of their useful lifespan.

1. MS Modular

   a. This building is served by a split system. It appears that the condensing unit is a low-efficiency unit, likely around 13 SEER and the furnace is around 80% efficient. When they reach the end of their useful life, it is recommended that they be replaced with a high efficiency condensing unit with a 20+ SEER rating and a condensing furnace with 95%+ efficiency.

2. High School

   a. A portion of this building is served by a gas-fired domestic water heater. This water heater has an efficiency of around 80%. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing water heater with 95%+ efficiency.

   b. The 1990 addition is served by two split systems. The condensing units have efficiencies around 14 SEER and the furnaces are around 80% efficient. When they reach the end of their useful life, it is recommended that they be replaced with high efficiency condensing units with a 20+ SEER rating and condensing furnaces with 95%+ efficiency.

   c. It appears that there are two ducted openings through the roof in the kiln room. While there is a damper on one of the ducts, it appears to be open even though the kiln was not in use. It is recommended that these ducts be provided with dampers that will close when the kiln is not in use, to prevent hot/cold air from entering the building.

   d. The high school building has approximately nine rooftop units that serve a majority of the building. The units have efficiencies around 11 EER. When they reach the end of their useful lives, it is recommended that they be replaced with high efficiency rooftop units with a 15+ EER rating.

3. Admin

   a. This building is served by two split systems. The condensing units have efficiencies around 15 SEER and the furnaces are around 80% efficient. When they reach the end of their useful life, it is recommended that they be replaced with high efficiency condensing units with a 20+ SEER rating and condensing furnaces with 95%+ efficiency.

b. A portion of this building is served by a gas-fired domestic water heater. This water heater has an efficiency of around 80%. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing water heater with 95%+ efficiency.

c. The building's hot water system does not utilize a recirculation system. While adding this system at this point would likely have a long payback, consideration should be given to providing these recirculation systems on future projects to minimize the amount of water that is wasted while waiting for hot water.

4. Elementary

a. A portion of this building is served by a gas-fired domestic hot water heater. This water heater has an efficiency of around 80%. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing water heater with 95%+ efficiency.

b. The building's hot water system does not utilize a recirculation system. While adding this system at this point would likely have a long payback, consideration should be given to providing these recirculation systems on future projects to minimize the amount of water that is wasted while waiting for hot water.

c. This building utilizes an air-cooled chiller for cooling. While the chiller is relatively efficient, the chiller relies on a constant speed pump to distribute the water throughout the building. It is recommended that, as the equipment is replaced, consideration be given to converting this system from a constant flow system to a variable flow system.

d. This building utilizes hot water boilers for heating. The boilers are 77.4% efficient and the hot water pumps are constant speed. It is recommended that, as equipment is replaced, the boilers be replaced with condensing boilers with 95%+ efficiency and consideration be given to converting this system from a constant flow system to a variable flow system.

5. Gym

a. The gym utilizes gas-fired unit heaters. The heaters appear to be around 80% efficient. When they reach the end of their useful life, it is recommended that they be replaced with high efficiency condensing unit heaters with 95%+ efficiency.

b. This building is served by two gas-fired domestic water heaters. These water heaters have an efficiency of around 80%. When they reach the end of their useful lives, it is recommended that they be replaced with high efficiency condensing water heaters with 95%+ efficiency. While this system does have a recirculation pump, it does not appear as though it is being controlled via a time clock or aquastat. It is recommended that one (or both) of these control options be utilized.

c. The lobby utilizes a gas-fired furnace. The furnace appears to be around 80% efficient. When it reaches the end of its useful life, it is recommended

that it be replaced with a high efficiency condensing furnace with 95%+ efficiency.

6. Ag Shop

    a. This building utilizes a gas-fired furnace. The furnace appears to be around 80% efficient. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing furnace with 95%+ efficiency.

    b. A portion of this building is served by a gas-fired domestic water heater. This water heater has an efficiency of around 80%. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing water heater with 95%+ efficiency. There is quite a bit of hot water piping that is not insulated. It is recommended that all hot water piping is insulated.

    c. The building's hot water system does not utilize a recirculation system. While adding this system at this point would likely have a long payback, consideration should be given to providing these recirculation systems on future projects to minimize the amount of water that is wasted while waiting for hot water.

7. Maintenance Shop

    a. This building utilizes a gas-fired unit heater. The heater appears to be around 80% efficient. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing unit heater with 95%+ efficiency.

8. Greenhouse

    a. This building utilizes a gas-fired unit heater. The heater appears to be around 80% efficient. When it reaches the end of its useful life, it is recommended that it be replaced with a high efficiency condensing unit heater with 95%+ efficiency.

9. South Campus

    a. This building is served by a split system. It appears that the condensing unit is a low-efficiency 13 SEER unit, and the furnace is 80% efficient. When they reach the end of their useful life, it is recommended that they be replaced with a high efficiency condensing unit with a 20+ SEER rating and a condensing furnace with 95%+ efficiency.

PART 8 - RECOMMENDATIONS

8.1 GENERAL

A. The priority of the recommendation is categorized as high, medium, or low.

1. **High:** A priority rating of high is justification for immediate remedy and corrective action. Service life of these systems or components has been reached or exceeded and are broken, unsafe, obsolete, or do not meet current code. Implementing recommendations will increase the life safety aspects of the buildings, will reduce further deterioration of the building components, will enhance the energy efficiency of the facility, and will ensure that the building operates as designed.

2. **Medium:** A priority rating of medium suggests the system or components has a remaining life of 5 years and may have minor deficiencies that can be funded as part of a capital renewal program. This category includes conditions requiring appropriate attention to preclude predictable deterioration or potential downtime and the associated damage or higher costs if deferred further.

3. **Low:** A priority rating of low represents systems or components with remaining life cycle exceeding 5 years but have minor deficiencies. Implementing recommendations in this category will either improve use of the building and/or reduce long-term maintenance.

B. Any opinions of probable construction cost are made based on information available and previous project experience. However, Farris Engineering has no control over the cost of labor, materials, equipment, or services furnished by others, over the contractor(s') methods of determining prices, or over competitive bidding or market conditions. Farris Engineering does not guarantee that proposals, bids, or actual project or construction costs will not vary from opinions of probable cost prepared by Farris Engineering. *All opinions of cost are intended to be considered only as a rough order of magnitude (ROM) for planning purposes.*

8.2 MECHANICAL

A. Medium:

1. Replace boilers in 1926 Elementary building with high-efficiency, condensing style boilers.

    a. Opinion of Probable Construction Cost: $200,000

2. Replace hot/chilled water pumps with new inline pumps and provide variable frequency drives and associated temperature control system upgrades.

    a. Opinion of Probable Construction Cost: $40,000

3. Replace chilled water pump with (2) new inline pumps in parallel configuration. Provide variable frequency drives and associated temperature control system upgrades.

    a. Opinion of Probable Construction Cost: $45,000

4. Add cooling to Main Gymnasium with new packaged rooftop units to include DX cooling, natural gas heat, and adequate ventilation for the rated occupancy of the spectator and play areas.

a. Opinion of Probable Construction Cost: $615,000

5. Incorporate replacement plan for all packaged rooftop units that are near or have exceeded their expected 15-year service life. Areas served by this equipment include:

a. 1966 High School

b. 1980 Administration

c. 1999 Music

d. 1999 Distance Learning

e. 2014 Commons

f. Opinion of Probable Construction Cost: $450,000

B. Low:

1. Convert 2-pipe hot/chilled water changeover system to a 4-pipe system capable of simultaneous heating and cooling operation.

a. Opinion of Probable Construction Cost: $415,000

2. Perform radon testing and mitigation as required.

a. Opinion of Probable Construction Cost: $5,000

3. Provide campus-wide building automation system.

a. Opinion of Probable Construction Cost: $175,000

8.3 ELECTRICAL

A. High:

1. Provide emergency egress lighting and exit signage in buildings that do not currently have emergency egress lighting to meet code required lighting levels and exit marking. The following buildings that would need this additional lighting include:

a. Maintenance Shop

b. Greenhouse

c. Football/Crow's Nest

d. Concessions Building

e. Multipurpose Room

f. Opinion of Probable Construction Cost: $30,000

2. Provide proper NEC clearances for each electrical panel that is not currently in compliance with the NEC code.

a. Opinion of Probable Construction Cost: $8000 (each panel)

B. Medium:

1. Replace existing fluorescent and metal halide lighting with new LED lighting for the interior and exterior lighting throughout all the buildings and site. As lighting is replaced in buildings that have existing emergency egress lighting, coverage of emergency egress lighting shall be updated as required to meet code minimum requirements.

   a. Opinion of Probable Construction Cost: $1,120,000

2. Provide and/or upgrade lighting controls to provide automatic light reduction to meet current energy code requirements for both exterior and interior lighting.

   a. Opinion of Probable Construction Cost: $280,000

3. Provide a new fire alarm system that provides recent code required voice evacuation systems in buildings that meet the classification of a building occupancy of education. Provide any corresponding upgrades to any fire alarm systems where fire sprinkler modifications or additions are added.

   a. Opinion of Probable Construction Cost: $420,000

C. Low:

1. Replace existing electrical equipment and panels that have reached end of life as budget and time permits. Panels can be replaced one at a time in lieu of replacing all at one time, if necessary. If any future remodels of the buildings were to occur, replacement of panels may be required due to any additional loads.

   a. Opinion of Probable Construction Cost: $10,000 (each panel)

2. Provide dedicated telecommunication spaces in buildings that have telecommunication equipment in areas that are not dedicated specifically for equipment.

   a. Opinion of Probable Construction Cost: $100,000 (each)

8.4 PLUMBING

A. High:

1. Provide backflow preventers at all domestic water service locations that are not currently protected.

   a. Opinion of Probable Construction Cost: $3,500 (each)

2. Engage a qualified plumbing contractor to scope, locate, and document the condition of all sanitary sewer piping mains below the building and on the site.

   a. Opinion of Probable Construction Cost: $5,000

B. Medium:

1. Incorporate replacement plan for all domestic water heaters that are near or have

exceeded their expected 10-year service life. Areas served by this equipment include:

a. 1980 Admin

b. 1990 High School

c. 2001 Middle School Modular

d. Ag Shop

e. Multipurpose Room

f. Opinion of Probable Construction Cost: $35,000

2. Convert all plumbing fixtures to ADA where required.

a. Opinion of Probable Construction Cost: $25,000

C. Low:

1. Replace all damaged or missing pipe insulation.

a. Opinion of Probable Construction Cost: $7,500

2. For fixtures that are in acceptable condition but are over 20 years old, replace plumbing accessories such as isolation valves, flexible piping, flush valves, trap insulation, etc.

a. Opinion of Probable Construction Cost: $25,000

8.5 FIRE PROTECTION

A. High:

1. Provide fire suppression for all areas of the Main School Building that are not currently protected.

a. Opinion of Probable Construction Cost: $400,000

2. Replace door lock on mechanical room door in Gymnasium where fire service is located.

a. Opinion of Probable Construction Cost: $500