# City of Ashland
# Vaughn Public Library

# Facility Assessment – Phase II
# Building Systems

# March 13, 2019

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# Facility Assessment Report (Phase II Building Systems)

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| Submitted To: | Sarah Adams, Director<br>Vaughn Public Library<br>City of Ashland |
| Address | Vaughn Public Library<br>502 West Main Street<br>Ashland WI 54806 |
| Year Built | Estimated 1890 |
| Building Type | Public Library, 3 Story<br>Brick Exterior / Wood framing |
| Present at Inspections | Cory A Scheidler, AIA, Cedar Corporation<br>Architect, Registered Interior Designer,<br>Commercial Building Inspector<br><br>Justin Musser, PE<br>Mechanical Engineer<br><br>Carl Klinkenberg, PE<br>Electrical Engineer<br><br>Sarah Vaughn, Library Director<br><br>Dan Homola, Facilities, City of Ashland<br><br>Tom Sutarik, City of Ashland |
| Date of Inspection | March 12, 2019 |

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# Introduction:

Cedar Corporation has been retained by the Vaughn Public Library to complete of a Facility Assessment for the Vaughn Public Library. The Facility Assessment has been divided into five phases to provide the Library Board a systematic approach to analyzing and planning future renovations and improvements to the library. The goal of the Vaughn Public Library Board is to provide a modern library facility that focuses on programming which is inviting and responsive to the public while maintaining the cultural and historic nature of the downtown facility to inspire a sense of community pride.

The first phase of the facility assessment included a Structural Assessment of the overall condition of the building. The second phase of the assessment is a review of the building's mechanical, plumbing, electrical, telecommunications, and security systems.

The second phase of the facility assessment included a visual inspection of the building's mechanical, plumbing and electrical system and components. The goal of the assessment is to understand the current systems conditions, how the systems operate and their suitability for the space and function, any deficiencies, and the expected life expectancy of the systems. With this information, we are able to to better understand what repairs or modifications may be needed or required to allow for continued use and future renovations. The intent is to also define any code deficiencies, system limitations, and how to move forward with repairs or modifications. As part of this initial phase, Cedar's assessment only includes a visual inspection and assessment of the equipment. Our analysis does not include extensive load calculations to determine if the systems are adequately sized for the facility. Our assessment will also offer recommendations for short and long term improvements and recommendations for future renovations.

# Facility Overview:

## General Summary

The Vaughn Public Library is located downtown at 502 Main Street in the West Second Street Historic District. The Vaughn Library was constructed in the late 1800's and has an extensive history. The Library originally utilized the second floor with a mercantile on the first floor and offices on the second level. Eventually the library expanded into the basement, first, and second level with the third level being utilized by various tenants. The facility has experienced various uses and renovations over the years, with the most recent extensive renovation in 1982.

## Building Summary

The building consists of three stories and a basement with 6,700 square feet per floor and a gross square footage of 27,000 square feet. The building construction consists of non-combustible exterior masonry/stone and brick walls with interior wood framing. The building construction appears to be a type five combustible construction; however, additional investigation may allow the building to be a type III construction.

## Mechanical Systems

The building is served by multiple heating and cooling units. The lower three floors are heated by a newer hot water boiler system. The basement and first floor have separate air handling units with split system air conditioning for cooling. The third floor is served by two gas-fired furnaces with integral split system air conditioning. Exhaust is provided at the restrooms and utility room by an individual ceiling exhaust fan. Controls are typically self-contained control valves, electric space thermostats, or programmable thermostats.

## Plumbing Systems

The majority of the building's plumbing systems were installed and/or updated in 1983. The building consists of multiple single use toilet rooms on each floor, a sink for a business on third floor, and janitorial sinks in the utility rooms. The piping systems are a mix of copper and PEX piping.

## Electrical – Telecommunications – Life Safety – Security

The building's electrical system is served by Xcel Energy with the main service located in the basement feeding panelboards on each floor to distribute power to the floor. Lighting and lighting controls are mostly fluorescent with limited lighting controls. Fire alarms exist throughout the building as well as select communication outlets. No security system is present.

# Mechanical (HVAC  Systems) Assessment:

## General

The building is served by multiple heating and cooling units.  The lower three floors are heated by a newer hot water boiler system that utilizes fin tube-type units near the floor. The basement and first floor have separate air handling units (AHU), located and exposed in the spaces served, with split system air conditioning for cooling.  However, it appears the basement condensing unit has been removed as the refrigerant piping from the AHU terminates in the boiler room.  The third floor is served by two gas-fired furnaces with integral split system air conditioning.  Exhaust is provided at each restroom and utility room by means of an individual ceiling exhaust fan interlocked with space light switch.  Controls are typically self-contained control valves, electric space thermostats, or programmable thermostats.

## Assessment Process

The purpose of the HVAC assessment is to determine how heating, cooling, and ventilation is provided for the building, along with possible deficiencies and general equipment conditions.  The assessment began with a visual examination during a walk-through with building maintenance staff on March 12, 2019, followed by an evaluation of existing plans and building studies.  The visual examination was limited to the main equipment, and systems that were easily accessible and visible.  Any ductwork or equipment located above ceilings was not included in this assessment.  Along with that, no actual system tests were done, including, but not limited to:  air or water flow testing, duct leakage, outdoor air or ventilation amounts, building pressure, or equipment functionality.

## Existing Systems Descriptions

*Central systems:*
The hot water system is configured in a primary-secondary configuration.  What this means is that there are boiler circulating pumps and system circulating pumps.  The system is comprised of two high efficiency boilers, two boiler circulating pumps, and two system circulating pumps that were installed in June 2016.  The boilers are Viessmann Vitodens 200 hot water boilers with Grundfos UPS43-100F boiler pumps.  The boilers have a rated thermal efficiency of 93.5% and an input capacity of 530,000 BTUH.  The boiler vents run exposed near the structure, go up to the first floor, and terminate out the south wall. Combustion air for the boilers is ducted from a louver at grade above the boiler room and allows the boilers to use room air for combustion.  The system circulating pumps are Bell & Gossett 2x2x5¼ in-line style pumps.  The pumps are designed to operate at 80 GPM at 20' of head with ¾ HP motors.  Based on existing plans, the majority of the hot water system piping and hot water coils/units were installed in 1983.  The interior condition of the existing piping was not verified in this assessment.

A central AHU with a hot water heating coil was installed in 1983 to provide ventilation air for the second floor and possibly cooling by using outside air when temperatures allowed.

The AHU is located in a mechanical room on the third floor. Outside air is ducted above the third floor ceiling to the unit from a louver on the south wall. There is no indication on the plans how much outside air this unit was to provide for ventilation, but based on the scheduled winter entering air temperature, it would appear to be around 900 CFM. The return air for this unit is not ducted and is open to the mechanical room. There is a large opening in the floor where the return comes up from the second floor ceiling space. There is a large ducted roof hood in the mechanical room that appears to be used as relief for when the AHU is using outside air for cooling. This is also known as economizer or economizer relief. The unit controls appear to have been updated recently with electric controls, damper actuators, and a variable frequency drive on the fan motor. The drive was operating at 35 hz during the assessment. It is not known how this frequency equates to total system airflow.

*Basement:*
Ceiling/structure height in the basement is approximately 8 feet. HVAC equipment, piping, and ductwork is typically visible and located just below structure. The basement HVAC system consists of two horizontal hot water unit heaters and an abandoned AHU that was previously used for cooling only. There also appears to be a number of ducts left in place that previously served a crawl space below. No visual inspection of the crawl space occurred during the building assessment. The old boiler breeching has been capped near the chimney and near the entrance to the boiler room. The elevator equipment room in the basement has an electric heater for heat and an exhaust system for heat removal. The exhaust fan is located on first floor and terminates at the south wall. There is no means of air transfer when the exhaust fan is operating. The adjacent electrical room in the basement has both a hot water pipe and refrigerant piping running through the room to serve associated equipment above.

*First Floor:*
The lay-in ceiling is approximately 11.5 feet above the floor with ductwork located both above and below the ceiling. Heating and ventilation on this floor is provided by three hot water unit ventilators located below the windows along the east wall, along with a hot water cabinet unit heater in the entry. Outside (ventilation) air is brought into the unit ventilators through ducted wall louvers. The ventilation air is relieved by means of a duct from first floor to second floor ceiling plenum. Cooling is provided by two separate split system AHUs. The large area to the north is served by a 7.5 ton vertical Trane model TWE090A100DA unit that is located next to the north stairway. The unit's supply air is distributed by means of exposed spiral ductwork below the lay-in ceiling and duct mounted supply air grilles. The condensing unit associated with this AHU is mounted on the south exterior wall and is a Daikin model DX13SA903AA. This unit appears to be new and indicates utilizing R410A, however, the Trane AHU indicates requiring R22. The refrigerant piping runs along the ceiling of the basement. There is a condensate pump below in the basement to collect cooling condensate. The condensate is piped from the pump to the 8" roof leader near the chimney. The second AHU is located in the library office. This unit is a vertical Trane unit, model TWG048A140B1 which utilizes R22 refrigerant. This unit is ducted to above the lay-in ceiling to ceiling diffusers and serves the rest of the library

area and office. The condensing unit is mounted on the south exterior wall and is a Trane model TTA048C300A0. Both cooling AHUs utilize return air located at the unit, and there is no ventilation associated with either unit. Controls on this floor are electric and programmable thermostats. Operation and control sequences were not verified.

*Second Floor:*
Heating for each space is provided by hot water fin tube units at the exterior walls. Units are controlled by self-contained control valves by Flair Mfg. Corp that are located behind the unit covers. Proper operation of these valves was not verified, but in conversations with library staff, they are currently using the isolation ball valves to increase/decrease water flow to these units and temperature control is an issue. As mentioned previously, second floor ventilation is provided by the AHU on third floor. The supply air duct is routed above the corridor ceiling to sidewall grilles or ceiling diffusers in each space. Existing ceiling heights were not documented on second floor but are higher than a typical office or conference space due to tall windows along the exterior.

*Third Floor:*
The third floor is served by two gas-fired furnaces with split system air conditioning; one on the north end and one on the south end. Exact routing of ductwork was not verified, but in general, supply air ductwork is run above the ceiling to ceiling diffusers. Return air utilizes the ceiling plenum space with ceiling grilles located in each space and the central return at each furnace. A six or eight inch round duct is connected to each return air duct to provide minimum outside air. The additional toilet room in office #303 does have an exhaust fan.

## Deficiencies, Limitations, and Immediate Repairs

*Deficiencies:*

- Combustion (outside) air is not connected directly to boilers. This is not a code issue, but cold air dumping into the boiler room can cause unnecessary issues like a cold boiler room or frozen water pipes.
- Humidity control is an issue under the current HVAC system, both in winter for humidification and dehumidification during the summer. Currently there is no means for adding humidification. Dehumidification is, and will be, difficult with the current HVAC arrangement. The ventilation system is not cooled and is separate from the cooling systems which allows hot/humid air to enter the building unconditioned.
- There are a number of locations where insulation has fallen off of the ductwork. These ducts need to be insulated to prevent heat loss and condensation issues inside the building.
- The cooling condensate from the large AHU in the library is piped to the 8” roof leader without any trap or check valve. This has likely been installed for 15+ years without any issues, but there is potential that water could back up in the roof leader and backflow into the condensate drain.

*Immediate Repairs (Code issues/deficiencies):*

- The boiler room is required to be fire rated because each boiler is over the 399,000 BTUH threshold determined by code. The current construction of the room should allow for this, however, there are numerous openings and penetrations that are not protected as required.
    - As a side note, a boiler room on the upper floor would be more ideal for a multi-story building like this for two reasons. One, the system and fill pressure would be lower due to the static height difference. Secondly, the boiler venting could be shorter and terminated through the roof versus the sidewall where exhaust can be a nuisance.
- The basement area is an occupiable space which is required to be provided with ventilation. No ventilation is currently being provided to the basement spaces.
- There is no means of air transfer when the exhaust fan for the elevator equipment room is operating. Transfer grilles with a fire damper are required.
- Per NFPA/NEC, no HVAC piping should be routed through a dedicated transformer vault or above panelboards/switchboards unless serving equipment in the electrical room.
- First, second, and third floors utilize the space above the lay-in ceilings for a return air path, also known as a return air ceiling plenum. There are a number of concerns and code issues with a ceiling return air plenum system. The main code issue is that materials without the minimum code required smoke/flame resistance are not allowed in a return air plenum, including PVC pipes and non-rated cabling/wiring. This includes all data cabling. A concern with this type of system is that it creates a negative pressure in the ceiling space and pulls air from the path of least resistance. This means if the building, spaces, or other pipe vent systems aren't sealed air tight, there is potential for pulling other air into the return air of the HVAC system.
- No exhaust fan for toilet room in office 303. Code requires a minimum of 75 CFM of exhaust air for each toilet fixture.

*Limitations:*

- The majority of the controls are self-contained or standalone electric. This can lead to an increase in building energy use due to lack of temperature control, night setback, and system monitoring. In addition, there are no controls for automatic switchover between heating and cooling.
- A majority of the spaces have high ceilings. This can create stratification where the air near the ceiling is quite a bit warmer than the air at the floor or occupiable space, which leads to higher energy use, lower ventilation effectiveness, and comfort issues.

**Life Expectancy and Considerations for Short Term Improvements**

*Life Expectancy:*

All HVAC equipment is near or past its life expectancy except the recently replaced boiler system and Daikin condensing unit. This includes a majority of the temperature controls and self-contained control valves.

*Short Term Improvements:*

- Correct minor code related deficiencies.
- Insulate ducts where insulation has fallen off.
- New programmable thermostats for furnaces and air handling units. This can improve energy usage and help with temperature set points.

## Long Term Solutions

Incorporate a more centralized system that provides all heating, cooling, and ventilation needs for the building. This could be a variable volume air handling system or multiple air handling systems, along with perimeter hot water heat, that utilizes the existing high efficiency boilers for heating and limits the amount of outdoor condensing units required.

A typical modern library facility would include proper heating, cooling, and ventilation, along with humidity and temperature control. The actual equipment/systems that are installed in these facilities can vary based on budgets, space, and size.

## Summary

The boiler system has been recently updated and provides most of the building with a high efficiency heating. In general, the ventilation systems, the cooling systems, and the heating systems are all provided by separate units that are each ducted individually to the occupied spaces. This can lead to control and humidity issues and would not be a typical design for a newly designed library. Also, a majority of the existing units are at or past their useful life; however, this doesn't mean the units aren't operational or cannot be maintained moving forward.

The entire HVAC system should be updated by looking at the building as a whole and in conjunction with any future plans for updated architectural/building layouts.

# Plumbing Systems Assessment:

## General

The majority of the building's plumbing systems were installed and/or updated in 1983. The building consists of multiple single use toilet rooms on each floor, a sink for a business on third floor, and janitorial sinks in the utility rooms.

## Assessment Process

The purpose of the plumbing assessment is to determine possible deficiencies and general equipment conditions. The assessment began with a visual examination during a walk-through with building maintenance staff on March 12, 2019, followed by an evaluation of existing plans and building studies. The visual examination was limited to the main equipment and systems that were easily accessible and visible. Any piping or equipment located above ceilings or in walls was not included in this assessment.

## Existing Systems Descriptions

*Water:*
Basement - Water meter and 1" domestic water supply in boiler room. Heat tape is wrapped around the water piping at the water meter location to help keep from freezing. Current water pressure that serves the building is unknown. Reduce Pressure Backflow prevention was provided for the boiler system. The first floor has a 6 year old, 30 gallon, 4500 Watt, Reliance water heater that serves the first and second floor. The second floor drinking fountain has a bottle filler. The third floor has a 23 year old, 19 gallon, 2500 Watt, A.O. Smith water heater with an Amtrol model RP-15 Pressurizer tank pressure booster. The pressure is set at 25 psi. The owner stated that the booster pump is not in service. PEX piping is used to serve the fixtures on the third floor, while the remainder of the water piping is copper. Not all of the water piping is insulated.

*Gas:*
The gas meter has a 2½" supply main that used to serve the original three boilers. The system now serves the two new boilers. An additional ¾" or 1" gas line was added for furnaces on third floor. The gas supply is low pressure: 5"-9" water column based on the regulator at the gas meter. The gas regulator is rated for a maximum inlet pressure of 1.5 psig. The gas piping material is black steel pipe.

*Fire Protection (Sprinkler):*
None.

*Toilet Rooms:*
There are two single use toilet rooms on the first, second, and third floors. The rooms contain floor drains on the first and second floors. The water closets are floor mounted flush tank type with a combination 1.6 and 3 gallons per flush capacity. The lavatory sinks are wall mounted with meter type faucets and exposed piping below. One lavatory sink has a wheel handle type faucet. These fixtures do not meet or are not installed to meet ADA standards. Drinking fountains are located at the toilet room locations. Two of the units are refrigerated and one also includes bottle fill. One unit is not refrigerated.

The third floor toilet rooms were added after 1983 along with a double compartment stainless steel sink with a residential kitchen style faucet located in the Office #303 space. There are plans for this addition.

*Utility Rooms:*
The first and second floor have an old style cast iron type wall janitor sink installed in 1983. The third-floor janitor has a floor type mop sink. The furnace/ac condensate drains into this sink.

*Sanitary:*
According to the 1982 plans, a new 4" sanitary was installed and connected to an existing 6" sanitary pipe in the boiler room. It appears that the 4" sanitary pipe (PVC) was not connected to the existing pipe, but instead it was run out of the building at the time of the project. No existing 6" sanitary pipe was found in the boiler room. There are no floor drains installed anywhere in the basement.

There is a sump pump located in the basement boiler room presumably for foundation drainage.

*Roof drains:*
There are three 4" roof drains with an 8" rain leader and clean-out located in the basement.

**Deficiencies, Limitations, and Immediate Repairs**

*Deficiencies:*

- Plumbing fixtures do not meet or are not installed to meet current American Disabilities Act (ADA) guidelines.
- A majority of the water closets are high water usage (3 gallon or more per flush).
- Meter faucets on lavatories are high maintenance type fixtures and are difficult to maintain proper run time for handwashing.
- 1" water supply is not insulated in boiler room and is subject to freezing.
- The water piping, located in the Boiler room, is subject to freezing.
- There are no housekeeping pads or containment for water heaters.
- The electric water cooler in the main lobby is wired with an electric cord, in lieu of direct hard wired, per manufacture specifications.

- The eyewash spray heads are pointing down. The heads should be pointing up to be effective. The operation of the eyewash, per ANSI standards, is to be one movement operation to activate eyewash, and shall be a push or pull motion to activate.
- The mop sink on the third floor is being used to receive condensate from the furnace. The mop sink is not a code approved receptor for condensate.

## Life Expectancy and Considerations for Short Term Improvements

*Life Expectancy:*
Electric water heater located on the third floor is 23 years old, which is past its expected life expectancy.

*Short Term Improvements:*
- Correct ADA guideline related deficiencies.
- Correct Code related deficiencies.
- Insulate water piping to conserve water usage for hot water.
- Provide new eyewash near janitorial sink.
- Correct electrical connection to electric water cooler.

## Long Term Solutions

Design and remodel toilet rooms to meet ADA guidelines with lavatory sinks mounted at ADA heights installed with ADA faucets, along with installing new water efficient water closets. Review domestic water piping and sizing to ensure proper water pressure at the third-floor level. Provide proper drain collection for all condensation piping throughout the building. Provide indirect waste piping for Reduce Pressure Backflow Preventer and extend to the sanitary drain. Redesign domestic hot water system to reduce the wait time for hot water at the fixtures. Replace the wall mount janitor sinks with floor mounted mop sinks to help with filling and the emptying of mop buckets.

## Summary

The plumbing system will function in its current state, but upgrades and revisions will help the system be more efficient and allow easier access for those with disabilities.
The majority of the existing fixtures are at or past their useful life; however, this doesn't mean the fixtures aren't operational or cannot be maintained moving forward.
The entire Plumbing system should be updated by looking at the building as a whole and in conjunction with any future plans for updated architectural/building layouts.

# Electrical Systems Assessment:

## General

The building electrical is served by Xcel Energy with the main service located in the basement. Each floor contains a panelboard that distributes power to the floor. Lighting and lighting controls are what is expected for the age of the building at the time of the last major remodeling. Fire alarms exist throughout the building as well as select communication outlets. No security system is present.

## Assessment Process

The purpose of the electrical assessment is to determine how power is delivered and distributed throughout the building as well as along with determining possible deficiencies and general equipment conditions of the fire alarm system, communications system, and security system. The assessment began with a visual examination during a walk-through with building maintenance staff on March 12, 2019, followed by an evaluation of existing plans and building studies. The visual examination was limited to the main equipment and systems that were easily accessible and visible. Any electrical equipment or wiring located above ceilings or in walls was not included in this assessment.

## Existing Systems Descriptions

*Power*
The existing service is a 600 Ampere 120/208V three-phase system. Power to the premises is provided overhead from Xcel on the south side of the building. Current transformers owned by Xcel are mounted directly on the building and not installed in a typical CT cabinet.

A 600 Ampere fused service disconnect switch manufactured by Square D is located in the basement electrical room. A 600 Ampere Square D QMB fused main distribution panel is also located in the basement electrical room. Five panelboards and the elevator are fed from this main distribution panel. Branch panelboards are Square D NQOB with the exception of a newer panel "A1" which is a Square D NQ panelboard.

A separate 60 Ampere service disconnect feeds an emergency lighting panel "EM".
All electrical distribution equipment with the exception of panel "A1" are past their life expectancy and parts may be difficult to obtain.

Wiring throughout is a combination of conduit and wire as well as MC cable. Surface mounted raceways can be found throughout the building.

*Lighting*
The majority of interior lighting is comprised of 2'x4' fluorescent troffers with (4) T-8 lamps and acrylic lens.

Mechanical spaces were provided with incandescent porcelain sockets or fluorescent industrial strip lights.

Lighting control throughout consisted of standard wall switches with some of the restrooms utilizing wall mounted occupancy sensor switches.

Emergency egress lighting is provided with combination exit sign and emergency lighting unit, stand-alone emergency lighting units, and remote lighting heads. Materials are a combination of new and old. Exterior emergency egress lighting is not provided on this building.

Exterior lighting consisted of a LED sconce mounted above the front entry door. No other exterior lighting is provided on the building.

The existing lighting and emergency lighting in the building are beyond their life expectancy. Lighting controls do not meet current energy Code.

*Miscellaneous Systems*
The fire alarm control panel is a Johnson Controls model IFC-320(E). This fire alarm control panel is an intelligent addressable panel of newer vintage. This panel can support up to 318 devices (159 detectors and 159 modules). Existing fire alarm devices such as smoke detectors and horn strobes are of an older obsolete vintage. No fire alarm annunciating panel is on the premises. The elevator recall is only to the first floor; it does not go to the nearest floor without an active fire alarm. Fire alarm coverage does not meet current Code.

The elevator is of older vintage. There is no Code required lockable switch for the elevator cab lighting. The required illumination level at the basement elevator lobby is not present. Communications is served by fiber to a data rack in the basement. This rack also serves the City Hall and the Courthouse. It appears that additional equipment would need to be provided if major remodeling were to occur.

Telephone equipment is located in the main electrical room and appears to be of newer vintage. Telephone and data throughout the building is sparse and it installed in surface mounted raceways and boxes. Wi-Fi coverage throughout the building is sparse.

A security system is not present in this building.

## Deficiencies, Limitations, and Immediate Repairs

- MC cabling installed throughout the building does not appear to be properly supported. This is a Code violation.

- Existing piping is routed above electrical equipment in the basement electrical room. This is a Code violation and safety hazard.
- The 1st, 2nd, and 3rd floor ceilings are utilized as a return air plenum. Data and telephone cabling are run in free air above these ceilings and are not contained in a raceway. It does not appear that any of this cabling is plenum rated. This is a Code violation and safety hazard.
- An exterior receptacle near the front door is not weather proof and is missing the weather proof cover allowing moisture to possibly penetrate the receptacle. This is a Code violation and safety hazard.
- The receptacle serving the drinking fountain on 1st floor is not GFCI protected. It is also powered through an extension cord which is against manufacturers installation requirements. This is a Code violation and safety hazard.

**Life Expectancy and Considerations for Short Term Improvements**

- All electrical equipment is beyond its life expectancy and is recommended to be replaced.
- A larger service may be required if additional cooling were to be added to the building, or if the usage of the building changes.
- Additional coordination will be required with Xcel to determine if a transformer upgrade will be required if additional load is added to the building. Xcel may require a pad mounted transformer and CT cabinet in the limited exterior space.
- Lighting and lighting controls throughout the building do not meet the current International Energy Conservation Code. It is recommended that new LED lighting and Code compliant lighting controls be installed.
- New interior and exterior egress lighting are recommended throughout.
- If fire protection is provided to the building, the disconnect serving the elevator will have to be replaced with a shunt-trip type disconnect.
- The fire alarm system is a combination of a new fire alarm control panel and vintage devices. It is recommended that new initiating and annunciating devices be installed along with a new fire alarm annunciating panel. Additional devices will be required to meet current Code.
- Fire alarm is not currently installed in conduit. Although not required by Code, it is recommended that the fire alarm system be installed in conduit for a more robust system.

**Summary**

The systems in this building are dated and past their life expectancy. New electrical, lighting, communications, and fire alarm should be considered for this building.

## Typical Modern Facility

Lighting for a typical modern library would consist of LED fixtures throughout with digital lighting controls. Digital lighting controls would include time clock functions, occupancy sensors, daylight harvesting sensors, dimming switches, and scene controllers for optimal flexibility.

Receptacles should be plentiful throughout the building to support work stations and charging of electronic equipment. Surge protection for electronic workstations should be provided to protect equipment from substantial damage.

Communications would consist of wired and wireless communications. It should be able to support digital networks from within and outside the library. Wireless access points would be abundant to support coverage throughout the building. Interior cabling would consist of CAT 6 cabling with RJ45 connections.

Fire alarm devices should be installed throughout to provide Code required coverage. A modern fire alarm system would be addressable and would allow the user and fire department to determine exactly where a trouble signal is emanating from.

## Electrical Systems Summary

The building electrical system appears to consist of new and old equipment. The lighting and technology components also appear to be a combination of new and aged components. A security system was not observed. In summary, the building's electrical, technology, and security systems require assessment and recommendations for the future.

## Building Systems Summary:

The intent of the building systems assessment phase of the project was to understand the building systems conditions, how the systems are operating and their suitability for the space and function, any deficiencies, and the expected life expectancy of the systems. This information will be utilized to make decisions on how the library and City should proceed with library improvements and what the immediate needs are.

The findings of our assessment are that the building systems are operational, however do have code deficiencies, limitations, and are dated systems that are beginning to experience needed repairs and replacement. The equipment is generally becoming functionally deficient and obsolete. Based on this, repairs that are being made are likely not addressing functionality improvements, added comfort to the facility patrons, nor increasing the energy efficiency of the facility.

Various components of the building's systems may continue to be utilized now and in the future, however will require maintenance, repairs, and replacements. Before exhausting large sums of money on repairs and replacements, it is our recommendation that the City and Library have a plan to move forward for the future. This may involve a capital improvement plan to replace components of the building systems as they fail. The replacement should be planned around the future goals for the building and future renovations.

The ultimate solution for the building and building systems is a renovation. The City will continue to experience costs related to repairs and replacements of the systems. A longer term solution is to develop a plan for the future that will include a renovation and replacement of the building's systems. This will ultimately improve the functionality of the space and use, increase the energy efficiency, and bring the building into code compliance. While this may be a more costly solution than the City and Library desire, it will be a lower cost over the life cycle of the facility and have a better return on investment.

# Recommendations:

**Summary**

Based on the findings within this assessment, we understand that the building's structural systems are generally in fair condition. There are needed structural repairs, however the main components within the building structure are good candidates for continued use and renovation. We also understand that the building systems are generally operational however are functionally deficient and obsolete.

Based on our findings, the facility requires ongoing maintenance, repairs, and replacement of equipment. Based on the condition and age of the building systems and the condition of the building, the facility is at a point in the facility life cycle where it is due for a renovation and improvements.

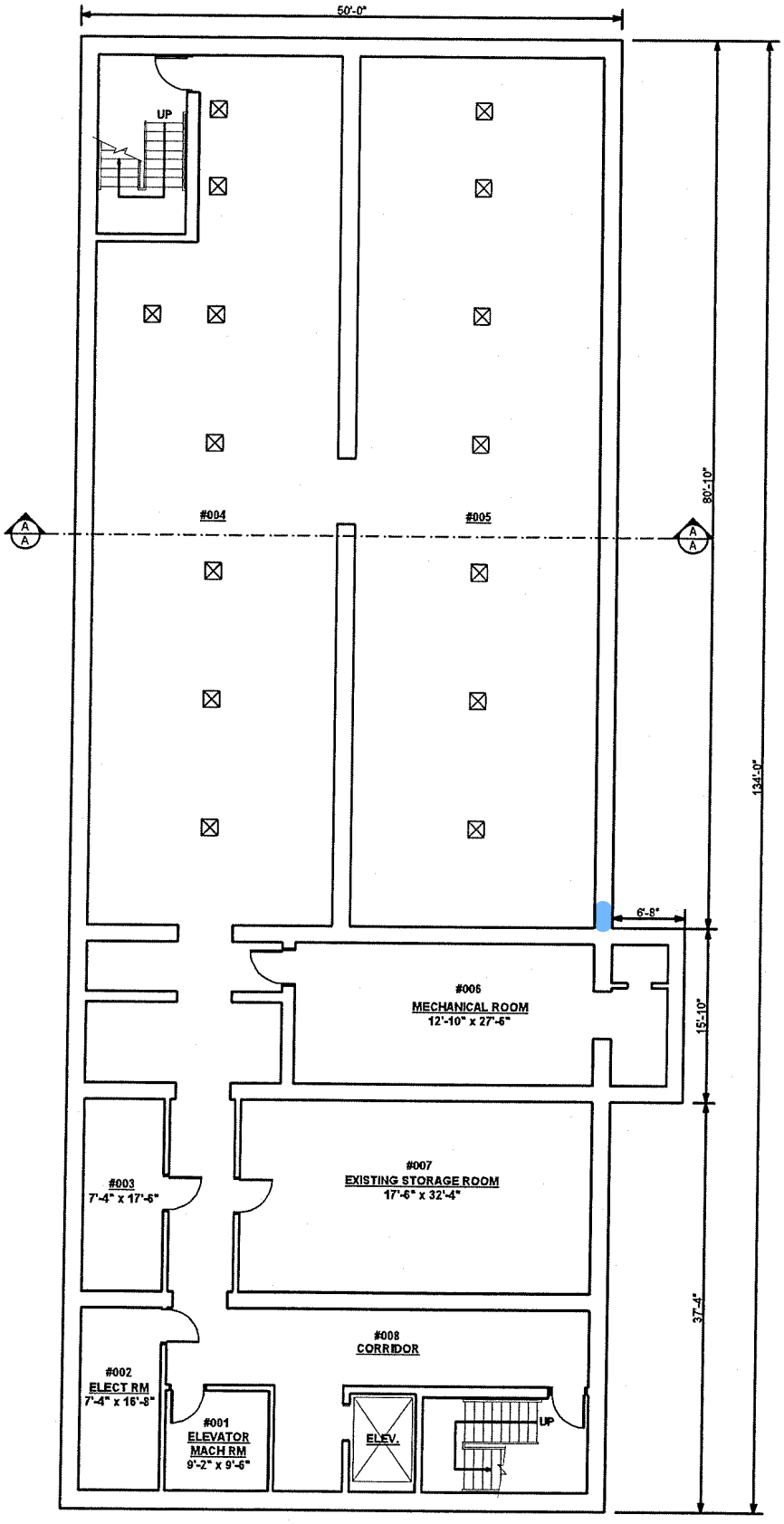
The Library is requires additional programing and will benefit from a more efficient layout. The obvious modification to allow for the added programing is to expand to the second level. Therefore, a renovation is necessary. This renovation should consider all aspects of the facility. This may include a long-term capital improvement plan for the facility that provides for improvements and maintenance over a 2, 5, 10, and 20 year approach. It is generally most cost effective to address the primary building components as part of the renovation.

The next step in this process is to evaluate the code implications of a renovation and the cost impact of building requirements. A space needs analysis and programing for the library and upper level spaces should also be considered. Upon understanding the code implications of a renovation, we can begin to assess what cost impacts will be to the project. The current and future space needs, functional requirements, and City and Library goals will also be necessary to develop a program and a conceptual plan. This information will be utilized to develop and to create a future program for the Vaughn Public Library This will lead to a conceptual plan, opinions of probable cost, budgeting, and planning.

As the Library and City desire to move forward with the remaining phases of the assessment, we are prepared to complete the remaining work. We propose the subsequent phases of the assessment be included in an updated report so that the library has a comprehensive assessment report. Additional steps may include funding and grant research, application preparation and assistance, additional studies, capital improvement plan preparation, and preparation of cost opinions.

# EXHIBIT A

## Plans




# BASEMENT FLOOR PLAN (EXISTING)

SCALE: 1/16" = 1'-0"

PLAN VIEWS BASED ON 2ND FLOOR
STRUCTURAL ASSESSMENT
C&S DESIGN & ENGINEERING INC. 2008

STRUCTURAL COMPONENT


Cedar corporation
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www.cedarcorp.com
MENOMONIE • MADISON • GREEN BAY
engineers • architects • planners • environmental specialists
land surveyors • landscape architects • interior designers


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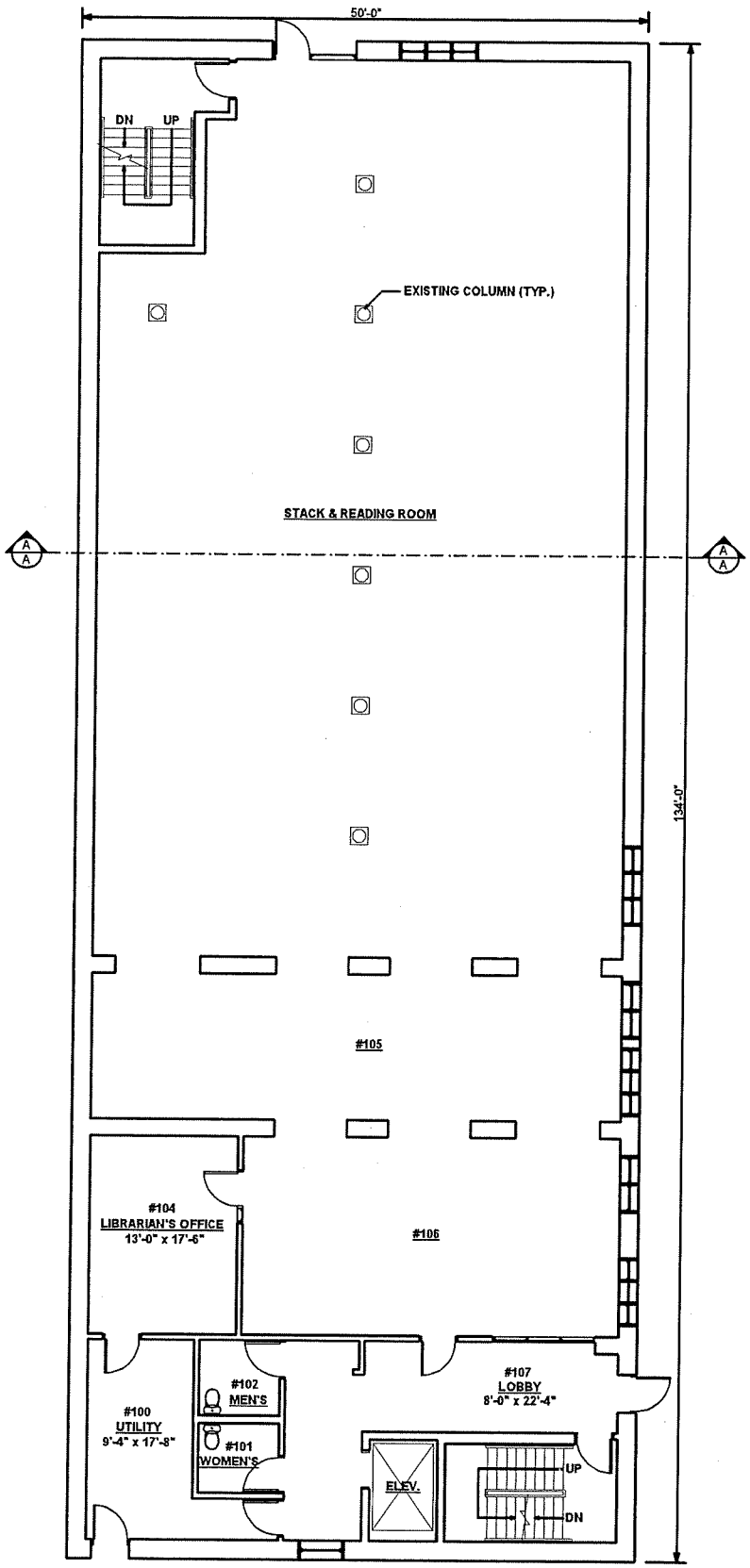


# FIRST FLOOR PLAN (EXISTING)

**SCALE: 1/16" = 1'-0"**

PLAN VIEWS BASED ON 2ND FLOOR
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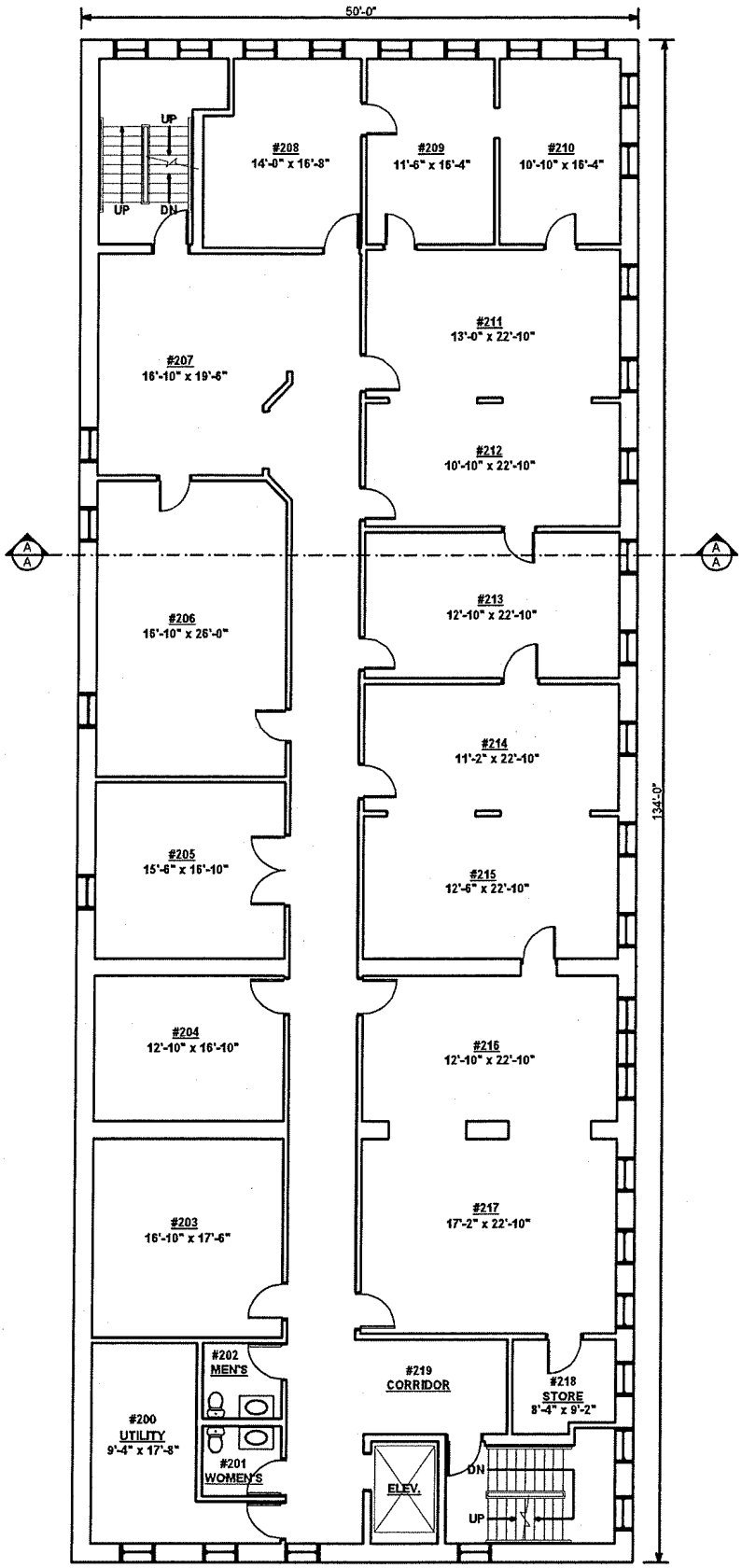


# SECOND FLOOR PLAN (EXISTING)

SCALE: 1/16" = 1'-0"

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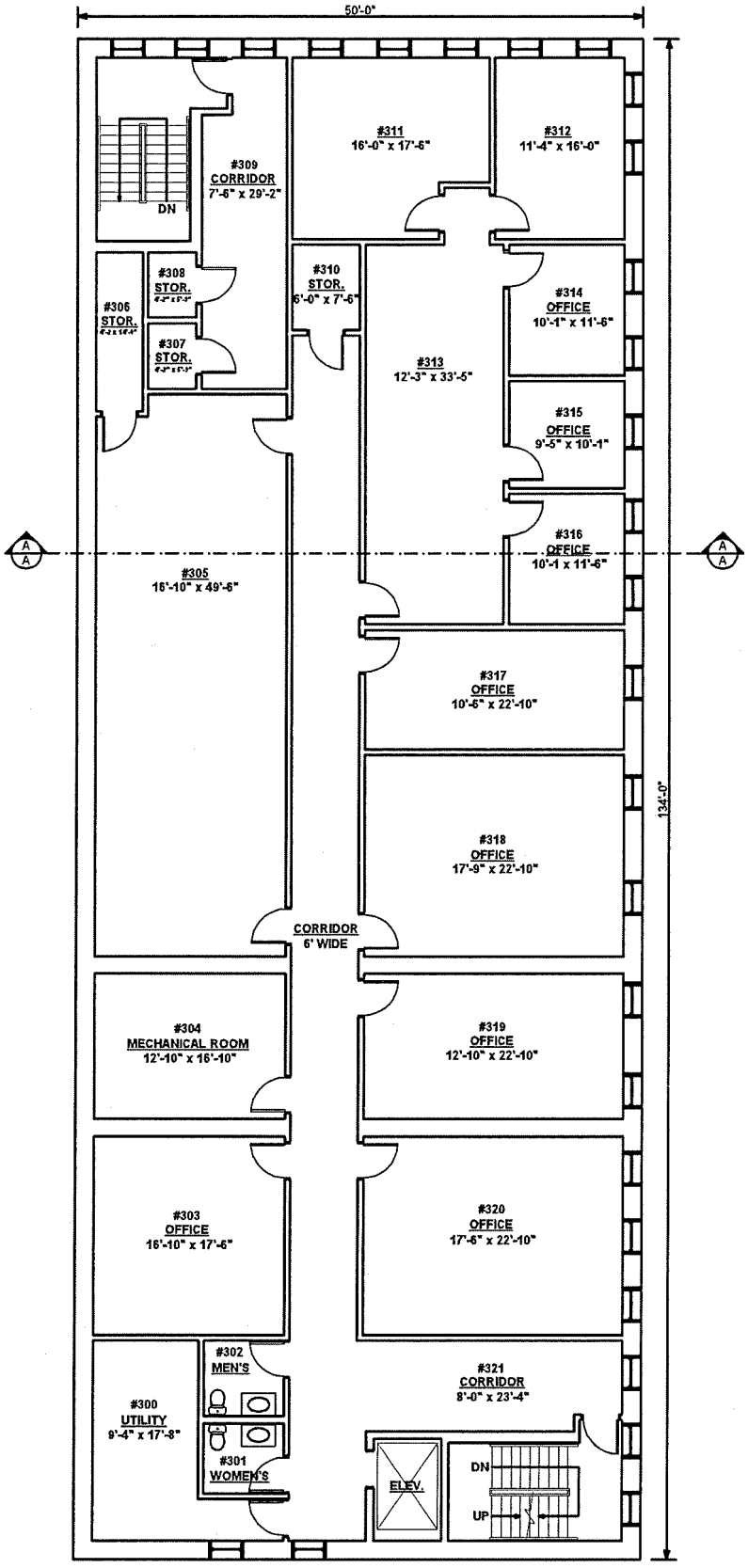


# THIRD FLOOR PLAN (EXISTING)

**SCALE: 1/16" = 1'-0"**

PLAN VIEWS BASED ON 2ND FLOOR
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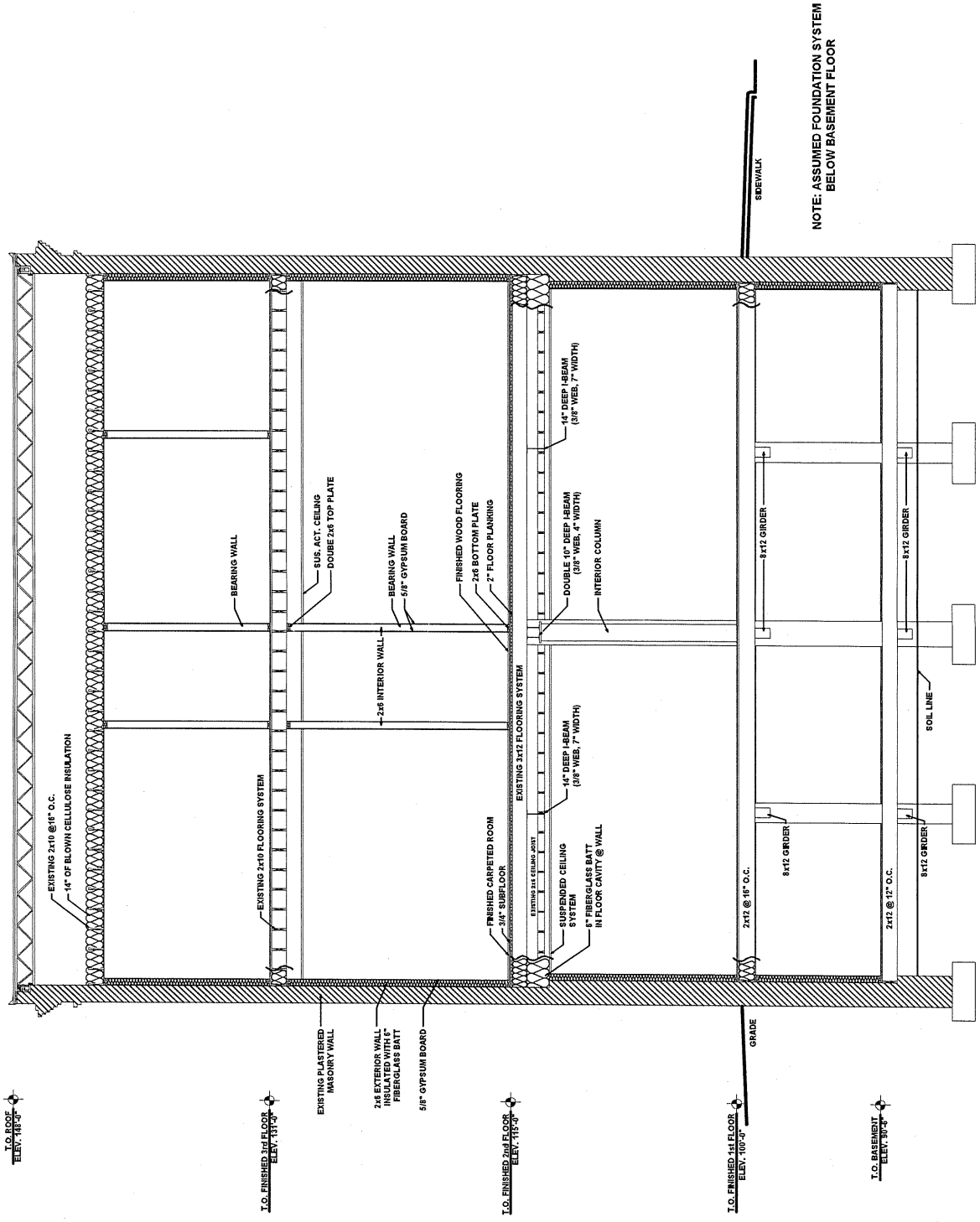


# BUILDING SECTION A-A (EXISTING)

SCALE: 3/32"=1'-0"


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PLAN VIEWS BASED ON 2ND FLOOR
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# EXHIBIT B

## Photos

Electrical Service


Fire Alarm Control Panel


Typical Exit – EM Light

Typical Lighting

Typical Panel

Library Cooling Area (North)

Third Floor, Floor Opening For Air Transfer


Hot Water Unit Heater in Basement

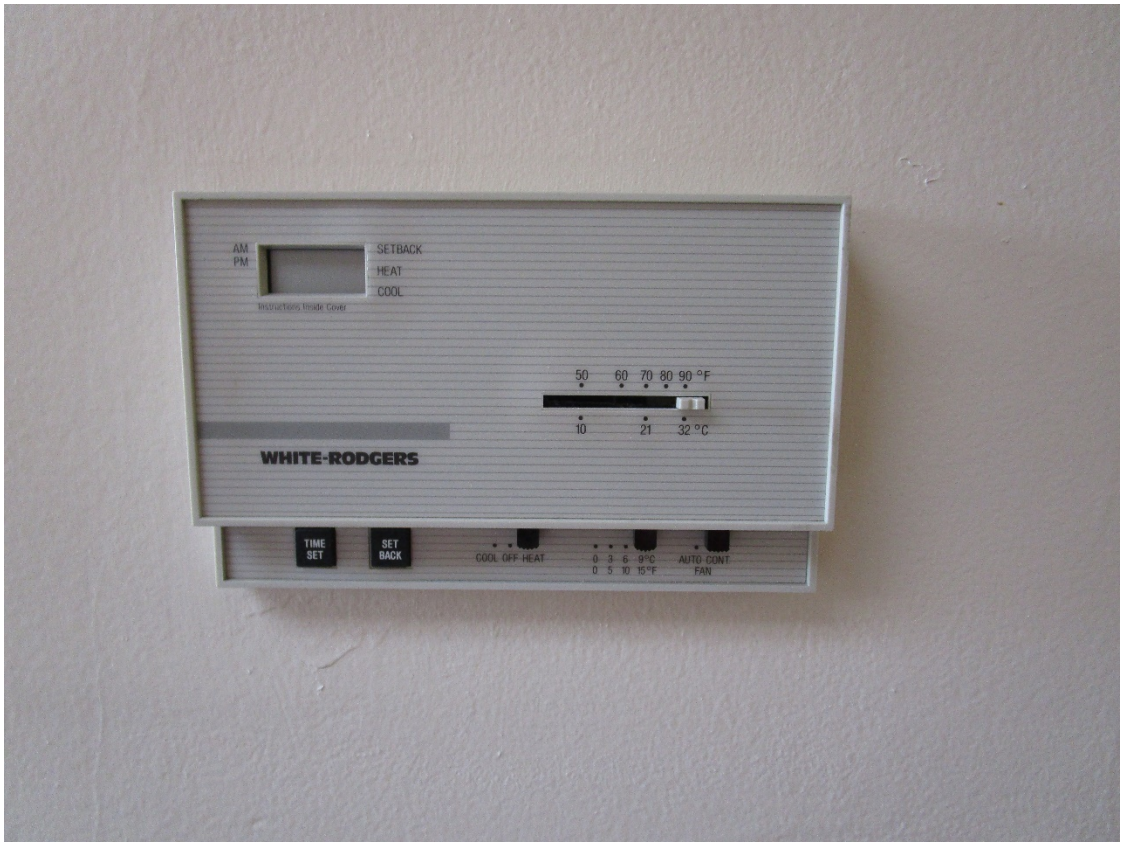
Abandoned Cooling Unit in Basement

Third Floor AHU

Third Floor Furnace (South)

Third Floor Water Heater and Pressure Booster

Typical Toilet Room




Programmable Thermostat

Third Floor Furnace (North)

Hot Water Boilers

First Floor Water Heater


Library Cooling AHU (South)

Multiple Thermostats for Heating and Cooling

Janitor Sink with Eye Wash

Typical Perimeter Hot Water Heaters

Typical Self-Contained Control Valve

South Building Elevation – Main Utility Entrance for Gas and Power

Wall-Mounted Condensing Unit for Library Cooling AHU (North)