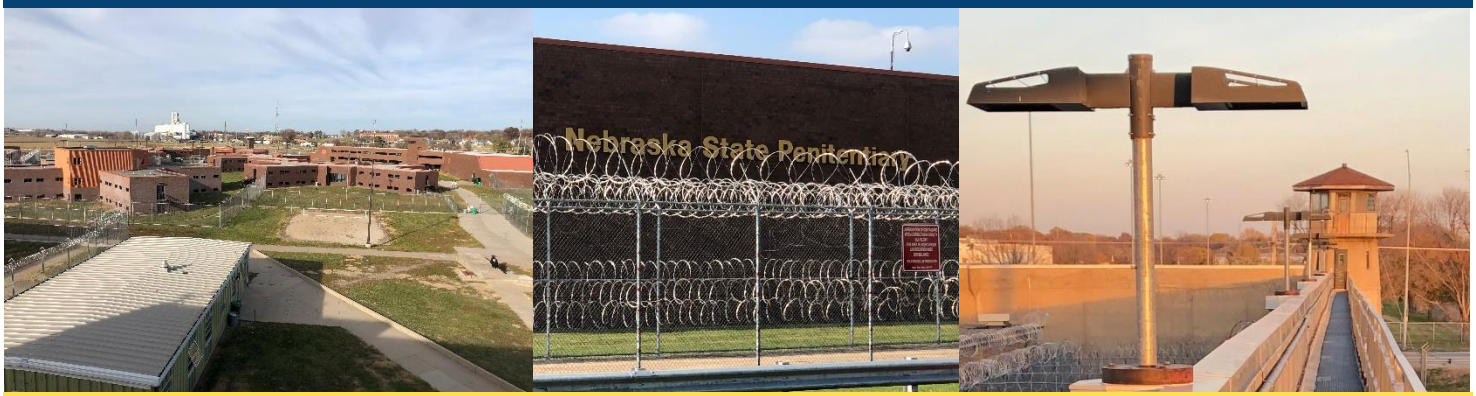


Nebraska State Penitentiary
Useful Life Engineering Study

Lincoln, Nebraska

Alvine No. 2021 8777
January 2022

ALVINE Engineering

CARLSON WEST POVONDRA ARCHITECTS · RO YOUKER STRUCTURAL ENGINEERING · benesch · LattaTech Advanced Security Engineering · Design Group CONSULTING + DESIGN

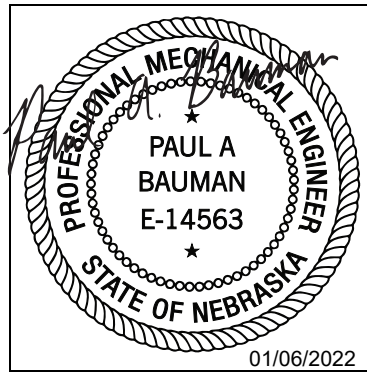
402.477.6161
www.alvine.com

Nebraska State Penitentiary
Useful Life Engineering Study
Lincoln, Nebraska

Alvine No. 2021 8777
January 2022

Prepared for:
State of Nebraska
Department of Correctional Services
Lincoln, Nebraska

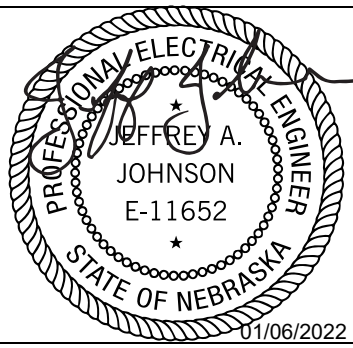
Prepared by:
Alvine Engineering
1800 O Street, Suite 104
Lincoln, Nebraska 68508



I, Paul A. Bauman, am the Coordinating Professional on the Nebraska State Penitentiary Useful Life Engineering Study. The mechanical portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

Paul A. Bauman — January 6, 2022
Name of Professional Engineer — Date

My license renewal date is December 31, 2023



I, Jeffrey A. Johnson, hereby certify that the electrical portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

Jeffrey A. Johnson — January 6, 2022
Name of Professional Engineer — Date

My license renewal date is December 31, 2023

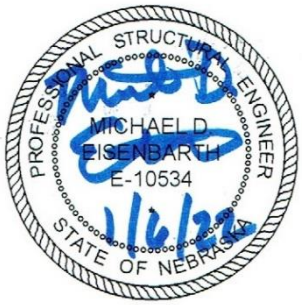
Carlson West Povondra Architects
5060 Dodge Street
Omaha, Nebraska 68132

I, Matthew S. Krause, hereby certify that the architectural portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Architect under the laws of the State of Nebraska.

Matthew S. Krause — January 6, 2022
Name of Architect — Date

My license renewal date is December 31, 2023

R.O. Youker, Inc.
1201 O Street, Suite 310
Lincoln, Nebraska 68508



I, Michael D. Eisenbarth, hereby certify that the structural portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

Michael D. Eisenbarth — January 6, 2022
Name of Professional Engineer — Date

My license renewal date is December 31, 2023

Benesch
825 M Street, Suite 100
Lincoln, Nebraska 68508

I, Frank J. Doland, hereby certify that the civil portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

Frank J. Doland — January 6, 2022
Name of Professional Engineer — Date

My license renewal date is December 31, 2023

LattaTech
500 N Central Expressway, Suite 310
Plano, Texas 75074

I, Michael J. Smith, hereby certify that the security portion of this technical submission was prepared by me or under my direct supervision and responsible charge. I am a duly licensed Professional Engineer under the laws of the State of Nebraska.

Michael J. Smith — January 6, 2022
Name of Professional Engineer — Date

My license renewal date is December 31, 2022

Table of Contents

Acknowledgements

Alvine Engineering and our dedicated group of sub consultants have enjoyed the opportunity to work with the State of Nebraska Department of Correctional Services (NDCS) staff in developing this Useful Life Engineering Study for the Nebraska State Penitentiary (NSP) in Lincoln. Through the efforts of this study, we have developed good working knowledge of the overall facility as well as a majority of the buildings on the campus. The direction and leadership of Director Scott Frakes has been very much appreciated. We would like to extend our sincere thanks to Rod Anderson, Nate Bornemeier, Ed Gonzalez, and Jerod Beach for their help in arranging and attending the numerous consultant visits to the penitentiary, and providing information relative to the study. Many penitentiary maintenance staff members provided their historic perspective on various systems within the facility. Without the help of all these individuals, this study would not be possible.

Executive Summary

The purpose of this study is to identify deficiencies in the aging buildings, infrastructure, and site-related systems at the NSP campus and to figure their repair or replacement costs to match a new modern version of the same quantity and/or size of what exists.

A summary of the deficiency costs per building and per site system is presented in Table ES1. Also, a total deficiency cost for the NSP campus is presented in Table ES1. See the Cost Estimating Criteria section, as well as the specific buildings and site systems sections of this study for information regarding how these costs were determined.

Table ES1: Deficiencies Cost Summary

Building Name or Site System	Building or Site System Abbreviation	Deficiency Cost
Activities Center	ACT	$ 940,000
Ancillary Building	ANC	$ 22,972,400
Canteen	CAN	$ 735,000
Central Warehouse	CW	$ 6,450,000
Control Unit	CON	$ 200,000
Cornhusker State Industries Factory	CFACT	$ 900,000
Corrections Emergency Response Team	CERT	$ 995,940
Chapel	CHAP	$ 4,509,600
Education Building	EDU	$ 3,091,000
Field Training Office	FTO	$ 545,000
Guard Tower No. 1	GT1	$ 268,040
Guard Tower No. 2	GT2	$ 339,640
Guard Tower No. 3	GT3	$ 268,040
Guard Tower No. 4	GT4	$ 217,620
Guard Tower No. 5	GT5	$ 184,700
Guard Tower No. 6	GT6	$ 246,700
Guard Tower No. 7	GT7	$ 266,000
Guard Tower No. 8	GT8	$ 204,200
Guard Tower No. 10	GT10	$ 58,600
Housing Unit No. 1 - 5	HU1-5	$ 96,723,390
Housing Unit No. 6	HU6	$ 40,300,000
Housing Unit No. 7 - 8	HU7&8	$ 9,139,905
Laundry Building	LAUN	$ 2,983,016
Library and Barber Shop	LIB	$ 1,860,000
Mental Health Building	MENT	$ 1,430,000
Old Central Utility Plant	OCUP	$ 232,064
Pre-Employment Building	PEB	$ 3,800,000
Private Venture Building	PVB	$ 5,100,000

Table ES1: Deficiencies Cost Summary *(continued)*		
Building Name or Site System	**Building or Site System Abbreviation**	**Deficiency Cost**
Soap Factory	SOAP	$ 650,000
Wellness Center	WELL	$ 720,000
Site Domestic Water and Fire Protection Water Systems	DW&FP	$ 2,050,000
Site Natural Gas Systems	NG	$ 390,000
Site Sanitary Systems	SAN	$ 1,900,000
Site Storm Systems	STORM	$ 800,000
Site Steam Systems	STM	$ 2,800,000
Site Chilled Water Systems	CWS	$ 325,000
Site Lighting Systems	LTG	$ 1,200,000
Site Security Systems	S-SEC	$ 1,496,000
Site Utility Tunnels	UT	$ 720,000
Site Contaminated Soils	CS	$ 350,000
Site Pavement	PAVE	$ 1,700,000
Total NSP Campus Deficiency Cost		**$ 220,061,855**

Contact Information for Stakeholders

Owner's Representatives

Scott Frakes
Director
State of NE Department of Correctional Services

Rod Anderson
Engineering Administrator
State of NE Department of Correctional Services
(402) 479-5778

Nate Bornemeier
Engineering Assistant Administrator
State of NE Department of Correctional Services
(402) 479-5861

Ed Gonzalez
Construction Coordinator II
State of NE Department of Correctional Services
(402) 479-5777

Consultants

Paul Bauman, P.E., LEED AP BD+C
Project Manager
Alvine Engineering
(402) 477-6161

Gene Neemann
Associate Principal
Alvine Engineering
(402) 477-6161

Jordon Kramp
Foodservice Consultant
Alvine Engineering
(402) 346-7007

Jacob Butler, RCDD
Telecommunications Designer
IP Design Group
(402) 346-7007

Matt Krause, AIA
Architect – Partner
Carlson West Povondra Architects
(402) 551-1500

Mike Eisenbarth, P.E, S.E.
Principal
R.O. Youker, Inc.
(402) 477-7640

Frank Doland, P.E.
Civil Group Manager – Senior Associate
Benesch
(402) 479-2200

Igor Abadzic
President
LattaTech Advanced Security Engineering
(972) 633-5850

Introduction

The NSP is located in Lincoln, Nebraska, and is the oldest correctional facility in Nebraska with it opening in 1869. The NSP campus has changed a lot over the years and contains numerous buildings, infrastructure, and site-related systems which are deteriorating as they age.

Purpose

The purpose of this NSP Useful Life Engineering Study is to identify deficiencies in the aging buildings, infrastructure, and site-related systems at the NSP campus and to figure their repair or replacement costs to match a new modern version of the same quantity and/or size of what exists.

Scope

The scope of this study includes the following:

1. All buildings noted as being included in the scope in Table 2
2. All site systems located at and within the perimeter fencing of the NSP
3. The following site systems located outside the perimeter fencing of the NSP:
    A. Contaminated soil at one buried fuel tank
    B. Contaminated soil at the coal pile
4. Review of existing drawings, building inventories, and documents provided by NDCS
5. Field work consisting of quick visual observations only
6. Meetings and discussions with NDCS staff
7. Probable project costs

Background

This study presents observations and deficiencies first, on a per building basis; and second, on a per site system basis. Systems which are not specific to a given building are included in the per site system sections.

Deficiencies

Deficiencies are identified per building or per site system. Each deficiency is assumed to be mutually exclusive unless specifically noted otherwise. Deficiencies are identified for each discipline and for each site system with a letter code as noted in Table 1 on the following page.

Table 1: Deficiencies Letter Code *(continued)*	
Deficiency Letter	**Deficiency per Discipline or Site System**
A	Architectural
FS	Foodservice
S	Structural
M	Mechanical
E	Electrical
T	Technology
SEC	Security
DW&FP	Site Domestic Water and Fire Protection Water Systems
NG	Site Natural Gas Systems
SAN	Site Sanitary Systems
STORM	Site Storm Systems
STM	Site Steam Systems
CWS	Site Chilled Water Systems
LTG	Site Lighting Systems
S-SEC	Site Security Systems
UT	Site Utility Tunnels
CS	Site Contaminated Soils
PAVE	Site Pavement

For example, the first architectural deficiency for the Activities Center (ACT) is identified as "ACT-A1." Deficiencies are only listed for those disciplines which have a deficiency in the building.

For deficiencies which affect multiple disciplines, such as a heating, ventilating, and air-conditioning (HVAC) system replacement which can involve architectural, structural, and electrical; the deficiency is included under the dominant discipline. That deficiency then includes the costs associated with the work of the other affected disciplines unless noted otherwise.

For deficiencies that have already been identified on the NDCS Building Renewal Request Report for the 2021 to 2023 biennium budget cycle, they are included as the first deficiencies for their respective disciplines. These deficiency items are identified in the study as "NDCS 2021 Biennium" items.

When there are enough deficiencies to indicate that a building should be replaced, then just one deficiency is listed for those buildings to indicate full demolition and replacement of the building.

Nearly all of the buildings on campus were built before the Americans with Disabilities Act (ADA) was signed into law in 1990. As a result, many of the buildings do not meet ADA requirements, so several of the deficiencies are related to these issues.

A priority level is assigned to each deficiency item to help indicate how urgent each one is.

1. A high priority level indicates a deficiency which is affecting life safety, ADA, or that needs to be repaired or replaced immediately.

2. A medium priority level indicates a deficiency which is not affecting life safety or ADA and needs to be repaired or replaced in the next three years.

3. A low priority indicates a deficiency which is not affecting life safety or ADA and needs to be repaired or replaced in the next five years.

Probable Project Cost Estimating Criteria

1. **No programming work has been performed for any of the deficiencies. This is especially true when a deficiency for full demolition and replacement is indicated for a building. It would be advisable in the future to go through a programming period before actually replacing a building or system, as it may make sense to group building functions or building systems differently than how they currently exist. However, programming and new design work are not included in this study since the purpose of the study is to identify deficiencies and to figure their repair or replacement to match a new modern version in the same quantity and size of what exists.**

2. The costs are developed to a conceptual level based on construction cost standards (RS Means), comparisons to similar projects, consultation with contractors, and professional experience. Equipment and system costs were obtained from local product representatives when possible.

3. The costs reflect costs as of December 2021. The costs are not inflated for any future dates unless specifically noted otherwise.

4. The costs are figured to reflect the high level of difficulty associated with working in an actively occupied penitentiary. This includes the extra security measures for admittance of staff, materials, tools, and machinery into the facility.

5. The costs for the recommendation for each deficiency are assumed to be mutually exclusive unless specifically noted otherwise.

6. The costs include a 20% contingency for full building demolition and replacement work. A 30% contingency is included for new work occurring in existing buildings.

7. The costs include 10% for professional design fees.

8. Hazardous materials such as asbestos and lead paint were not addressed during the field work at the NSP. As a result, costs for removing hazardous materials, such as asbestos or lead paint, are not included in this study.

9. For deficiencies that have already been identified on the NDCS 2021 Biennium items report, their costs are included as-is per owner request. NDCS indicates that those costs were calculated right before the outbreak of COVID 19 in early 2020 and that is how they are to be presented.

10. The gross square footage and year of original construction for each building are based on information provided by NDCS.

Campus Information

A simplified NSP campus plan is included in Figure 1.

Figure 1: NSP Campus Plan

A more detailed campus plan listing the year each building was constructed, is included in Appendix A. In general, the oldest buildings on campus are located towards the south end and the newest buildings on campus are located towards the north end. The building abbreviations and scope indicated in Figure 1 are explained in Table 2.

Table 2: NSP Building Abbreviations

Building Name	Building Abbreviation	Included in Scope?
Activities Center	ACT	Yes
Ancillary Building	ANC	Yes
Canteen	CAN	Yes
Central Warehouse	CW	Yes
Construction Maintenance Shop/ Tanks	CMS	No (3)
Control Unit	CON	Yes (1)
Cornhusker State Industries Factory	CFACT	Yes (1)
Corrections Emergency Response Team	CERT	Yes
Chapel	CHAP	Yes
Education Building	EDU	Yes
Field Training Office	FTO	Yes
Guard Tower No. 1	GT1	Yes
Guard Tower No. 2	GT2	Yes
Guard Tower No. 3	GT3	Yes
Guard Tower No. 4	GT4	Yes
Guard Tower No. 5	GT5	Yes
Guard Tower No. 6	GT6	Yes
Guard Tower No. 7	GT7	Yes
Guard Tower No. 8	GT8	Yes
Guard Tower No. 10	GT10	Yes
Housing Unit No. 1	HU1	Yes
Housing Unit No. 2	HU2	Yes
Housing Unit No. 3	HU3	Yes
Housing Unit No. 4	HU4	Yes
Housing Unit No. 5	HU5	Yes
Housing Unit No. 6	HU6	Yes
Housing Unit No. 7	HU7	Yes
Housing Unit No. 8	HU8	Yes
Housing Unit No. 9	HU9	No
Laundry Building	LAUN	Yes
Library and Barber Shop	LIB	Yes
Maintenance Office	MAIN	No (3)
Mental Health Building	MENT	Yes
New Central Utility Plant	NCUP	No
Old Central Utility Plant	OCUP	Yes (2)

Table 2: NSP Building Abbreviations *(continued)*		
Building Name	**Building Abbreviation**	**Included in Scope?**
Pre-Employment Building	PEB	Yes
Private Venture Building	PVB	Yes
Shop and Storage Building	SHOP	No
Soap Factory	SOAP	Yes (1)
Vehicle Maintenance Building	VM	No (3)
Welding Shop	WELD	No (3)
Wellness Center	WELL	Yes

Notes:

(1) Scope only includes demolition of the building and no replacement.

(2) Scope only includes listing out previously identified deficiencies provided by NDCS.

(3) This building is not shown in the simplified campus plan but, is shown in the appendices.

Activities Center Observations

Photo ACT-1: Activities Center

The Activities Center (ACT) was built in 1975 and has an area of 1,880 gross square feet. It is functionally used for miscellaneous activities by the inmates. The north and east exteriors of the building are shown in Photo ACT-1.

Architectural

Envelope

The exterior envelope consists of pre-finished metal building panels on the walls and roof. The windows are all double-hung, single-pane aluminum windows. The roof is a metal standing seam roof that is part of the pre-finished metal building. The building sits on a slab on grade.

Interior

The building consists of stud walls with gypsum board finish with vinyl composite tile flooring (VCT). The ceilings are composed of gypsum board.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system.

Americans with Disabilities Act

The ACT was built pre-ADA.

Structural

The ACT building is a pre-engineered metal building (PEMB) manufactured by Armco. Previous cracks had been repaired in the gypsum ceiling; however, there were no control joints present to accommodate the flexibility of the PEMB system. No structural concerns were observed.

Photo ACT-M1: Existing Electric Water Heater

Mechanical

Plumbing Systems

An electric water heater exists, which is about 10 years old. See Photo ACT-M1. The water heater was observed to be actively leaking water. The domestic hot water piping has no pipe insulation installed.

The plumbing fixtures are original from 1975. This building was built before the Energy Policy Act (EPAct) of 1992 and before ADA, so the plumbing fixtures and flush valves are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one air handling unit (AHU), one air-cooled condensing unit (ACCU), a thermostat, direct-buried underfloor supply air ductwork serving floor registers along the perimeter of the building, and two restroom exhaust fans. The AHU is original from 1975 and has a steam heating coil and a direct expansion (DX) refrigerant cooling coil. See Photo ACT-M2.

Photo ACT-M2: Existing AHU

Photo ACT-M3: Existing ACCU

The steam piping and refrigerant piping are both missing pipe insulation. The ACCU is from the 1990s. See Photo ACT-M3. There is an outdoor air louver in the exterior wall for ventilation purposes, but it has been disconnected from the AHU's return air ductwork and is capped. As a result, the buildings only source of ventilation air is from operable windows which are only used during mild weather conditions.

The AHU, ductwork, and exhaust fans are original from 1975 which makes them about 46 years old, while the ACCU is from the 1990s, which makes it between 21 and 31 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years, while the ACCU has a median service life of about 15 to 20 years. As a result, the existing equipment is operating beyond its expected useful life.

Electrical

Power Systems

The power distribution equipment is original to the building and is operating beyond its useful service life. See Photo ACT-E1. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo ACT-E1: Main Electrical

Lighting Systems

Lighting systems are older fluorescent fixtures and are, for the most part, surface-mounted to the relatively low ceilings. These fixtures are not confinement-rated, which presents a security risk.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources, which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing lockable wall-mount telecommunication cabinet located in Storage 112 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry Building (LAUN). The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is an uninterruptible power supply (UPS) within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Photo ACT-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There are three existing cameras inside of the building. All three cameras are low resolution and manufactured by Panasonic (1.3MP).

Activities Center Deficiencies

This section presents deficiencies for the ACT. A summary of the ACT deficiencies analyzed for this study is presented in Table ACT-1.

Table ACT-1: Activities Center Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
ACT-1	Full Demolition & Replacement of Building	$ 940,000	All ACT Photos	No	High
Activities Center Deficiencies Total Costs:		**$ 940,000**			

ACT-1: Full Demolition and Replacement of the Building

The building roof leaks, and the windows do not meet current standards for energy code. There were several rust spots noted on the metal panels and gutters. Sealant at the windows is dry and cracked. If the building is to continue being used, new windows and a new roof with gutter and downspouts are recommended, and all the exterior walls should be repainted. This type of construction is not recommended as a permanent solution in a correctional environment.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged from water infiltration, and walls need a fresh coat of paint. The flooring has reached the end of its useful life and should be replaced. If the building is to continue being used, a complete interior renovation is recommended. The ceilings are low and the light fixtures are accessible to inmates.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult, expensive, and would reduce programming space. The probable project cost for this scope of work is $940,000.

Ancillary Building Observations

The Ancillary Building (ANC) was built in 1981 and has an area of 66,329 gross square feet. It is functionally used as administrative offices for staff and as a gymnasium, kitchen, dining, and skilled nursing facility for the inmates. The southwest and west exteriors of the building are shown in Photo ANC-1.

Photo ANC-1: Ancillary Building

Architectural

Envelope

The envelope of the building is brick veneer with a mix of concrete masonry unit (CMU) and stud back-up. Most of the brick appears to be in good condition. The windows on the building are double-paned aluminum and in good condition. The roof appears to be a modified bitumen roof and is roughly 20-25 years old, an age when this type of roof typically reaches the end of its useful life. All exterior doors on the secure side are hollow metal (HM) with the main entry doors being aluminum storefront.

Interior

The interior of the building is mostly in good shape considering its age. The walls are a combination of stud walls and masonry depending on the use of the space. The administration and office areas are stud with VCT flooring in the halls and carpet in the offices. Ceilings in these areas are ACT. To the north of the administration area, is medical. The walls switch to masonry with VCT floors and gypsum board ceilings. The main floor houses the main kitchen and dining areas. These areas are mainly VCT flooring, except for the kitchen which is Quarry tile. The ceiling in the kitchen is ACT. The walls are painted CMU with some fiberglass reinforced panels (FRP) above the counters. To the south of dining are more offices for staff, as well as central control and visitation. VCT floors, CMU walls, and ACT ceilings comprise most of these areas. To the south of visitation is the gym. This is an open two-story structure with a VCT floor and painted CMU walls. Storage and locker rooms are on the south end. The bathrooms are tile with stud back-up.

Photo ANC-A1: Existing Roof

Life Safety

The central stair in the facility that connects all three floors of the building is open and has been noted to be a life safety hazard. A project is currently underway to enclose this stair as part of the 2021 biennium request.

Americans with Disabilities Act

The ANC was built pre-ADA. The building does have full elevator access to all areas, but as noted below, the toilet rooms do not comply with current ADA standards.

Elevators

As noted above there are three elevators in the building that provide access to all areas in the building. Two are outside the secure perimeter and one is inside.

Structural

Photo ANC-S1: Rusting Gym Roof Framing

Photo ANC-S2: Cracks in Gym Flooring

With exception to the gym at the south end, the building is reinforced concrete slabs at the second floor and roof supported by interior concrete columns and concrete beams and columns at the perimeter. The gym roof is framed with long-span steel bar joists with steel beam and short-span steel bar joists at the southernmost end, all supported by CMU bearing walls. Rusting was present where the roof transitioned from the high flat roof to the sloped roof at the south end.

Cracks are present in the gym flooring. Review of the original building documents suggest there may have been a recessed portion of the floor that may have been infilled and corresponds with the cracks. Additionally, there may be a slab control joint at this location. This does not appear to be a structural concern.

Brick above the kitchen receiving door was damaged, most likely from vehicular impact. The concrete curb around a floor drain in Mechanical Room 2B68 is severely cracked and deteriorating.

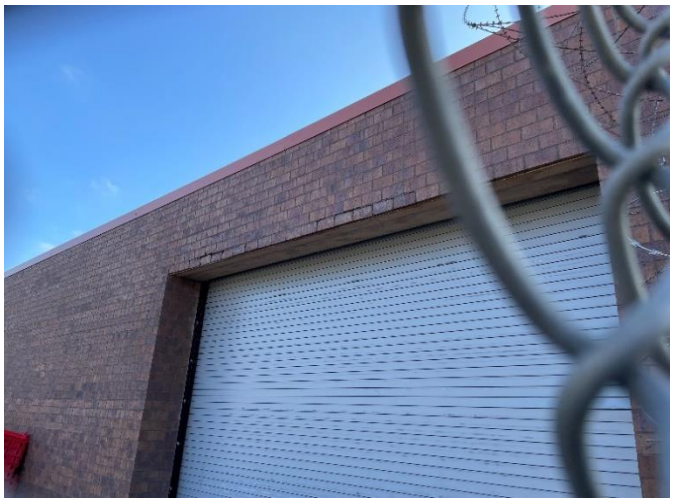


Photo ANC-S3: Damaged Brick at Kitchen Receiving

Photo ANC-S4: Deteriorated Curb in Mech Room 2B68

Foodservice

ANC contains the main kitchen and dining room located on the campus. They currently serve three meals per day to about 750 people at this location.

The hot water dispenser in employee dining area is an older unit and shows signs of extensive use. See Photo ANC-FS1. Also, the existing ice/water dispenser appears to not have a water filter assembly.

Photo ANC-FS1: Existing Hot Water Dispenser

The can racks and track wire shelving in the dry storage room show signs of being heavily used, as they have bent tops and shelves, and some units are showing signs of rust. See Photos ANC-FS2 and ANC-FS3.

Photo ANC-FS2: Existing Can Racks

Photo ANC-FS-3: Existing Track Wire Shelving

The griddle with stand appears to be heavily used (loss of control knobs, shows signs of high heat and unit has numerous dents) and shows signs of end of serviceable life. See Photos ANC-FS4 and ANC-FS5. The mixer is an older discontinued model, and appears to be extensively used and shows signs of end of serviceable life. See Photo ANC-FS6. The conveyor toasters appear to be heavily used. See Photo ANC-FS7.

Photo ANC-FS4: Existing Griddle

Photo ANC-FS5: Existing Griddle with Stand

Photo ANC-FS6: Existing Mixer

Photo ANC-FS7: Existing Conveyor Toasters

The reach-in refrigerators are older units and appear to be extensively used (both units are missing bottom front panels and have numerous dents on exterior), and show signs of end of serviceable life. See Photos ANC-FS8 and ANC-FS9.

Photo ANC-FS8: Existing Reach-in Refrigerator

Photo ANC-FS9: Existing Reach-in Refrigerator

All serving counters (utility counter, hot serving counter, refrigerated/cold serving counter) appear to be extensively used (loss of control knobs and scratched sneeze guards), and show signs of end of serviceable life. See Photos ANC-FS10, ANC-FS11, ANC-FS12, and ANC-FS13.

Photo ANC-FS10: Existing Utility & Hot Counter

Photo ANC-FS11: Existing Hot Serving Counter

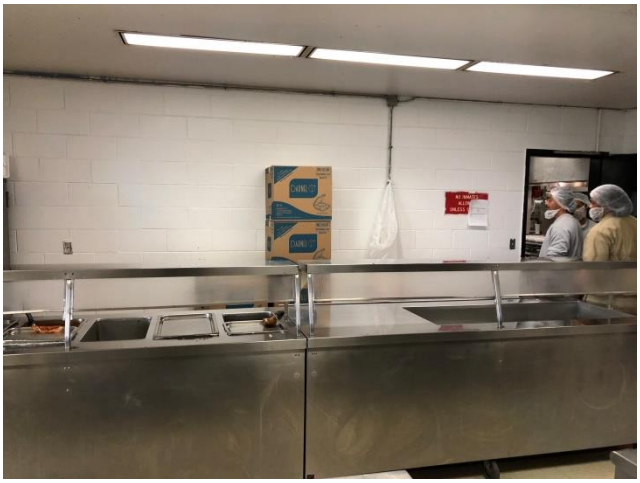


Photo ANC-FS12: Existing Refrigerated Counter

Photo ANC-FS13: Existing Refrigerated Counter

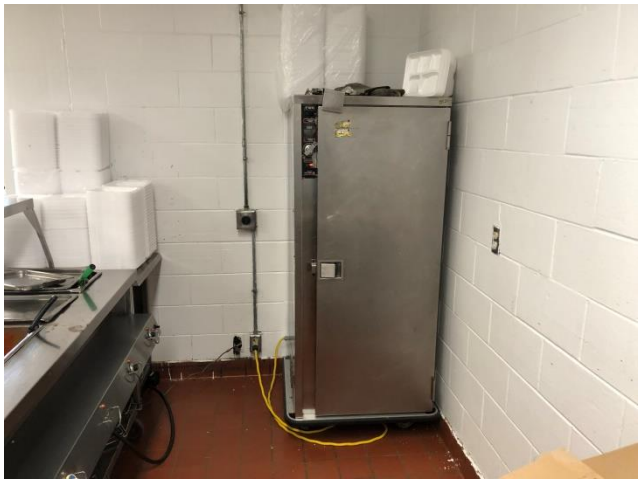


Photo ANC-FS14: Existing Mobile Hot Cabinet

Photo ANC-FS15: Existing Ice/Water Dispenser

Mobile hot cabinet in serving area appears to be an older unit and shows signs of extensive use. See Photo ANC-FS14.

Ice/water dispenser in serving area shows signs of extensive use. See Photo ANC-FS15.

The scullery sink and pre-rinse assembly appear to be original and shows signs of being heavily used (missing parts). See Photos ANC-FS16 and ANC-FS17.

Photo ANC-FS16: Existing Scullery Sink

Photo ANC-FS17: Existing Pre-Rinse Assembly

The hose reel spray assembly (at ceiling) and mixing valve (at wall) in the dish wash room appear to be original. They show signs of being heavily used and are at end of serviceable life. See Photos ANC-FS18 and ANC-FS19.

Photo ANC-FS18: Existing Hose Reel Spray Assembly

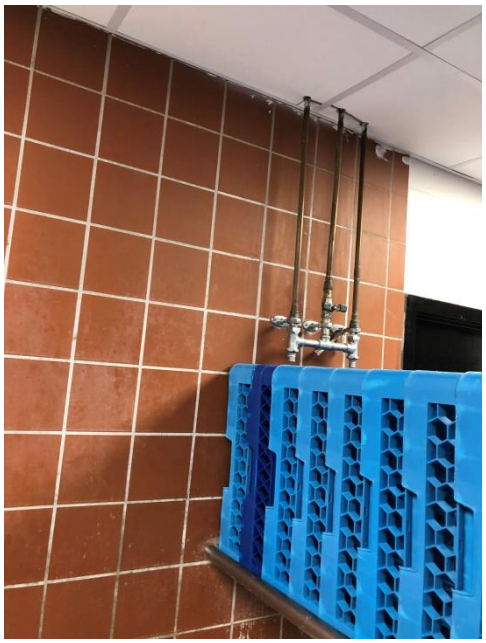


Photo ANC-FS19: Existing Hose Reel Mixing Valve

The work tables appear to be original units and show signs of heavy use. Some of the units are in worse condition than others (dented countertops and bent/damaged legs). See Photos ANC-FS20 and ANC-FS21.

Photo ANC-FS20: Existing Work Table

Photo ANC-FS21: Existing Work Table with Utensil Rack

Walk-in coolers/freezer appear to be original box assemblies and show signs of end of serviceable life. Walk-in door hinges have been pulled off of wall panels and doors numerous times, as there are multiple holes from hinges being relocated (vertically). See Photos ANC-FS22 and ANC-FS23.

Photo ANC-FS22: Existing Walk-in Coolers/Freezer

Photo ANC-FS23: Existing Walk-in Evaporator Coil

Mechanical

Plumbing Systems

A steam water heater exists in the second floor Mechanical Room 2B68 which is original from 1981. See Photo ANC-M1. The water heater has a pneumatic steam control valve which serves a steam tube bundle in this 680-gallon water tank. There is only one tube bundle in this water heater.

Photo ANC-M1: Existing Steam Water Heater

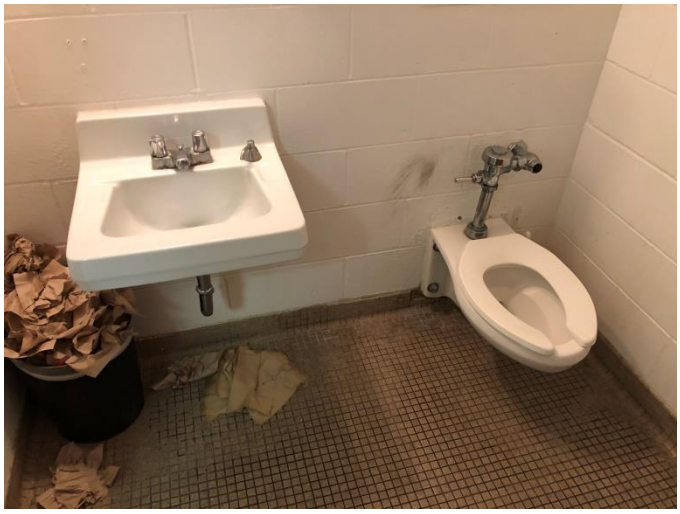


Photo ANC-M2: Typical Existing Plumbing Fixtures

With exception of the electric water coolers, the plumbing fixtures are original from 1981. See Photo ANC-M2 for typical plumbing fixtures. This building was built before the EPAct of 1992 and before ADA, so the plumbing fixtures and flush valves are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building only has standpipes at the stair towers, but it does not have fire sprinkler systems.

Photo ANC-M3: Typical Existing AHU

Heating, Ventilating, and Air-Conditioning Systems

The HVAC systems are composed of eight AHU systems; a steam heat exchanger; perimeter finned-tube heating; hydronic four-pipe fan coils; and base-mounted, end-suction pumps with most equipment still original from 1981. Humidifiers do not exist for this building.

There are five constant-volume AHU systems and three variable-air-volume (VAV) AHU systems which include inlet guide vanes at the fans and terminal units. See Photo ANC-M3 for a typical existing AHU. Four of the eight AHU systems utilize return air ceiling plenums, including the skilled nursing facility AHU. Three of the AHU systems provide supply air and return air through the slots around the ceiling-mounted light fixtures. The AHU fans are composed of one or two fans on a common shaft which are operated by a belt-driven fan motor. Ventilation air is provided via outdoor air louvers mounted in the exterior walls. The temperature controls are still pneumatic, but there are direct digital control (DDC) panels installed in each mechanical room, which are interfaced with the pneumatic controls to allow for remote monitoring and control of the building via the Honeywell building automation system (BAS).

Photo ANC-M4: Changed Out Chilled Water Coils

In the second floor Mechanical Room 2B68, two AHU chilled water coils have been changed out and left on the floor of the mechanical room, which provides evidence of previous equipment failure. See Photo ANC-M4.

Photo ANC-M5: Existing Kitchen Exhaust Hood

The kitchen is served by a constant-volume, make-up air unit with 100% outdoor air. However, the supply air is distributed via diffusers located out away from the two kitchen exhaust hoods. One of the kitchen exhaust hoods is shown in Photo ANC-M5. The kitchen exhaust hood ductwork is welded black steel, but it is not insulated with any type of duct insulation. There is a single centrifugal exhaust fan serving these hoods which appears to be from 1981.

Electrical

Power Systems

The electrical power distribution system includes a newer main service switchboard. See Photo ANC-E1. The remaining system components are a majority of equipment that is original to the building and some equipment that appears to be approximately 20 years old. The equipment original to the building is serving beyond its useful service life and needs to be replaced. It is also by a manufacturer that has been well documented for unreliable equipment. Replacement parts are only available on the secondary market, if they are available at all. It was noted in some locations that proper National Electrical Code (NEC) working clearances are not

maintained around equipment. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting systems throughout the building are varied as follows:

The gymnasium has old technology high-intensity discharge (HID) fixtures with fluorescent fixtures in the locker rooms. The emergency fixtures are in poor condition and need to be replaced.

Photo ANC-E1: Main Electrical Service

The kitchen has light-emitting diodes (LED) lamps installed in old fluorescent fixtures. The exit and emergency lighting are old and need to be replaced.

The dining area has old fluorescent fixtures. The exit and emergency lighting are old and need to be replaced.

The skilled nursing facility has old fluorescent fixtures. The exit and emergency lighting are old and need to be replaced.

Offices and remaining areas are generally lighted with older fluorescent fixtures. In general, the exit and emergency lighting are old and need to be replaced.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain, as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

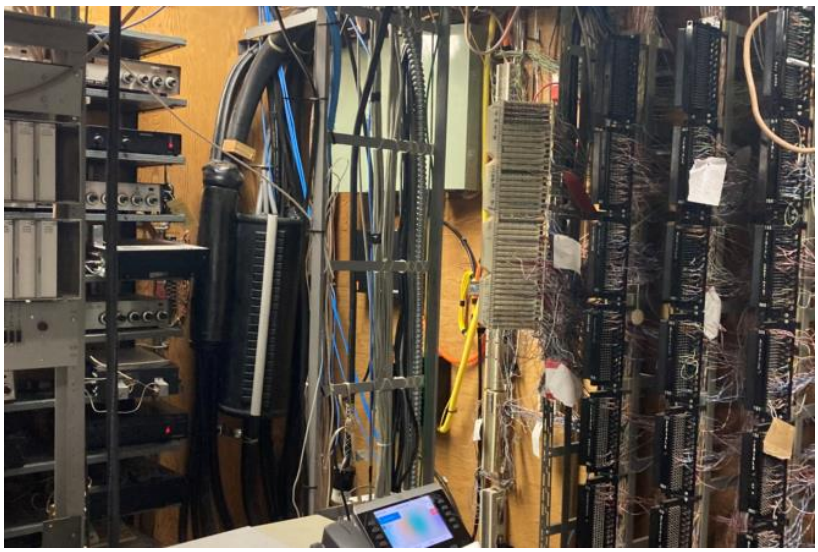


Photo ANC-T1: Existing Telecom Room 2B03

Technology

There are several telecommunication spaces throughout the building that serve the building for data, wireless, and telephones. The telecommunications room where the services enter the building and demarks is located in Telecom Room 2B03 located on the second floor. The building paging system amplifiers are also located in this room for most of the building and the surrounding parking/entry areas. There are existing telephone wall fields and entrance protectors within the room for analog telephones. There is a single data rack that houses network equipment and fiber optic cabling. The room has an existing HVAC system within the room and some overhead cable tray. The existing copper cabling consists of coaxial and Category 6 data cabling.

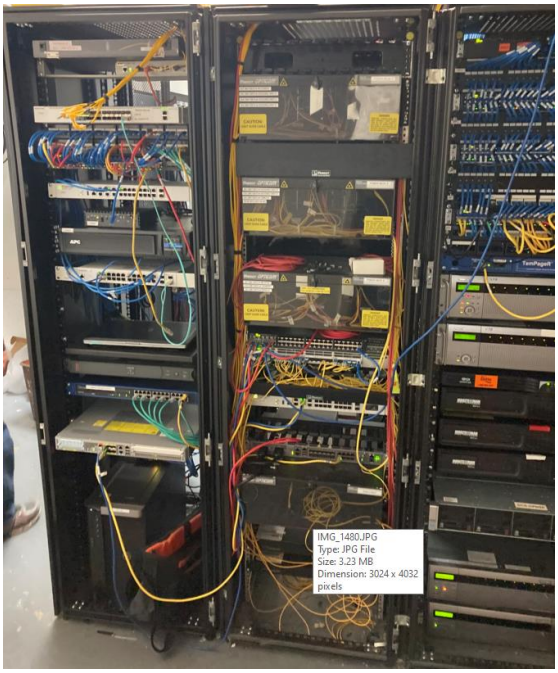


Photo ANC-T2: Existing Telecom Room 2A18

The main telecommunications room that services the building for data, wireless, and telephone is located in Telecom Room 2A18 located on the second floor. There are four data cabinets in the room that house fiber optic shelves, copper patch panels, networking equipment, UPSs, and network video records (NVRs) for video surveillance. The room has ladder rack and fiber cable tray above the cabinets for wire management. The room has a dedicated Emerson computer room air-conditioning (CRAC) unit for cooling the room. The fiber optic cabling for the NSP site distributes from this room to the other buildings on site or to the LAUN, where fiber optic cabling is also distributed to multiple buildings. The horizontal data cabling to work area outlets (WAOs) is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling.

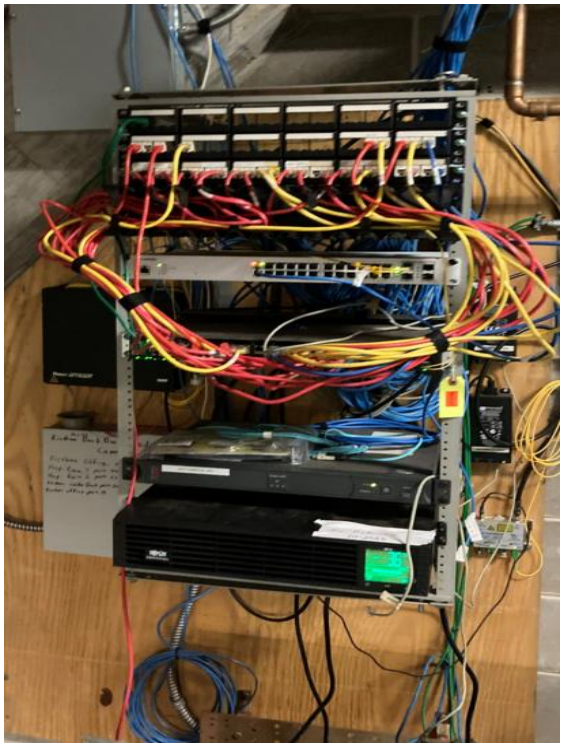


Photo ANC-T3: Existing Mechanical Room 2B68

There are several other telecommunications rooms in the ANC that service different areas in the building. The telecommunications rooms each have a wall-mounted telecommunications rack that includes copper patch panels, network equipment, and UPS. There is a telecommunications rack located in Telecom Room 1B12 and Mechanical Room 2B68. Each rack has single mode, fiber optic cabling that routes back to the main telecommunications room located on the second floor. The existing copper cabling consists of coaxial and Category 6 data cabling. There are telecommunications ground bars located

near each telecommunications rack, and the racks are grounded. The telecommunications rack within Mechanical Room 2B68 is a shared space with other trades and should be within a lockable telecommunications cabinet to control against unauthorized access.

Security

Detention Door Control Systems

There are several control locations in the Ancillary building that control and monitor movement at doors in the building.

1. Basement level – Public Entrance
2. Master Control Room
3. Turnkey Entrance
4. Nurses Office
5. Skilled Nursing Facility Entrance

Photo ANC-SEC1: Existing Door Control Panel - Basement Level - Public Entrance

All control locations use obsolete control panels to control and monitor their areas. Control panels consist of rotary switches and old-type LED indicators installed on composite board (plastic/steel) with text engraved on their surface. Some panels are installed into desk mounted turrets, and some are wall-mounted. The master control station has the capability to turn ON/OFF all local control panels, but cannot take control of doors controlled by local control panels. The existing doors are hard-wired into door control relays and switches.

Photo ANC-SEC2: Existing Door Control Panel - Master Control Room

Photo ANC-SEC3: Existing Door Control Panel – Turnkey Entrance

Photo ANC-SEC4: Existing Door Control Panel – Nurses Office

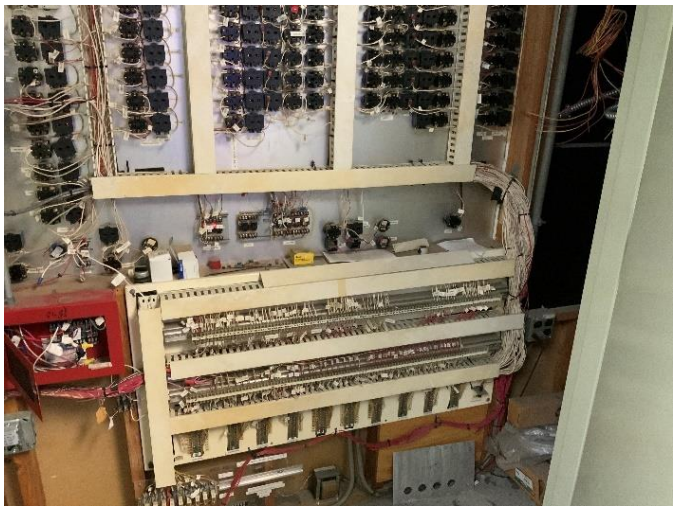


Photo ANC-SEC5: Existing Door Control Panel – Medical Area Entrance

Photo ANC-SEC6: Existing Door Control Panel – Door Control Relays and Switches (behind panels)

Intercom and Paging Systems

There is no detention intercom and paging system in this building. Life safety paging is provided through the building's telephone system.

Video Surveillance Systems

The existing video surveillance has existing IP cameras managed by an obsolete Panasonic PMPU server with Panasonic ND400 storage arrays. Most cameras are low resolution Panasonic internet protocol (IP) fixed and pan-tilt-zoom (PTZ) cameras. All video surveillance servers and recorders are installed in this building. The main video observation room is installed in this building.

Photo ANC-SEC8: Video Surveillance System Servers and Recorders

Photo ANC-SEC7: Main Video

Perimeter Detection System

Perimeter detection system (PDS) head-end equipment and monitoring stations are installed in the master control room. New Senstar, Fiber Patrol System was installed in late 2020. The detection sensors consist of fiber optic cables. The cables are connected to a signal processing module that detects and locates attempted intrusions by analyzing the changes in reflected energy that occur as a result of minute vibrations in the sensor cables.

Photo ANC-SEC10: Existing Perimeter Detection System – Head-End Equipment Cabinet (Controller)

Photo ANC-SEC9: Existing Perimeter Detection System Monitoring Station

The PDS also includes the bi-static microwave system consisting of separate microwave transmitter and receiver assemblies, which between them, create a roughly cylindrical zone of detection. The system detects intruders by sensing variations in the strength of the microwave signal arriving at the receiver when an intruder attempts to pass through the detection zone. The microwave PDS detects intruders attempting to cross the detection zone in any manner including walking, running, crawling, rolling, and jumping. The microwave devices are installed at all vehicle sally ports in the facility.

Ancillary Building Deficiencies

This section presents deficiencies for the ANC. A summary of the ANC deficiencies analyzed for this study is presented in Table ANC-1.

Table ANC-1: Ancillary Building Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
ANC-A1	Fire Egress at Stair S4	$ 145,000	NA	Yes	High
ANC-A2	Elevator Upgrade for No. 1, 2, & 3	$ 750,000	NA	Yes	High
ANC-A3	ADA Power Assists at Main Entry	$ 75,000	NA	Yes	High
ANC-A4	ADA Modifications at Visting, Gym, Admin	$ 180,000	NA	Yes	High
ANC-A5	Roof Replacement	$ 2,178,000	ANC-A1	No	Medium
ANC-A6	Below Grade Waterproofing	$ 50,000	NA	No	High
ANC-A7	Exterior Door Repair / Replacement	$ 25,000	NA	No	Medium
ANC-A8	Gym Structure Cleaning and Repainting	$ 25,000	NA	No	Low
ANC-A9	Gym Floor Replacement	$ 110,000	NA	No	Low
ANC-A10	Dining / Kitchen Ceiling Replacement	$ 70,000	NA	No	High
ANC-FS1	Foodservice Equipment Replacement	$ 625,000	ANC-FS1 thru FS21	No	Medium
ANC-FS2	Walk-in Coolers / Freezer Replacement	$ 680,000	ANC-FS22 & FS23	No	Medium
ANC-S1	Rusted Gym Roof Framing	$ 5,400	ANC-S1	No	Low
ANC-S2	Damaged Brick at Kitchen Receiving	$ 2,700	ANC-S3	No	Low
ANC-S3	Deteriorated Mechanical Curb	$ 6,300	ANC-S4	No	Low
ANC-M1	New Fire Sprinkler System	$ 865,000	NA	No	High
ANC-M2	Water Heater Replacement	$ 329,000	ANC-M1	No	High
ANC-M3	Plumbing Fixtures Replacement	$ 772,000	ANC-M2	No	High
ANC-M4	HVAC Systems Replacement	$ 7,020,000	ANC-M3	No	High
ANC-M5	Kitchen Hoods Replacement & Add MAU	$ 452,000	ANC-M4	No	High
ANC-M6	Grease Interceptor Replacement	$ 151,000	NA	No	Low
ANC-E1	Power Distribution System Replacement	$ 3,990,000	ANC-E1	No	High
ANC-E2	Lighting System Replacement	$ 2,660,000	NA	No	High
ANC-E3	Convenience Receptacle Upgrade for ADA	$ 598,000	NA	No	High
ANC-E4	Replace Fire Detection and Alarm System	$ 465,000	NA	No	High
ANC-T1	New Telecom Room	$ 95,000	ANC-T3	No	Low
ANC-SEC1	Detention Door Control System Replacement	$ 98,000	ANC-SEC2	No	Medium
ANC-SEC2	Intercom and Paging System Addition	$ 120,000	NA	No	Medium
ANC-SEC3	Video Surveillance System Replacement	$ 430,000	ANC-SEC8	No	Medium
Ancillary Building Deficiencies Total Costs:		**$ 22,972,400**			

ANC-A1: Fire Egress at Stair S4 (NDCS 2021 Biennium Item)

This project will add fire separation for the main stairwell in the main administration building entrance with one-hour fire construction per site inspection by the fire marshal. The probable project cost for this scope of work is $145,000.

ANC-A2: Elevator Upgrade for No. 1, 2, and 3 (NDCS 2021 Biennium Item)

This project would replace the three elevators in the ANC. One of the elevators is for inmate use to get from the front entrance of the facility to intake and medical. Another elevator is for staff and visitors from the staff check-in station to visiting and administration area. The last elevator is for access from the main doors to the staff/visitor check in. All of the elevators are used every day by staff, inmates, and visitors. These elevators are

original to the building that was built in the mid-1980s. The probable project cost for this scope of work is $750,000.

ANC-A3: Americans with Disabilities Act Power Assists at Front Entrance (NDCS 2021 Biennium Item)

This project encompasses modifications to the main entrance front door power assists, new doors, locks, and frames. The project consists of the ADA installation of two power assist door operators; one each at the front door and vestibule door. It would also replace six, 3-foot rusted-out HM doors and replace with four new 4-foot HM doors. The probable project cost for this scope of work is $75,000.

ANC-A4: Americans with Disabilities Act Modifications at Visiting, Gym, and Admin (NDCS 2021 Biennium Item)

This project encompasses modifications to the ADA ANC in two parts. The first part involves public areas such as visitation and the gymnasium. The second is in the administration areas. This project involves changes/modifications found to be necessary to comply with the ADA of 1990. The probable project cost for this scope of work is $180,000.

ANC-A5: Roof Replacement

The roof leaks at a transition point between the high roof and low roof on the south end of the building above the gym. The flashing and sloped metal roof in this area appears to have failed and should be replaced. A full roof replacement should also be considered due to the age of the roof. The probable project cost for this scope of work is $2,178,000.

ANC-A6: Below Grade Waterproofing

The building does leak at the main entry vestibule below grade. This is most likely due to a failure of the waterproofing below grade. The grade should be pulled away from the building at this point of intrusion, and the existing waterproofing should be inspected and repaired as needed to ensure a watertight envelope. The probable project cost for this scope of work is $50,000.

ANC-A7: Exterior Door Repair/Replacement

The doors at the kitchen are heavily damaged and should be replaced. The doors elsewhere should be repainted and repaired as required. At the loading dock of the kitchen, there is an overhead roll up steel door that is reaching the end of its useful life and should be replaced. The probable project cost for this scope of work is $25,000.

ANC-A8: Gym Structure Cleaning and Repainting

The gym ceiling is an exposed ceiling structure and his extremely dirty with dust and water spots from old roof leaks. The structure should be cleaned and repainted. The probable project cost for this scope of work is $25,000.

ANC-A9: Gym Floor Replacement

The facility would like to see the VCT flooring in the gym replaced with a rubberized sport flooring that is more typically used in a gym setting. The probable project cost for this scope of work is $110,000.

ANC-A10: Dining/Kitchen Ceiling Replacement

The ceilings in the dining halls and kitchen are damaged in several locations and are missing tiles. These tiles are extremely difficult to replace because they are clipped -in-place security tiles. The entire ceiling system in both areas should be replaced. The probable project cost for this scope of work is $70,000.

ANC-S1: Rusted Gym Roof Framing

The rust appeared to be minimal. Loose material requires removal and the steel then painted. The probable project cost for this scope of work is $5,400.

ANC-S2: Cracks in Gym Flooring

This is non-structural, but may require repair. The probable project cost for this scope of work is $3,000.

ANC-S3: Damaged Brick at Kitchen Receiving

The brick requires repair, including any weeps existing at the lintel. The probable project cost for this scope of work is $2,700.

ANC-S4: Deteriorated Mechanical Room Curb

Portions of the curb require repair or replacement. The probable project cost for this scope of work is $6,300.

ANC-FS1: Foodservice Equipment Replacement

The hot water dispenser (in employee dining), can racks, and track wire shelving (in dry storage), griddle, mixer, conveyor toasters and reach-in refrigerators (in Kitchen), serving counters, mobile hot cabinet, ice/water dispenser (in serving area), scullery sink, pre-rinse assembly, hose reel spray assembly and mixing valve (in dish wash area), work tables, and faucets at sinks (in kitchen) are showing signs of heavy use and damage from the high volume of meals, and are nearing the end of their expected median service life and need to be replaced. It is recommended to replace the foodservice equipment listed above. The probable project cost for this scope of work is $625,000.

ANC-FS2: Walk-in Coolers/Freezer Replacement

The walk-in coolers/freezer compartments and the refrigeration systems are older units, showing deterioration at the wall/ceiling panels and doors, and the refrigeration systems are operating on discontinued refrigerant. As a result, these units are nearing the end of their expected median service life and need to be replaced.

It is recommended to replace the walk-in coolers/freezer compartments and the refrigeration systems with a single rack refrigeration system. The rack refrigeration system would be capable of running all walk-in

compartments from a single rack, and includes a back-up compressor for 100% redundancy, operating with the newer refrigerant. The probable project cost for this scope of work is $680,000.

ANC-M1: New Fire Sprinkler System

This project would install a complete fire sprinkler system to include materials, fire water service, and construction costs in all areas of the ANC, including the skilled nursing facility, to minimize the risk of life-threatening fires in this building. The probable project cost for this scope of work is $865,000.

ANC-M2: Water Heater Replacement

The steam water heater is original from 1981 which makes it about 40 years old. According to ASHRAE, a steam tube bundle heat exchanger, which is part of this water heater, has a median service life of about 24 years. As a result, the existing water heater is operating at about 16 years beyond its expected median service life and needs to be replaced. The water heater also has no redundancy so, if the steam tube bundle should fail, the building would be without domestic hot water until it can be repaired. The existing water softener for this system appears to be about 20 years old and is in need of replacement.

It is recommended to replace this water heater with two storage tank steam water heaters and two equally sized pumps which are piped in parallel. Each water heater would be capable of providing 100% of the heating load so there is full domestic hot water heating redundancy. A new water softener would also be provided. The probable project cost for this scope of work is $329,000.

ANC-M3: Plumbing Fixtures Replacement

With exception of the electric water coolers, the plumbing fixtures are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. It is recommended to replace the plumbing fixtures with modern water conserving fixtures which also meet ADA requirements. The probable project cost for this scope of work is $772,000.

ANC-M4: HVAC Systems Replacement

The HVAC systems are mostly original from 1981 which makes them about 40 years old. According to ASHRAE, most fans, coils, terminal units, pumps, and controls have a median service life about 20 years. As a result, the existing equipment is operating at about 20 years beyond its expected useful life and needs to be replaced. The AHUs also have no redundancy on their air-side so, if the single supply fan for each system should fail, portions of the building would be without HVAC until it can be repaired.

It is recommended to replace the existing HVAC equipment, clean, and reuse duct mains where they are not accessible, install modern supply air diffusers and ducted return air grilles, and to upgrade the building to a fully integrated digital BAS. The new AHUs will be provided with fan arrays which are composed of multiple direct drive fans which can automatically speed up to provide redundancy in the event that one fan should fail. The AHUs will also include MERV 13 filters, ultraviolet (UV) lights at the cooling coils, and humidifiers to provide improved indoor air quality for the occupants. This work will require the acoustical lay-in ceilings and the hard ceilings to be removed and replaced, and those costs are included. The light fixtures would also need to be

removed and replaced, but those costs are included only in Deficiency ANC-E2 to avoid duplication of costs. The probable project cost for this scope of work is $7,020,000.

ANC-M5: Kitchen Exhaust Hoods Replacement and Add Make-Up Air Unit

The kitchen exhaust hoods are original from 1981 which makes them about 40 years old and due for replacement. The kitchen exhaust ductwork is welded black steel, but fire-rated duct insulation is not installed, which is required by the International Mechanical Code (IMC) and by National Fire Protection Association (NFPA).

It is recommended to replace both of the kitchen exhaust hoods with two similar-sized, modern, Type I exhaust hoods which are rated for grease exhaust air. The welded black steel exhaust ductwork will be cleaned and reused, but a new grease rated exhaust fan will be provided. The hoods will be provided with 100% outdoor air make-up air at the perimeter of the hoods to help with the capture of moist grease laden air from the cooking equipment below. A make-up air unit (MAU) will be installed on the roof and ducted down to the kitchen exhaust hoods in the first floor kitchen. The MAU and the exhaust fan will be controlled in steps to correspond to having one or both kitchen exhaust hoods on at a time. The probable project cost for this scope of work is $452,000.

ANC-M6: Grease Interceptor Replacement

It is recommended to remove the two smaller grease interceptors from the floor of the kitchen and to install a single larger grease interceptor outside of the perimeter security fencing to allow for simplified routine cleaning of the grease interceptor by external contractors. The probable project cost for this scope of work is $151,000.

ANC-E1: Power Distribution System Replacement

Overall, the existing power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $3,990,000.

ANC-E2: Lighting System Replacement

Lighting throughout the building is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $2,660,000.

ANC-E3: Convenience Receptacle Upgrade for Americans with Disabilities Act

Convenience receptacle mounting heights are not compliant with modern ADA standards. Relocation of these receptacles is required to meet ADA requirements. The probable project cost for this scope of work is $598,000.

ANC-E4: Fire Detection and Alarm System Replacement

The probable project cost for this scope of work is $465,000.

ANC-T1: New Telecom Room

The existing telecommunications rack in Mechanical Room 2B68 is a shared space with other trades. BICSI standards recommend that telecommunication equipment cabinets should control against unauthorized access

and in a controlled environment. It is recommended that an enclosed telecommunication room be added around the existing telecommunication wall-mounted rack so that the telecommunication equipment can be secured and controlled. Recommend building out a dedicated telecommunication room with proper security, cooling, and grounding per BISCI standards. The probable project cost for this scope of work is $95,000.

ANC-SEC1: Detention Door Control System Replacement

Security in a detention facility has never been easy, but societal requirements continue to evolve in a manner that makes security even more complex and critical. It is the opinion of this consultant that the NDCS needs to make several upgrades in the direction of increased integration of security functions so that staff can keep up with the workload.

The existing control panels are in very bad shape. Some of them are not working at all (nurses station) and some of them are partially operational due to broken switches and LED indicators. The door control technology used to control and monitor existing field devices is obsolete and does not provide any flexibility necessary to provide more secure and efficient system.

The door control system is the base upon which all the security sub-systems reside, so it is of fundamental importance. Modern detention control systems are based on a type of special purpose computer known as programmable logic controllers (PLCs). One of the crucial features of these devices is that they are set up so that a precise operational sequence is placed in a thing called a read only memory (ROM). A copy is then made in regular memory to run the program and the system constantly checks that the operation matches the program in the ROM. Re-writing the ROM can only be done with special equipment, so the operational sequences cannot be altered by regular staff, which is important where reliability and accountability are important. Still another crucial feature is that these devices have been designed specifically for the control of critical processes in frequently bad environmental conditions. There is a measure of the reliability of equipment called mean time between failure (MTBF). Industrial PLCs are designed and tested to have an MTBF, which is typically in excess of 15 years. By comparison, the personal computers that you probably use at home or work has an MTBF in the one to two-year range if the manufacturer will even quote a figure.

The last point leads to a critical consideration for the upgrade since the touch screen interface is typically driven by a consumer-grade computer (i.e., that a critical location like Central Control should be redesigned to have two operator stations). This is so that a backup is instantly available in case of failure of the other station, as well as allowing multiple operators during times of high activity. In addition, spare equipment should be on site to allow prompt repair of any touch screen that goes down. Most large facilities being installed today will have all of the touch screen computers programmed the same with special partitions on the hard drives for different areas, or have a special server on the network that can download appropriate screens to any other computer on the network when required. The server is then equipped with a feature called random array of inexpensive disks (RAID), so that loss of data is prevented. It should be noted that the critical sequences are all on the PLCs. The regular computers are only for running the touch screen displays.

The replacement of the existing control panels and the existing relays should be considered as a high priority considering the age and present condition of the existing door control equipment. New door control system shall consist of a multiple PLC(s), administration server and touch screen control stations at several control

locations. New PLC based head-end equipment (included but not limited to CPU, Ethernet communication modules, I/O modules, power supplies, relays, etc.) shall be provided in each security equipment room. All new electronic security system head-end equipment shall communicate over new security system network.

New touch screen (TS) control stations are recommended for master control room (three stations) and nurses control station (one). Other control station could be eliminated with provision of new intercom stations and camera coverage of the doors currently controlled by local panels at Turnkey entrance, front entrance and Skilled Nursing Facility entrance. New TS system in the master control should be provided with the capability to take over and/or backup any control station in entire facility. Housing Unit No. 5 (HU5) and Housing Unit No. 9 (HU9) currently have capability to transfer their control to the master control room. The probable project cost for this scope of work is $98,000.

ANC-SEC2: Intercom and Paging System

The building does not have intercom system that would allow communication between officers at control location and persons at the remotely controlled doors. To provide more efficient and secure system, we recommend providing new intercom system that would include intercom stations at each remotely controlled door and master intercom station at each control station. Intercom system would be integrated into new touch screen control system. The probable project cost for this scope of work is $120,000.

ANC-SEC3: Video Surveillance System

The existing Panasonic video surveillance system should be replaced with the new video management and recording system that will allow live video monitoring and recording of all existing cameras. All existing cameras with resolution lower than 2MP and cameras that do not support new compression technology (H.264 and higher) should be replaced. New cameras should be provided to improve video coverage and allow more secure building operation. All existing video viewing stations and video storage should be replaced to meet standards established in some other NDCS facilities such as LCC, DEC, TCSI and RTC.

There is a need for approximately 35 new cameras and approximately replacement of 22 existing cameras. To support operation of recommended touch screen stations there will be a need for eight new video viewing stations, eight new 27-inch video monitors and eight new 65-inch video monitors. New video management server, new video recording server, and video storage will be required to support operation of all new cameras and video viewing stations. The probable project cost for this scope of work is $430,000.

Canteen Observations

The Canteen Building (CAN) was built in 1981 and has an area of 1,796 gross square feet. It is functionally used as a store where inmates can purchase various products. The south and west exteriors of the building are shown in Photo CAN-1.

Photo CAN-1: Canteen

Architectural

Envelope

The CAN is a single-story building with single wythe exterior masonry walls and a steel joist super structure with metal deck and an ethylene propylene diene monomer (EPDM) roof. There are a several hollow metal doors; one that provides access to the storage side and three on the side that inmates access to pick up their items.

Interior

The interior of the building is all exposed structure with VCT flooring. The interior walls are studs with wood doors and windows. The walls are painted. Mechanical systems and pipes are exposed and within reach of inmates.

Life Safety

There is currently no fire suppression system in the building, and boxes are stacked to the roof deck between joists and on the ductwork. Ductwork systems are not designed for or intended to support the weight of stored items and the stacked boxes limit the distribution of airflow to the space. The mechanical equipment is not separated from the storage areas.

Americans with Disabilities Act

The CAN was built pre-ADA.

Structural

The structure is steel roof deck on steel bar joists supported by CMU bearing walls. No structural items were noted.

Foodservice

Canteen building contains storage for dry, refrigerated, and frozen goods. Currently, there are two single-section, reach-in freezers and a two-section, reach-in refrigerator for cold storage.

The reach-in refrigerator appears to be an older unit and nearing the end of its serviceable life. The interior cavity of the unit is showing signs of rust/corrosion along the panel joints. See Photos CAN-FS1 and CAN-FS2.

Photo CAN-FS1: Existing Reach-in Refrigerator

Photo CAN-FS2: Existing Reach-in Refrigerator Interior

Mechanical

Plumbing Systems

The domestic hot water is provided to this building from a water heater in the Soap Factory (SOAP). The plumbing fixtures are a mixture of ages. The flush tank water closet is about five years old, but the lavatory appears to be original from 1981. See Photo CAN-M1. This building was built before the EPAct of 1992 and before ADA, so the lavatory and faucet are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Photo CAN-M1: Existing Plumbing

Fire Protection Systems

This building does not have a fire sprinkler system. Boxes of items are stacked up to the bottom of the roof deck. See Photo CAN-M2, which would need to be reduced if a fire sprinkler system was added.

Photo CAN-M2: Stacked Boxes up to Roof

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two AHUs one ACCU thermostats, and one restroom exhaust fan. The west AHU is from 2012 and has a steam heating coil and a chilled water cooling coil. See Photo ACT-M3. The steam piping, chilled water piping, and cooling coil condensate are all routed over food items which need to be avoided. There is not any mechanically introduced ventilation air provided for this building.

The east AHU, ductwork, and exhaust fan are original from 1981, which makes them about 40 years old; while the west AHU is from 2012, which makes it about 9 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years. As a result, the existing east AHU and the exhaust fan are operating beyond its expected useful life.

Photo ACT-M3: Existing AHU

Electrical

Power Systems

Power distribution equipment within this building is load-center type and in fair condition. See Photo CAN-E1. Load centers are generally considered residential-grade and not a good long-term solution for a commercial building. It appears to date to the original building construction and is serving beyond its useful service life. Convenience receptacle quantities are fewer than what should be available for the occupancy and use of the Canteen. Various convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo CAN-E1: Electrical Panel

Lighting Systems

Interior lighting appears to have been recently updated with LED strip fixtures, hung from the overhead structure. Exit lights are new LED-type with emergency heads and integral batteries. All these fixtures appear to be in good, serviceable condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources, which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall-mount telecommunication rack located in Office 104 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. There is a telecommunication ground bar that provides grounding to the telecommunications rack.

Photo CAN-T1: Existing Telecom Cabinet

Canteen Deficiencies

This section presents deficiencies for the CAN. A summary of the CAN deficiencies analyzed for this study is presented in Table CAN-1.

Table CAN-1: Canteen Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
CAN-1	Full Demolition & Replacement of Building	$ 735,000	All CAN Photos	No	High
Canteen Deficiencies Total Costs:		**$ 735,000**			

CAN-1: Full Demolition and Replacement of the Building

The canteen building is grossly undersized for its current use, and the building itself has no easy or economical way to become ADA compliant. Adding fire sprinklers would only limit the amount of space needed for storage, as inventory could not be stacked as high as it currently is, and current energy codes do not allow for single wythe construction. The toilet and storage side of the building do not meet current ADA standards, as there is no ability to turnaround with the amount of shelving in the building. It is the recommendation of this report that the building should be demolished and replaced with a new building that meets current standards. The probable project cost for this scope of work is $735,000.

Central Warehouse Observations

The Central Warehouse (CW) was originally built in 1955, with a freezer added in 1999 for a total area of 30,869 gross square feet. It is functionally used to store products and food ordered for the NSP. The southwest exterior of the building is shown in Photo CW-1.

Photo CW-1: Central Warehouse

Envelope

The CW is a single-story building comprised of three sections. The middle section is single wythe masonry, with overhead steel doors and hollow metal pedestrian doors and frames. The outside sections appear to be tilt-up concrete walls with concrete posts and steel joists and beams. There is an insulated metal freezer on the west side of the building.

Interior

The interior of the building is mostly open with shelving for storage. There are several mezzanines with offices and toilets located underneath them. The walls are painted, and the floor is sealed concrete. The walls of these offices are studs with wood doors and windows. There is a high-speed insulated overhead door that separates the freezer from the rest of the space.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire suppression and fire alarm system.

Americans with Disabilities Act

The CW was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Structural

The roof is steel deck supported by steel bar joists. The joists are supported by a combination of cast-in-place concrete and CMU bearing walls. Approximately the north half of the east bay has had the roof deck replaced due to reported extensive rusting.

Cracks are present in the south-central CMU wall. No control joints were observed in this wall.

Photo CW-S1: Cracked CMU

The metal roof deck at the west bay is installed upside down. This significantly weakens the deck and does not provide adequate support for rigid insulation installed on top of the deck. Additionally, small areas of rusted deck are also present, estimated to be less than 10 percent of the deck area.

Cracking is present in the exterior concrete walls at or near control joint reveal locations.

CW-S2: Rusted Roof Deck Installed Upside Down

CS-S3: Cracked Concrete Walls

Foodservice (Freezer)

The walk-in freezer is located on the exterior of the CW building and is accessed by an overhead roll-up door from the inside of the warehouse. The walk-in freezer accommodates storage for pallets of frozen food to be distributed to the kitchens.

The existing walk-in freezer contains a total of five evaporator coils, of which four appear to be original equipment from 1999. The larger (fifth) evaporator coil was added to aid in holding the proper temperature inside of the freezer compartment. See Photos CW-FS1&CW-FS2.

Photo CW-FS1: Existing Freezer Evaporator Coils

Photo CW-FS2: Existing Freezer Evaporator Coils

The existing insulation on the refrigeration piping (between the condensing units outside and the evaporator coils) is in poor condition, as it is missing in areas and deteriorating in other areas. See Photos CW-FS3&CW-FS4. This results in cold dissipating in the pipe and allowing ice to build-up around the refrigeration piping (especially at the exterior of the compartment). This reduces the efficiency of the refrigeration system by not providing the proper operating temperature at the evaporator coils.

Photo CW-FS3: Existing Older Condensing Units

Photo CW-FS4: Existing Refrigeration Piping

The condensate drain lines from all five evaporator coils appear to be routed straight through the wall panel of the walk-in freezer compartment to the exterior of the building without any traps. See Photos CW-FS5&CW-FS6. This results in warm/humid air infiltrating into the walk-in freezer compartment through the condensate drain piping and being dispersed throughout the interior of the box by the evaporator fans.

Photo CW-FS5: Existing Freezer Evaporator Coils

Photo CW-FS6: Existing Evaporator Coil Drains

Regarding the location of the newer/larger Russell condensing unit, it has been located directly in front of the hot air discharge (exit) side of the two older condensing units. See Photos CW-FS7&CW-FS8. This results in the newer condensing unit bringing in warmer air into the air in-take side, making it less efficient for cooling the unit. Photo CW-FS8 shows that a plastic pallet has been attached to the end of the newer condensing unit to help prevent the hot air from blowing into the newer condensing unit.

Photo CW-FS7: Existing Freezer Condensing Units

Photo CW-FS8: Existing Large Condensing Unit

Mechanical

Plumbing Systems

Two electric water heater exists which are both about five years old. See Photo CW-M1. The domestic hot water piping has no pipe insulation installed.

The building is served by two natural gas meters with one on each end of the U-shaped building. The southwest gas meter and piping appears to be at least 40 years old and is shown in Photo CW-M2.

Photo CW-M1: Typical Existing Electric Water Heater

Photo CW-M2: Existing Natural Gas Meter at SW Wall

With exception of the electric water cooler which is a couple of years old, the plumbing fixtures are about 40 years old. These fixtures are older than the EPAct of 1992 and before ADA, so the plumbing fixtures are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building has a wet-pipe fire sprinkler system with the fire protection water service located in the warehouse manager's office. See Photo CW-M3.

Photo CW-M3: Fire Protection Water Service Entrance

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of eight natural, gas-fired unit heaters of which, three do not work. See Photo CW-M4. There are two rows of natural gas infrared radiant heaters in the middle warehouse area.

There are three roof-mounted exhaust fans, which are interlocked to exterior wall control dampers to help ventilate the warehouse during the summer. See Photo CW-M5.

Photo CW-M4: Existing Abandoned Gas Unit Heater

Photo CW-M5: Existing Ventilation Control Damper

There are also three office spaces in the warehouse with two being served by ductless mini-split heat pump systems, and the other one is served by a gas furnace and ACCU split system. See Photo CW-M6.

At the walk-in freezer entry door, there is an air curtain with electric heat to help keep the material of the rapid open freezer door flexible. See Photo CW-M7.

Photo CW-M6: Existing Gas Furnace and ACCU Split System

Photo CW-M7: Existing Air Curtain at Rapid Open Freezer Door

The unit heaters vary in age from about 25 years old to only about one year old, with half being older and half being newer. The two ductless mini-split heat pump systems are about one year old, and the gas furnace with ACCU split system is about five years old. The natural gas infrared radiant heaters were installed in the last couple of years, but the exhaust fans and associated ventilation air control dampers are about 30 years old. The air curtain is only a couple of years old.

According to ASHRAE, gas unit heaters have a median service life of about 25 years, while the roof-mounted exhaust fans have a median service life of about 20 years. Also, the ACCU has a median service life of about 15 to 20 years. As a result, half of the gas unit heaters and all of the exhaust fans and associated control dampers are operating beyond their expected useful life.

Electrical

Power Systems

The power distribution system is comprised of several different vintages of electrical gear. See Photo CW-E1. Most all of the equipment is serving beyond its useful service life and needs to be replaced. Convenience receptacles are of varied vintages as well. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo CW-E1: Main Electrical Service

Lighting Systems

Lighting in the warehouse storage areas and main office area is comprised of newer LED fixtures. These fixtures are in good, serviceable condition. The remaining lighting throughout the facility is a combination of older fluorescent and incandescent fixtures that are serving beyond their useful service life and need to be replaced. In general, the exit and emergency lighting fixtures appear to be newer vintage and in serviceable condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

Photo CW-T1: Existing Telecom Cabinet

There is an existing, lockable, wall-mount telecommunication cabinet located in Office 111 that serves data for the entire building, including the central receiving warehouse. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunication rack located in Mechanical 102 of the CERT building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal data cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Central Warehouse Deficiencies

This section presents deficiencies for the CW. A summary of the CW deficiencies analyzed for this study is presented in Table CW-1.

Table CW-1: Central Warehouse Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
CW-1	Full Demolition & Replacement of Building	$ 6,450,000	All CW Photos	No	High
Central Warehouse Deficiencies Total Costs:		**$ 6,450,000**			

CW-A1: Full Demolition and Replacement of the Building

The central warehouse building is grossly undersized for its current use and the building itself has no easy or economical way to become ADA compliant, and current energy codes do not allow for single wythe construction. There are several cracks in exterior walls and the roof leaks in several areas. The grading around the building is not sufficient and water infiltrates at the base of the exterior walls. It is the recommendation of this report that the building should be demolished and replaced with a new building that meets current standards. The probable project cost for this scope of work is $6,450,000.

Chapel Observations

The Chapel (CHAP) was built in 1931 and has an area of 12,552 gross square feet. It is functionally used as a religious center for the inmates. The north and east exteriors of the building are shown in Photo CHAP-1.

Photo CHAP-1: Chapel

Architectural

Envelope

The exterior of the CHAP is masonry construction with plaster walls on the interior face. Most of the windows are single-pane, operable windows with a few newer double-hung windows on the east side of the building. The roof is a relatively new EPDM roof with metal cap flashing. The main entry doors are painted hollow metal.

Interior

The interior of the building is mostly plaster and lathe with carpeted floors in the main space and offices and VCT at the entryway. The sanctuary opens to a stage and orchestra pit. There is a balcony that overlooks the sanctuary space. Permanent pews are set in the space and the floor slopes down from back to front to allow for better viewing angles.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire suppression and fire alarm system.

Americans with Disabilities Act

The CHAP was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Structural

The CHAP is constructed from unreinforced multi-wythe brick masonry bearing walls with steel bar joists framing the roof over the stage. The sanctuary roof structure could not be determined, but is assumed to be steel girders spanning north-south with either steel or wood joist framing between the girders. A partial basement exists under the stage. The stage floor is cast-in-place concrete and the basement walls are brick masonry. A concrete tunnel extends north from the northeast corner of the building.

There is evidence of moisture infiltration in some of the exterior walls. This appears to be a long-term problem. See Photo CHAP-S1.

CHAP-S1: Moisture Damage at Lower and Upper Wall

The surface of the stair wall into the tunnel is delaminating, apparently from moisture infiltration. See Photo CHAP-S2.

The tunnel lid was very wet in some locations, and there is also significant deterioration in approximately 30 percent of the bottom of the lid. See Photo CHAP-S3.

CHAP-S2: Moisture Damage at Tunnel Stair

CHAP-S3: Deteriorated Tunnel Lid

Mechanical

Plumbing Systems

An electric water heater exists which is about 10 years old. The plumbing fixtures are a mixture of ages. The flush tank water closet is about five years old, but the lavatory appears to be about 40 years old. This building was built before the EPAct of 1992 and before ADA, so the older lavatory and faucet are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two original 1930s AHUs and perimeter steam finned tube with no controls. Since there is no control over the heating systems when the steam is on, it is hot in the CHAP; and the windows need to be opened on mild days to keep from overheating the CHAP. Chilled water was extended to the CHAP's basement in 2003, but has never been put to use. The AHUs are original from 1931, except for the fan motors, and each AHU has a steam-heating coil with no control either. See Photo CHAP-M1. The building's only source of ventilation air is from operable windows which are primarily used during mild weather conditions.

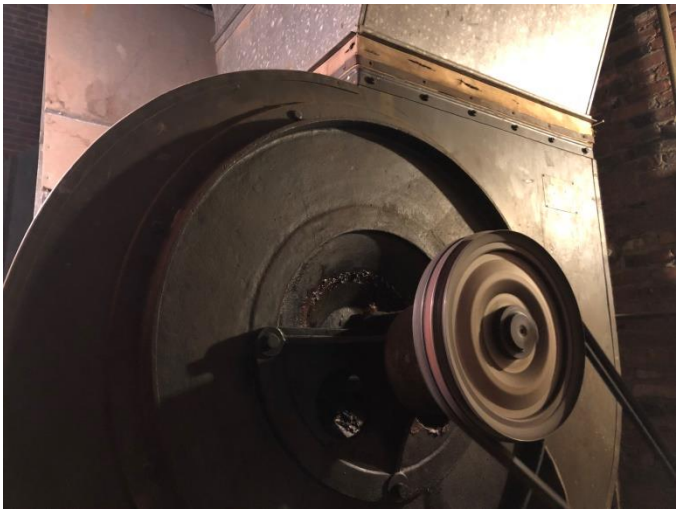


Photo CHAP-M1: Existing South AHU

The AHUs exist on a mezzanine level which is about 12 feet above the stage and is accessed via an old ladder and wood catwalk system which do not meet current codes for safe access to mechanical equipment. See Photo CHAP-M2.

Photo CHAP-M2: Existing Access to AHUs

The steam finned tube is estimated to be about 40 years old and has exposed uninsulated steam piping serving it. See Photo CHAP-M3. The steam piping is a scald hazard for people who walk near it.

There is a leaking steam condensate pipe in the floor of the sanctuary near the north wall, which is causing the floor to be excessively hot. It is so hot that it has melted/vaporized the carpet, plus a rug that was then placed over the melted carpet. See Photo CHAP-M4.

The basement is hot enough that you do not want to spend more than a couple of minutes down there, so those spaces are not usable when the steam system is on. It is hot because the steam service entrance is located there, and it has a steam condensate return pump. The condensate return pump has a receiver from 1981, but the pumps have been replaced over the years. The pumps cannot be insulated, but there is a lot of steam condensate piping that needs to be insulated. See Photo CHAP-M5.

Photo CHAP-M3: Exposed Steam Condensate Piping

Photo CHAP-M4: Melted/Vaporized Carpet and Rug

Photo CHAP-M5: Existing Steam Condensate Return Pump

Electrical

Power Systems

The main electrical panel is an older vintage-fused distribution panel. See Photo CHAP-E1. The branch circuit panels are older vintage as well and are serving beyond their useful service life and need to be replaced. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo CHAP-E1: CHAP Electrical Service

Lighting Systems

Lighting systems are a combination of incandescent and older fluorescent fixtures. The sanctuary has historic globe fixtures that should be retained, but re-wired and re-fitted with new sockets and LED bulbs. See Photo CHAP-E2. The remainder of the lighting has served beyond its useful service life and needs to be replaced. Emergency and exit lights appear to be newer vintage and are in serviceable condition.

Photo CHAP-E2: CHAP Sanctuary Lighting

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain, as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall-mount telecommunication rack located in Stairway 014 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunication rack located in the basement telecommunication room of the LAUN. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications rack is not properly grounded per BICSI standards and is located in a stairwell that is open to the tunnels below.

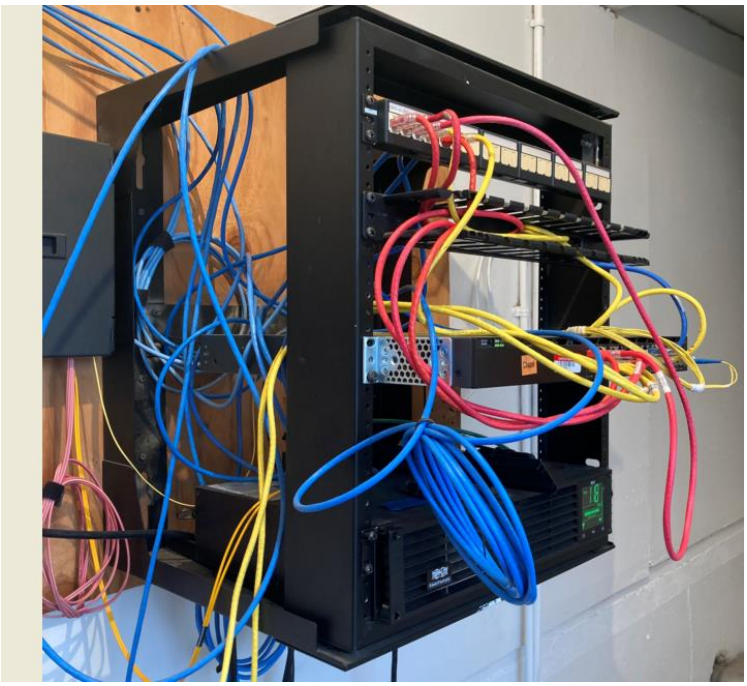


Photo CHAP-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There is one existing Panasonic PTZ cameras and three existing Panasonic fixed, low resolution cameras in the CHAP.

Chapel Deficiencies

This section presents deficiencies for the CHAP. A summary of the CHAP deficiencies analyzed for this study is presented in Table CHAP-1.

Table CHAP-1: Chapel Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
CHAP-A1	ADA Modifications	$ 56,000	NA	Yes	High
CHAP-A2	Full Carpet Replacement	$ 50,000	CHAP-A1	No	Low
CHAP-A3	Full Window Replacement	$ 225,000	NA	No	Medium
CHAP-A4	Full Roof Replacement & Parapet Tuckpoint	$ 690,000	NA	No	Medium
CHAP-A5	Below Grade Waterproofing	$ 50,000	NA	No	Medium
CHAP-A6	Interior Wall Repair	$ 30,000	CHAP-S1	No	Medium
CHAP-A7	Exterior Door Repaint	$ 8,000	NA	No	Low
CHAP-S1	General Moisture Damage	$ 324,000	CHAP-S1	No	High
CHAP-S2	Moistrue Damage at Tunnel Stair	$ 27,000	CHAP-S2	No	High
CHAP-S3	Deteriorated Tunnel Lid	$ 135,000	CHAP-S3	No	High
CHAP-M1	Replace HVAC System	$ 1,510,000	CHAP-M1 thru M5	No	High
CHAP-E1	Power Distribution System Replacement	$ 629,000	CHAP-E1	No	Medium
CHAP-E2	Lighting System Replacement	$ 453,000	CHAP-E2	No	Medium
CHAP-E3	Convenience Receptacle Upgrade for ADA	$ 120,000	NA	No	High
CHAP-E4	Replace Fire Detection and Alarm System	$ 88,000	NA	No	High
CHAP-T1	Relocating Telecom Cabinet	$ 110,000	CHAP-T1	No	Low
CHAP-SEC1	Video Surveillance System - Cameras Replacement	$ 4,600	NA	No	Low
Chapel Deficiencies Total Costs:		**$ 4,509,600**			

CHAP-A1: Americans with Disabilities Act Modifications (NDCS 2021 Biennium Item)

This project encompasses modifications to the CHAP (auditorium) necessary to comply with the ADA of 1990. This request considers the components required to make an entire area accessible. The sub-projects required to make the area accessible include, but are not limited to: 1) ADA signage; 2) entry ramp; 3) entry doors (one); 4) restroom modifications (one); 5) lever door handles (two); and 6) miscellaneous modifications. The probable project cost for this scope of work is $56,000.

CHAP-A2: Full Carpet Replacement

The carpet in the entire chapel needs to be replaced. It is either bunching up or heavily damaged in just about every area of the building. The probable project cost for this scope of work is $50,000.

CHAP-A3: Full Window Replacement

All the windows in the chapel should be replaced with modern inoperable windows once the HVAC systems have been replaced. This will allow for better temperature control and a more useful building. New flashing and sealant should also help with water infiltration issues. The probable project cost for this scope of work is $225,000.

CHAP-A4: Full Roof Replacement and Parapet Tuckpointing

There has been significant water infiltration at the roof wall transition point inside the main auditorium space. This appears to be due to damage at the parapet and a roof that is not properly adhered to the structural deck. The probable project cost for this scope of work is $690,000.

CHAP-A5: Below Grade Waterproofing

There are also several areas down lower on the wall that show water damage. This could be due to a lack of waterproofing below grade at the exterior of the building. The probable project cost for this scope of work is $50,000.

CHAP-A6: Interior Wall Repair

Once the water infiltration issues have been resolved, a full interior wall repair to the plaster can be completed. The probable project cost for this scope of work is $30,000.

CHAP-A7: Exterior Door Repaint

All the exterior doors need to be repainted. The probable project cost for this scope of work is $8,000.

CHAP-S1: General Moisture Damage

This is typically the result of failed roofing material, poor termination of the roofing material at the parapet, or deteriorated masonry in the exterior wall and/or parapet. The roof condition requires investigation and possible repair or replacement, and then the exterior masonry can be repaired. This is typically in the form of tuckpointing or repointing the masonry. The probable project cost for this scope of work is $324,000.

CHAP-S2: Moisture Damage at Tunnel Stair

This is like CHAP-S1. Moisture is most likely migrating through the wall. The exterior face of the wall most likely needs to be waterproofed. The probable project cost for this scope of work is $27,000.

CHAP-S3: Deteriorated Tunnel Lid

The extent of reinforcing deterioration observed requires that some or all of this tunnel lid be removed and replaced. The probable project cost for this scope of work is $135,000.

CHAP-M1: HVAC System Replacement

The HVAC systems are between 40 years old (for the condensate return pump and the steam finned tube) and 90 years old (for the original AHUs). According to ASHRAE, most fans, coils, and pumps have a median service life of about 20 years. As a result, the existing equipment is operating beyond its expected useful life and needs to be replaced.

It is recommended to replace the existing HVAC equipment, clean and reuse ductwork where possible, and to upgrade the building to an electronic centralized BAS. The new AHUs will be provided with fan arrays which are composed of multiple direct drive fans which can automatically speed up to provide redundancy in the event that one fan should fail. The AHUs will also include MERV 13 filters and UV lights at the cooling coils to provide improved indoor air quality for the occupants. Working in a historic building also brings more challenges than normal so, extra time and coordination is anticipated. The number one request from the chaplain is to provide cooling to the chapel. This HVAC project would also fix the deficiencies for the hot floor issue in the sanctuary, the unsafe AHU access pathway issues at the stage, and the hot basement issue. The probable project cost for this scope of work is $1,510,000.

CHAP-E1: Power Distribution System Replacement

The majority of equipment in the power distribution system is serving beyond its useful service life. The probable project cost for this scope of work is $629,000.

CHAP-E2: Lighting System Replacement

Lighting throughout the building needs to be replaced. The original historic globes in the sanctuary should be retained and electrically updated with new wiring, sockets, and LED lamps. The probable project cost for this scope of work is $453,000.

CHAP-E3: Convenience Receptacle Upgrade for Americans with Disabilities Act

Convenience receptacle mounting heights are not compliant with modern ADA standards. Relocation of these receptacles is required to meet ADA requirements. The probable project cost for this scope of work is $120,000.

CHAP-E4: Fire Detection and Alarm System Replacement

The fire detection and alarm system need to be replaced. The probable project cost for this scope of work is $88,000.

CHAP-T1: Relocating Telecom Cabinet

The existing telecommunications rack in located in Stairway that is shared space to the tunnels below. BICSI standards recommend that telecommunications equipment cabinets should control against unauthorized access and in a controlled environment. It is recommended that the existing telecommunications wall mounted rack be relocated to a location where access to the rack can be secured and controlled. This will require the existing data cabling within the building to be re-done. Recommend building out a dedicated telecommunications room with proper security, cooling and grounding per BISCI standards. The probable project cost for this scope of work is $110,000.

CHAP-SEC1: Video Surveillance System

Four existing cameras (low resolution and incompatible drivers) should be replaced to improve video coverage in the building and allow more secure building operation. The probable project cost for this scope of work is $4,600.

Control Unit Observations

The Control Unit (CON) was built in 1956 and has an area of 8,505 gross square feet. It is currently not used by inmates. The south and east exteriors of the building are shown in Photo CON-1.

The CON was originally excluded from this study, but is only being listed now for demolition at the request of NDCS.

Photo CON-1: Control Unit

Control Unit Deficiencies

This section presents deficiencies for the CON. A summary of the CON deficiencies provided by NDCS for this study is presented in Table CON-1.

Table CON-1: Control Unit Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
CON-1	Demolish CON and Return Grounds to Greenfield	$ 200,000	NA	No	High
Control Unit Deficiencies Total Costs:		**$ 200,000**			

CON-1: Demolish Control Unit and Return Grounds to Greenfield

The NDOC determined that the control unit should be demolished, and the grounds returned to greenfield. The probable project cost to demolish the building and remove construction debris, as well as grading and seeding the grounds is $200,000.

Cornhusker State Industries Factory Observations

The Cornhusker State Industries (CSI) Factory (CFACT) was built in 1955 and has an area of 66,610 gross square feet. It is functionally used as a factory to produce goods made by the inmates. The south and east exteriors of the building (white building) are shown in Photo CFACT-1.

The CFACT was originally excluded from this study, but is only being listed now for demolition at the request of NDCS.

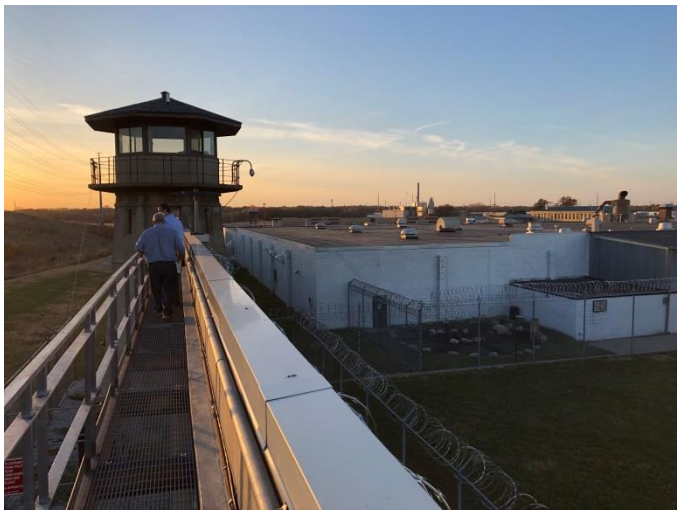


Photo CFACT-1: CSI Factory

Cornhusker State Industries Factory Deficiencies

This section presents deficiencies for the CSI Factory (CFACT). A summary of the CFACT deficiencies provided by NDCS for this study is presented in Table CFACT-1.

Table CFACT-1: Cornhusker State Industries Factory Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
CFACT-1	Demolish CFACT and Return Grounds to Greenfield	$ 900,000	NA	No	High
CSI Factory Deficiencies Total Costs:		**$ 900,000**			

CFACT-1: Demolish Cornhusker State Industries Factory and Return Grounds to Greenfield

The Nebraska Department of Corrections determined that the Cornhusker State Industries Factory should be demolished, and the grounds returned to greenfield. The probable project cost to demolish the building and remove construction debris, as well as grading and seeding the grounds is $900,000.

Corrections Emergency Response Team Building Observations

The Corrections Emergency Response Team Building (CERT) was built in 1974 and has an area of 3,240 gross square feet. It is functionally used as a meeting and training building for the members of CERT. The south and east exteriors of the building are shown in Photo CERT-1.

Photo CERT-1: CERT Building

Architectural

Envelope

The exterior envelope consists of pre-finished metal building panels on the walls and roof. The exterior doors at the main entry are aluminum while the rest are hollow metal. The windows are all double hung single-pane aluminum windows. The roof is a metal standing seam roof that is part of the pre-finished metal building. The building sits on a slab on grade. There is a small overhang at the entry.

Photo CERT-A1: Typical Window at CERT

Interior

The building consists of stud walls with gyp board finish with carpet flooring and VCT in the toilet rooms. The ceilings are ACT drop ceilings. The interior doors are all wood with wood frames.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire suppression and fire alarm system.

Americans with Disabilities Act

The CERT was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Structural

The building is a pre-engineered metal building manufactured by Armco. There is damage to canopy over the main door that appears to be from impact. There is also damage to the exterior metal wall panels at various locations around the building that also appear to be from impact.

Photo CERT-S1: Damaged Canopy

Photo CERT-S2: Example of Impact Damage to Exterior Panels

Mechanical

Plumbing Systems

An electric water heater exists which is about 6 years old. See Photo CERT-M1. About half of the hot water piping insulation is missing on the piping which is not in the photo.

The plumbing fixtures are new from about five years ago. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building does not have a fire sprinkler system.

Photo CERT-M1: Existing Electric Water Heater

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one natural gas furnace, one Air-Cooled Condensing Unit (ACCU), a thermostat, above ceiling supply air ductwork serving ceiling diffusers, and one restroom exhaust fan. The furnace is from 2012 and has a DX refrigerant cooling coil. See Photo CERT-M2.

Photo CERT-M2: Existing Gas Furnace Split System

The ACCU is from 2012. See Photo CERT-M3. There is an outdoor air louver in the exterior wall for ventilation purposes, but it has been disconnected from the AHU's return air ductwork and is capped. As a result, the building does not have a source of ventilation air since the windows are not operable in this building.

The furnace and ACCU are from 2012 which makes them about 9 years old. According to ASHRAE, furnaces and ACCUs have a median service life of about 15 to 20 years. As a result, the existing equipment still has useful life left in it.

Photo CERT-M3: Existing ACCU

Electrical

Power Systems

The main electrical panel is an older load center that likely dates to the original building construction. See Photo CERT-E1. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo CERT-E1: Main Electrical Panel

Lighting Systems

Lighting throughout the building is fluorescent. Exit lights and emergency lighting fixtures are old and need to be replaced.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in Mechanical 101 that serves data for the entire building. The building is served by a 144-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The CERT distributes fiber to several buildings on this part of the site. There are 24-strand, single mode fibers that route from the CERT building to the CW and Central Utility Plant. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications rack is grounded. This building serves fiber optic cabling to several buildings on this side of the property. If the building is demolished, this fiber optic cabling will need to be re-done.

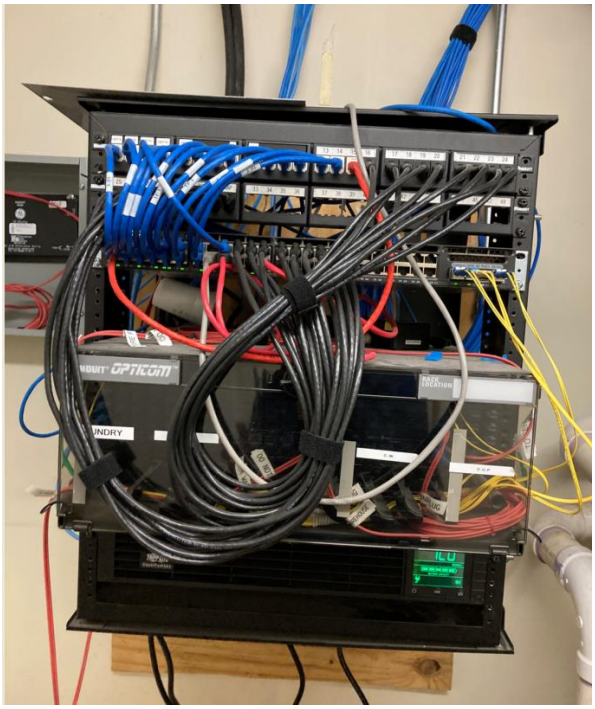


Photo CERT-T1: Existing Telecom Cabinet

Corrections Emergency Response Team Building Deficiencies

This section presents deficiencies for the Corrections Emergency Response Team Building (CERT). A summary of the CERT deficiencies analyzed for this study is presented in Table CERT-1.

Table CERT-1: Corrections Emergency Response Team Building Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
CERT-1	Full Demolition & Replacement of Building	$ 995,940	All CERT Photos	No	High
CERT Deficiencies Total Costs:		**$ 995,940**			

CERT-1: Full Demolition and Replacement of the Building

The building windows do not meet current standards for energy code. The metal panels on the exterior have recently been repainted, but there are still several panels that have dents. The canopy at the main entry leaks into the building and the gutters and downspouts are damaged in several locations. Sealant at the windows is dry and cracked. If the building is to continue being used, new windows are recommended. This type of construction is not recommended as a permanent solution in a correctional environment.

All the interior finishes in the building have recently been replaced and are in good condition.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult and expensive. The probable project cost for this scope of work is $995.940.

Education Building Observations

The Education Building (EDU) was built in 1981 and has an area of 5,100 gross square feet. It is functionally used for education of the inmates. The west exterior of the building is shown in Photo EDU-1.

Photo EDU-1: Education Building

Architectural

Envelope

The exterior envelope consists of pre-finished metal building panels on the walls and roof. There is a brick wainscot that goes around the building on all four sides and goes up to approximately 4' from finish floor. The brick is supported at grade by a steel angle and flat steel bar stock down to the top of foundation. The exterior doors are aluminum. The windows are all double hung single-pane aluminum windows. The roof is a metal standing seam roof that is part of the pre-finished metal building. The building sits on a slab on grade.

Interior

The building consists of Stud walls with gyp board finish with carpet flooring and VCT in the toilet rooms. The ceilings are ACT drop ceilings. The interior doors are all wood with wood frames.

Photo EDU-A1: Typical Ceiling Stain in classroom

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire suppression and fire alarm system.

Americans with Disabilities Act

The EDU was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Structural

This building is a PEMB manufactured by Star. The exterior finish is metal wall panels with a brick wainscot. The brick appears to have been added to the exterior and is supported by a steel angle bolted to the foundation wall. See Photo EDU-S1.

Sealant at the top of the brick has failed and moisture is able to get between the brick and metal wall panels. There is also moisture infiltration in the brick sills at some windows. See Photo EDU-S2.

Photo EDU-S1: Brick Wainscot Supported by Steel Angle

Photo EDU-S2: Sealant and Moisture Issues

Mechanical

Plumbing Systems

An electric water heater exists which is about 10 years old. The plumbing fixtures are new from about ten years ago. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one AHU, a thermostat, above ceiling supply air ductwork serving ceiling diffusers, and one restroom exhaust fan. The AHU is original from 1981 and has a steam heating coil, as well as a chilled water cooling coil. See Photo EDU-M1. The cooling coil is noted as being replaced in 2012.

Photo EDU-M1: Existing AHU

The piping serving the AHU is shown in Photo EDU-M2. The steam piping is missing all of its pipe insulation which makes the mechanical room hot in the winter.

There is not an outdoor air louver in the exterior wall or a roof intake hood for ventilation purposes. As a result, the building's only source of ventilation air is from operable windows which are only used during mild weather conditions.

The HVAC system is mostly original from 1981 which makes it about 40 years old except for the chilled water coil. According to ASHRAE, fans and steam coils have a median service life of about 20 years. As a result, the existing equipment is operating beyond its expected useful life.

Photo EDU-M2: Piping Connections to AHU

Electrical

Power Systems

The main electrical panel is in good condition but it is serving beyond its useful service life and needs to be replaced. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting throughout the building is generally older fluorescent installed in the lay-in ceilings. The ceilings are low and accessible to inmates. The lighting fixtures are not confinement rated which presents a security risk. Exit and emergency lighting is older and needs to be replaced.

Photo EDU-E1: Main Electrical Panel

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in Mechanical 114 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications rack is not properly grounded per BICSI standards.

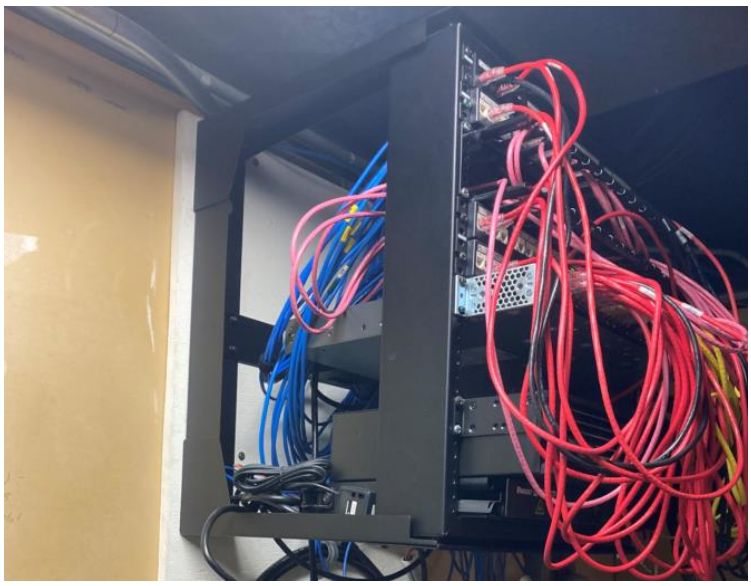


Photo EDU-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There are four existing Panasonic fixed cameras.

Education Building Deficiencies

This section presents deficiencies for the Education Building (EDU). A summary of the EDU deficiencies analyzed for this study is presented in Table EDU-1.

Table EDU-1: Education Building Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
EDU-1	Full Demolition & Replacement of Building	$ 3,091,000	All EDU Photos	No	High
Education Building Deficiencies Total Costs:		**$ 3,091,000**			

EDU-A1: Full Demolition and Replacement of the Building

The building roof leaks, and the windows do not meet current standards for energy code. There were several rust spots noted on the metal panels and gutters. Sealant at the windows is dry and cracked and the sill flashing needs to be replaced. If the building is to continue being used, new windows and a new roof with gutter and downspouts is recommended, and all the exterior walls should be repainted. The brick wainscot needs to be tuckpointed and the flashing at the transition between the metal panels and brick needs to be replaced. This type of construction is not recommended as a permanent solution in a correctional environment.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged from water infiltration and walls need a fresh coat of paint. The carpet has reached the end of its useful life and should be replaced. If the building is to continue being used, a complete interior renovation is recommended. The ceilings are low and accessible to inmates.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult, expensive, and reduce programming area space.

The probable project cost for this scope of work is $3,091,000.

Field Training Office Observations

The Field Training Office (FTO) (AKA SATOP) was built sometime before 1979 and has an area of 900 gross square feet. It is functionally used as a training center for the staff. The north and east exteriors of the building are shown in Photo FTO-1.

Photo FTO-1: Field Training Office

Architectural

Envelope

The exterior envelope consists of pre-finished metal building panels on the walls and roof. The roof appears to have been covered with tar at some point to deal with roof leaks. There is a brick wainscot that goes around the building on all four sides and goes up to approximately 4’ from finish floor. The brick is supported at grade by a steel angle that sits on top of the exterior foundation. The exterior doors are hollow metal. The windows are hollow metal single-pane aluminum windows. The roof is a metal standing seam roof that is part of the pre-finished metal building. The building sits on a slab on grade.

Photo FTO-A1: Typical Ceiling Stain

Interior

The building consists of stud walls with gyp board finish with carpet flooring and VCT in the toilet rooms. The ceilings are ACT drop ceilings. The interior doors are all wood with wood frames.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire suppression and fire alarm system.

Photo FTO-A2: Typical Existing Toilet Room

Americans with Disabilities Act

The FTO was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Mechanical

Plumbing Systems

A gas water heater exists which is about 21 years old. See Photo FTO-M1. The hot water piping insulation is missing on all of the piping.

With exception of the electric water cooler, the plumbing fixtures are new from about ten years ago and in good condition. For a discussion on ADA issues, see architectural.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one natural gas furnace, one Air-Cooled Condensing Unit (ACCU), a thermostat, above ceiling supply air ductwork serving ceiling diffusers, and one restroom exhaust fan. The furnace is about 10 years old and has a DX refrigerant cooling coil. See Photo FTO-M2.

The ACCU is about 20 years old and is located on the roof. There is not an outdoor air louver or roof hood for ventilation purposes. As a result, the building does not have a reliable source of ventilation air since the windows are not operable in this building.

According to ASHRAE, furnaces and ACCUs have a median service life of about 15 to 20 years. As a result, the existing furnace still has useful life left in it, but the ACCU is at the end of its useful life.

Photo FTO-M1: Existing Electric Water Heater

Photo FTO-M2: Existing Gas Furnace Split System

Electrical

Power Systems

The main electrical panel is load center construction. It does appear to be in good, serviceable condition. See Photo FTO-E1. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo FTO-E1: Main Electrical Panel

Lighting Systems

Lighting systems throughout the building are fluorescent and appear to be in good working condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling within the building runs back to 110 blocks located in the mechanical room and connects to existing copper backbone cabling. There is not a telecommunications cabinet or rack within the building.

Photo FTO-T1: Existing Telecom Cabinet

Field Training Office Deficiencies

This section presents deficiencies for the Field Training Office (FTO). A summary of the FTO deficiencies analyzed for this study is presented in Table FTO-1.

Table FTO-1: Field Training Office Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
FTO-1	Full Demolition & Replacement of Building	$ 545,000	All FTO Photos	No	High
Field Training Office Deficiencies Total Costs:		**$ 545,000**			

FTO-1: Full Demolition and Replacement of the Building

The building roof leaks, and the windows do not meet current standards for energy code. There were several rust spots noted on the metal panels and gutters. Sealant at the windows is dry and cracked and the sill flashing needs to be replaced. If the building is to continue being used, new windows and a new roof with gutter and downspouts is recommended, and all the exterior walls should be repainted. The brick wainscot needs to be tuckpointed and the flashing at the transition between the metal panels and brick needs to be replaced. This type of construction is not recommended as a permanent solution in a correctional environment.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged from water infiltration and walls need a fresh coat of paint. The carpet has reached the end of its useful life and should be replaced. If the building is to continue being used, a complete interior renovation is recommended. The ceilings are low and accessible to inmates. Several door trims at the frames are missing or damaged.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. The biggest issue is that the toilets sit less than 18 inches from the adjacent wall. Since the toilets share this wall, the only way to fix this problem would be to demo the floor and move the toilets away from the wall. This would be difficult and expensive. The probable project cost for this scope of work is $545,000.

Guard Tower No. 1 Observations

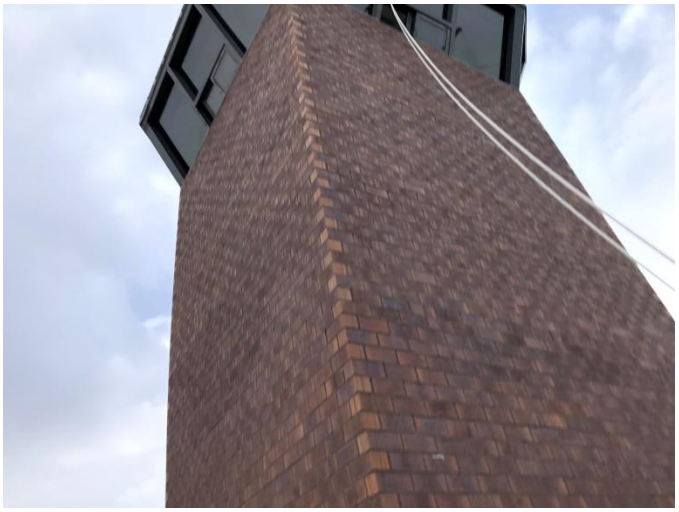


Photo GT1-1: Guard Tower No. 1

Guard Tower No. 1 (GT1) was built in 1981 and has an area of 144 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The northeast and southeast exteriors of the building are shown in Photo GT1-1.

Architectural

Envelope

The guard tower is of free-standing solid masonry construction with a brick veneer with CMU back-up. The windows are angled aluminum frames and have one operable slider on each side. There is a hollow metal door at the base to allow for access. A fence surrounds the base. The roof of this tower is metal panel.

Interior

The interior walls are unpainted CMU in the base. There is a ships ladder that takes you from the ground level to the tower with one landing in between. The base is also used for storage. The tower station room at the top of the tower has painted CMU walls with VCT flooring and ACT ceiling. There is an open toilet room in the center of the space with a toilet and vanity. Millwork cabinets sit at the sill of the windows for ammunition storage.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT1 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT1 is a CMU and brick structure with cast-in-place concrete floors and intermediate landings. There were no noted structural items of concern; however, there are locations where sealant needs to be replaced.

Photo GT1-S1: Failed Sealant

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory is original from 1981, but the flush tank water closet is about 10 years old. See Photo GT1-M1.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Photo GT1-M1: Existing Plumbing Fixtures

Photo GT1-M2: Existing Ceiling Mounted Fan Coil

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two ductless split systems. Each ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. See Photo GT1-M2. One fan coil is located in the ceiling of the tower and the other one is located down at the entry level near the door. Ventilation air is provided via operable windows. The ductless split systems are both brand new this year.

Electrical

Power Systems

Power distribution equipment within this tower is relatively new and in good working condition. See Photo GT1-E1. Convenience receptacle quantities are fewer than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo GT1-E1: Existing Electrical Panel

Lighting Systems

Lighting on the ground floor level and intermediate floor level is a combination of surface mounted fluorescent and incandescent fixtures. Fixtures in the top floor Guard observation area are flush, ceiling mounted down lights with incandescent lamps. These fixtures have all served beyond their useful service life, are an ongoing maintenance issue for lamp replacement, and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to increase reliability and reduce ongoing maintenance for facility staff as well as improving energy efficiency. Emergency lighting fixtures are battery operated, wall mounted, "bug-eyes." These emergency fixtures appear to be newer and are in serviceable condition.

Fire Alarm Systems

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire detection and alarm system be replaced.

Technology

There is an existing wall mount telecommunication rack located on the lower at the front entry way that serves data for the entire guard tower. There is an existing fiber optic cable that serves the guard tower; however, it is unknown what building this fiber optic cabling runs back to. The telephone in the guard tower control room is served from existing copper backbone lines running to the guard tower. The existing copper lines do not have protectors on them when entering the building. This guard tower has not been updated like GT4, 5, 6, and 8 were with new fiber optic cabling, telecom rack, and new horizontal data cabling.

Photo GT1-T1: Existing Telecom Cabinet

Guard Tower No. 1 Deficiencies

This section presents deficiencies for GT1. A summary of the GT1 deficiencies analyzed for this study is presented in Table GT1-1.

Table GT1-1: Guard Tower No. 1 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT1-A1	Roof Replacement	$ 8,640	NA	No	Medium
GT1-A2	Ceiling Replacement	$ 1,800	NA	No	Medium
GT1-A3	VCT Flooring Replacement	$ 2,000	NA	No	Medium
GT1-A4	Vanity / Sink / Toilet Replacement	$ 5,000	NA	No	Medium
GT1-S1	Failed Sealant	$ 3,600	GT1-S1	No	Medium
GT1-E1	Lighting System Replacement	$ 22,000	NA	No	High
GT1-E2	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT1-E3	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT1-T1	Add Fiber to Guard Tower and Lockable Telecom Cabinet	$ 200,000	NA	No	Medium
Guard Tower No. 1 Deficiencies Total Costs:		**$ 268,040**			

GT1-A1: Roof Replacement

The Metal Roof of this tower leaks and needs to be replaced. The probable project cost for this scope of work is $8,640.

GT1-A2: Ceiling Replacement

The ceiling is heavily damaged from the leaking roof and needs to be replaced. The probable project cost for this scope of work is $1,800.

GT1-A3: VCT Flooring Replacement

The VCT flooring in the tower station room has significant damage and should be replaced. The probable project cost for this scope of work is $2,000.

GT1-A4: Vanity Sink/Toilet Replacement

The vanity and plumbing fixtures are damaged and should be replaced. The probable project cost for this scope of work is $5,000.

GT1-S1: Failed Sealant

Failed sealant requires removal and replacement to maintain envelope integrity. The probable project cost for this scope of work is $3,600.

GT1-E1: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT1-E2: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT1-E3: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT1-T1: Add Fiber to Guard Tower and Lockable Telecom Cabinet

Provide new 24 stand single mode fiber optic cabling to the GT1 to align with the similar approach to GT4,5,6,&8. Fiber optic cabling can route back to GT6, Ancillary building, laundry building, or CERT building. Provide a lockable telecommunications cabinet within the guard tower and provide new Category 6 cabling for the existing phone. Provide power and grounding for telecommunications cabinet. The probable project cost for this scope of work is $200,000.

Guard Tower No. 2 Observations

Guard Tower No. 2 (GT2) was built in 1981 and has an area of 144 gross square feet. It is functionally used to control the west sallyport for the NSP and for monitoring activity inside and outside the NSP. The west exterior of the building is shown in Photo GT2-1.

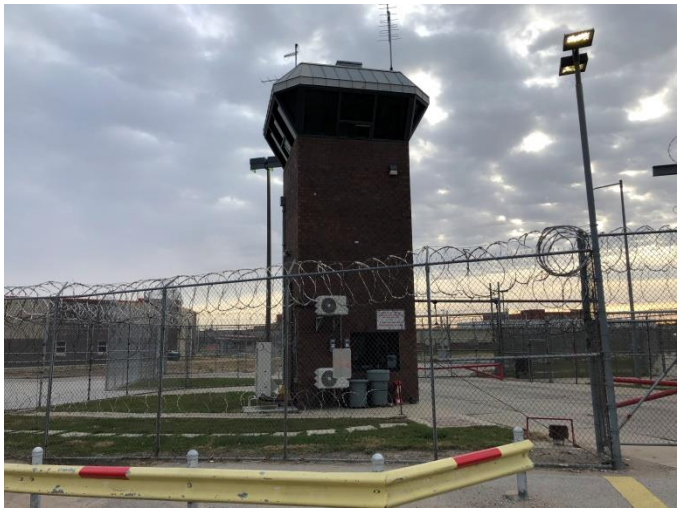


Photo GT2-1: Guard Tower No. 2

Architectural

Envelope

The guard tower is of free-standing solid masonry construction with a brick veneer with CMU back-up. The windows are angled aluminum frames and have one operable slider on each side. There is a hollow metal door at the base to allow for access. A fence surrounds the base. The roof of this tower is metal panel.

Interior

The interior walls are unpainted CMU in the base. There is a ships ladder that takes you from the ground level to the tower with one landing in between. The base is also used for storage. The tower station room at the top of the tower has painted CMU walls with VCT flooring and ACT ceiling. There is an open toilet room in the center of the space with a toilet and vanity. Millwork cabinets sit at the sill of the windows for ammunition storage.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system.

Americans with Disabilities Act

The GT2 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT2 is a CMU and brick structure with cast-in-place concrete floors and intermediate landings. There were no noted structural items of concern.

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory is original from 1981, but the flush tank water closet is about 10 years old. A second set of plumbing fixtures exists in this tower at the entry level for the guards at the sally port. See Photo GT2-M1.

Photo GT2-M1: Existing Plumbing Fixtures

The water pressure is very low in GT2 because the water just trickles out of the faucet at the top of GT2. The maintenance staff believes this is due to the plumbing bypass work that was performed in October of this year when they had three site domestic cold water system pipe breaks. During the pipe breaks they had to isolate the campus and it was discovered that they had to bypass the domestic cold water for GT2 through HU6 in order to keep providing water to GT2 when either the north or south half of campus was isolated. The long length of PEX piping that was installed for this bypass may be at least contributing to the low water pressure.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of three ductless split systems. Each ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. See Photos GT2-M2 and GT2-M3. The first fan coil is located in the ceiling of the tower, the second one is on the middle level, and the third one is located down at the entry level. The thermostat for the entry level fan coil is installed too close to the fan coil and the guards say it cycles off too quickly. Ventilation air is provided via operable windows. The ductless split systems are all brand new this year.

Photo GT2-M2: Existing Wall Mounted Fan Coil

Photo GT2-M3: Existing Air-Source Heat Pump

Electrical

Power Systems

Power distribution equipment within this tower is relatively new and in good working condition. See Photo GT2-E1. Convenience receptacle quantities are fewer than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo GT2-E1: Existing Electrical Panel

Lighting Systems

Lighting on the ground floor level and intermediate floor level is a combination of surface mounted fluorescent and incandescent fixtures. Fixtures in the top floor Guard observation area are flush, ceiling mounted down lights with incandescent lamps. These fixtures have all served beyond their useful service life, are an ongoing maintenance issue for lamp replacement, and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to increase reliability and reduce ongoing maintenance for facility staff as well as improving energy efficiency. Emergency lighting fixtures are battery-operated, wall-mounted "bug-eyes." These emergency fixtures appear to be newer vintage and are in serviceable condition.

Fire Alarm Systems

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is no existing wall mount telecommunication rack located in the guard tower. The existing telephones in the tower are connected to existing backbone copper lines running back to the ancillary building. There are two telephones in the guard tower control room and one in the lower control room. This guard tower has not been updated like GT4,5,6,&8 were with new fiber optic cabling, telecom rack, and new horizontal data cabling.

Security

Detention Door Control Systems

GT2 control room is responsible to observe and control movement through the West vehicle sallyport. There are two control panels that are remotely controlling, and monitoring vehicle and pedestrian gates located beneath the GT2. The smaller of the two panels controls four vehicle gates associated with entrance to HU9. Control panels consist of rotary switches and old type LED indicators installed on composite board (plastic/steel) with text engraved on their surface. Both panels are desk mounted. The existing gates are hard wired into door control relays and switches that are installed in the wall mounted enclosure. The enclosure is installed on the wall one level below the tower control room. All door control panel components are using very old technology.

Photo GT2-SEC1: GT2 Control Panels

Video Surveillance Systems

There is one existing Panasonic fixed camera.

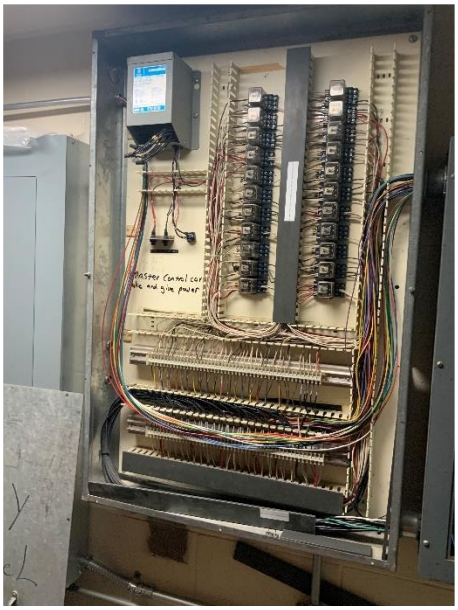


Photo GT2-SEC2: GT2 Gate Control Relays, Wire Termination Blocks, and Power Supply

Guard Tower No. 2 Deficiencies

This section presents deficiencies for GT2. A summary of the GT2 deficiencies analyzed for this study is presented in Table GT2-1.

Table GT2-1: Guard Tower No. 2 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT2-A1	Roof Replacement	$ 8,640	NA	No	Medium
GT2-A2	Ceiling Replacement	$ 1,800	NA	No	Medium
GT2-A3	VCT Flooring Replacement	$ 2,000	NA	No	Medium
GT2-A4	Vanity / Sink / Toilet Replacement	$ 5,000	NA	No	Medium
GT2-S1	Sealant Removal and Replacement	$ 2,000	NA	No	Medium
GT2-E1	Lighting System Replacement	$ 22,000	NA	No	High
GT2-E2	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT2-E3	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT2-T1	Add Fiber to Guard Tower and Lockable Telecom Cabinet	$ 200,000	NA	No	Medium
GT2-SEC1	Detention Door Control Systems Repacement	$ 21,000	GT2-SEC1	No	Medium
GT2-SEC2	Intercom System Addition	$ 36,000	NA	No	Medium
GT2-SEC3	Video Surveillance System - Cameras Replacement and Addition	$ 16,200	NA	No	Medium
Guard Tower No. 2 Deficiencies Total Costs:		**$ 339,640**			

GT2-A1: Roof Replacement

The metal roof of this tower leaks and needs to be replaced. The probable project cost for this scope of work is $8,640.

GT2-A2: Ceiling Replacement

The ceiling is heavily damaged from the leaking roof and needs to be replaced. The probable project cost for this scope of work is $1,800

GT2-A3: VCT Flooring Replacement

The VCT flooring in the tower station room has significant damage and should be replaced. The probable project cost for this scope of work is $2,000

GT2-A4: Vanity Sink/Toilet Replacement

The vanity and plumbing fixtures are damaged and should be replaced. The probable project cost for this scope of work is $5,000.

GT2-E1: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT2-E2: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT2-E3: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT2-T1: Add Fiber to Guard Tower and Lockable Telecom Cabinet

Provide new 24 stand single mode fiber optic cabling to the GT2 to align with the similar approach to GT4,5,6,&8. Fiber optic cabling can route back to GT6, Ancillary building, laundry building, or CERT building. Provide a lockable telecommunications cabinet within the guard tower and provide new Category 6 cabling for the existing phone. Provide power and grounding for telecommunications cabinet. The probable project cost for this scope of work is $200,000.

GT2-SEC1: Detention Door Control Systems

The existing control panels are in very bad shape. There are some missing/broken rotary switches. The door control technology used to control and monitor existing field devices is obsolete and does not provide any flexibility necessary to provide more secure and efficient system.

The replacement of the existing control panels and the existing relays should be considered as a high priority considering the age and present condition of the existing door control equipment. The new door control system shall consist of a single PLC and touch screen control station. New PLC based head-end equipment (included but not limited to CPU, Ethernet communication modules, I/O modules, power supplies, relays, etc.) shall be provided in place of the existing relay-based equipment (existing wall mounted enclosure may remain in use). All new electronic security system head-end equipment and TS shall communicate over the new security system network.

New touch screen (TS) control station is recommended for the GT2 Control Room. New intercom stations and camera coverage of the gates currently controlled by the local panels is recommended. New TS control station should be provided with the capability to transfer control to the Master Control Room. The probable project cost for this scope of work is $21,000.

GT2-SEC2: Intercom and Paging System

To provide a more efficient and secure system we recommend providing a new intercom system that would include intercom stations at each remotely controlled door/gate and master intercom station at the control station. The intercom system would be integrated into new touch screen control system. The probable project cost for this scope of work is $36,000.

GT2-SEC3: Video Surveillance System

One existing camera (low resolution 1.3MP) should be replaced to improve video coverage in the tower. Two additional multisensory, high-resolution cameras should be mounted on the GT2 to provide better video coverage around the vehicle sallyport controlled from the GT2. New video viewing station should be provided in the GT2 control room to support operation of the TS control system. The probable project cost for this scope of work is $16,200.

Guard Tower No. 3 Observations

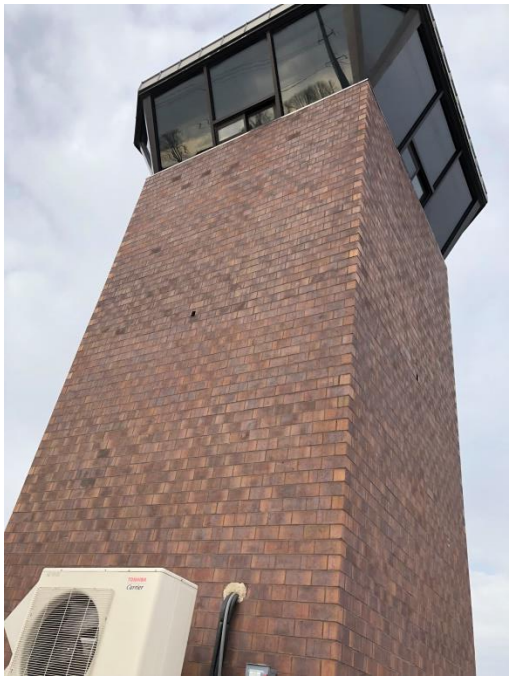


Photo GT3-1: Guard Tower No. 3

Guard Tower No. 3 (GT3) was built in 1981 and has an area of 144 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The southwest and southeast exteriors of the building are shown in Photo GT3-1.

Architectural

Envelope

The guard tower is of free-standing solid masonry construction with a brick veneer with CMU back-up. The windows are angled aluminum frames and have one operable slider on each side. There is a hollow metal door at the base to allow for access. A fence surrounds the base. The roof of this tower is metal panel

Interior

The interior walls are unpainted CMU in the base. There is a ships ladder that takes you from the ground level to the tower with one landing in between. The base is also used for storage. The tower station room at the top of the tower has painted CMU walls with VCT flooring and ACT ceiling. There is an open toilet room in the center of the space with a toilet and vanity. Millwork cabinets sit at the sill of the windows for ammunition storage.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT3 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT3 is a CMU and brick structure with cast-in-place concrete floors and intermediate landings. There were no noted structural items of concern; however, there are locations where sealant needs replaced.

Photo GT3-S1: Failed Sealant

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush tank water closet are both original from 1981.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two ductless split systems. Each ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. One fan coil is located in the ceiling of the tower and the other one is located down at the entry level near the door. The fan coil located at the entry level is shown in Photo GT3-M1. Ventilation air is provided via operable windows. The ductless split systems are both brand new this year.

Photo GT3-M1: Existing Wall Mounted Fan Coil

Electrical

Power Systems

Power distribution equipment within this tower is relatively new and in good working condition. See Photo GT3-E1. Convenience receptacle quantities are fewer than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting on the ground floor level and intermediate floor level is a combination of surface mounted fluorescent and incandescent fixtures. Fixtures in the top floor Guard observation area are flush, ceiling mounted down lights with incandescent lamps. These fixtures have all served beyond their useful service life, are an ongoing maintenance issue for lamp replacement, and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to increase reliability and reduce ongoing maintenance for facility staff as well as improving energy efficiency. Emergency lighting fixtures are battery-operated, wall-mounted “bug-eyes.” These emergency fixtures appear to be newer vintage and are in serviceable condition.

Photo GT3-E1: Existing Electrical Panel

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is no existing wall mount telecommunication rack located in the guard tower. The existing telephone in the tower is connected to existing backbone copper lines running to the ancillary building. There is a telephone in the guard tower control room. This guard tower has not been updated like GT4,5,6,&8 were with new fiber optic cabling, telecom rack, and new horizontal data cabling.

Guard Tower No. 3 Deficiencies

This section presents deficiencies for GT3. A summary of the GT3 deficiencies analyzed for this study is presented in Table GT3-1.

Table GT3-1: Guard Tower No. 3 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT3-A1	Roof Replacement	$ 8,640	NA	No	Medium
GT3-A2	Ceiling Replacement	$ 1,800	NA	No	Medium
GT3-A3	VCT Flooring Replacement	$ 2,000	NA	No	Medium
GT3-A4	Vanity / Sink / Toilet Replacement	$ 5,000	NA	No	Medium
GT3-S1	Failed Sealant	$ 3,600	GT3-S1	No	Medium
GT3-E1	Lighting System Replacement	$ 22,000	NA	No	High
GT3-E2	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT3-E3	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT3-T1	Add Fiber to Guard Tower and Lockable Telecom Cabinet	$ 200,000	NA	No	Medium
Guard Tower No. 3 Deficiencies Total Costs:		**$ 268,040**			

GT3-A1: Roof Replacement

The metal roof of this tower leaks and needs to be replaced. The probable project cost for this scope of work is $8,640.

GT3-A2: Ceiling Replacement

The ceiling is heavily damaged from the leaking roof and needs to be replaced. The probable project cost for this scope of work is $1,800.

GT3-A3: VCT Flooring Replacement

The VCT flooring in the tower station room has significant damage and should be replaced. The probable project cost for this scope of work is $2,000.

GT3-A4: Vanity Sink/Toilet replacement

The vanity and plumbing fixtures are damaged and should be replaced. The probable project cost for this scope of work is $5,000.

GT3-S1: Failed Sealant

Failed sealant requires removal and replacement to maintain envelope integrity. The probable project cost for this scope of work is $2,000.

GT3-E1: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT3-E2: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT3-E3: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT3-T1: Add Fiber to Guard Tower and Lockable Telecom Cabinet

Provide new 24 stand single mode fiber optic cabling to GT3 to align with the similar approach to GT4,5,6,&8. Fiber optic cabling can route back to GT6, Ancillary building, laundry building, or CERT building. Provide a lockable telecommunications cabinet within the guard tower and provide new Category 6 cabling for the existing phone. Provide power and grounding for telecommunications cabinet. The probable project cost for this scope of work is $200,000.

Guard Tower No. 4 Observations

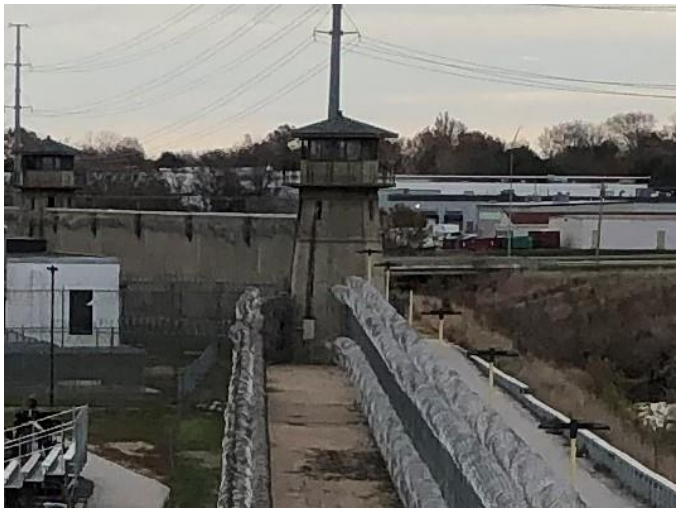


Photo GT4-1: Guard Tower No. 4

Guard Tower No. 4 (GT4) was built in 1953 and has an area of 279 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The west exterior of the building is shown in Photo GT4-1.

Architectural

Envelope

The tower is a solid concrete building with aluminum frame windows at the guard station. The lower portion of the tower is open air with no windows or doors. The roof is asphalt shingles and has been recently replaced. It was noted that there are several cracks in the wall that have been filled with caulk. One of the doors at the guard station appeared to be a replacement and is painted wood. There is a wood soffit and trim under the overhang of the roof over the windows. The tower ties into the concrete wall that forms a portion of the secure perimeter.

Interior

The interior is all bare concrete floors with painted concrete walls. The ceiling is ACT. There is an open toilet and vanity in the center of the guard station. The base of the tower is all bare concrete with no finishes and is open to the exterior.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT4 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT4 is a concrete structure. Spalling is present in small areas on the bottom of the observation level floor.

Photo GT4-S1: Spalled Slab

Photo GT4-S2: Map Cracking

Photo GT4-S3: Concrete Deterioration at Window

Photo GT4-S4: Pipe Chase

Areas of map cracking were present in several locations on the tower.

Spalling and cracking were evident around the lower level window. Some cracks are filled with an expanding foam product.

The clay-tile pipe chase inside the tower is detaching from the exterior wall. Several locations were filled with an expanding foam product.

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush tank water closet are both over 20 years old.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one ductless split system and a natural gas unit heater. The ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. The fan coil is installed low on a sidewall of the tower as shown in Photo GT4-M1. This system had problems working this summer until it stopped working all together in June of this year. Before it stopped working the guards tied up a fan to help distribute the air from the fan coil as can be seen in the photo. Ventilation air is provided via operable windows.

The gas unit heater was installed in the last ten years or so, but it produces too much heat. The gas unit heater as shown in Photo GT4-M2 delivers hot air in a very directional pattern so, it can overheat one side of GT4 and under heat the other side. As a result, the guards only use this on either very cold days or when the fan coil fails.

Photo GT4-M1: Existing Wall Mounted Fan Coil

Photo GT4-M2: Existing Gas Unit Heater

Electrical

Power Systems

Power distribution equipment within this tower is in very poor condition and is serving well beyond its useful service life and needs to be replaced. The electrical panel was observed to have a wasp nest inside the front cover. See Photo GT4-E1. The equipment manufacturer, Frank Adam, has long since ceased to be in business. Any failure of equipment would require replacement parts that, if available, are only found on the secondary market. This particular equipment is well-known for developing dangerous electrical problems throughout its lifetime. Convenience receptacles are fewer quantities than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo GT4-E1: Existing Electrical Panel

Lighting Systems

Lighting systems are old, in poor condition, and are serving beyond their useful service life.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount lockable telecommunication cabinet located on the lower level that serves data for the entire guard tower. The guard tower is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications cabinet located on the lower level of GT6. The data cabling serving the guard tower phone is Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications cabinet that supports the telecommunication network. The telecommunication cabinet is not grounded per BISCI standards.

Photo GT4-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There is one existing Panasonic PTZ camera.

Guard Tower No. 4 Deficiencies

This section presents deficiencies for GT4. A summary of the GT4 deficiencies analyzed for this study is presented in Table GT4-1.

Table GT4-1: Guard Tower No. 4 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT4-A1	Ceiling Replacement	$ 3,000	NA	No	Medium
GT4-A2	Soffit And Fascia Repair And Repaint	$ 2,000	NA	No	Medium
GT4-A3	Exterior Door / Window Replacement	$ 16,000	NA	No	Medium
GT4-S1	Spalled Slab	$ 3,600	GT4-S1	No	Low
GT4-S2	Concrete Map Cracking	$ 18,000	GT4-S2	No	Low
GT4-S3	Concrete Deterioration at Window	$ 7,920	GT4-S3	No	Medium
GT4-S4	Pipe Chase	$ 26,100	GT4-S4	No	Medium
GT4-M1	HVAC System Replacement	$ 11,600	GT4-M1 thru M2	No	High
GT4-E1	Power Distribution System Replacement	$ 65,000	GT4-E1	No	High
GT4-E2	Lighting System Replacement	$ 22,000	NA	No	High
GT4-E3	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT4-E4	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT4-T1	Grounding of Telecommunications Cabinet	$ 5,000	GT4-T1	No	Medium
GT4-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 12,500	NA	No	Medium
Guard Tower No. 4 Deficiencies Total Costs:		**$ 217,720**			

GT4-A1: Ceiling Replacement

The ceiling in the guard station is heavily damaged and needs to be replaced. The probable project cost for this scope of work is $3,000.

GT4-A2: Soffit and Fascia repair and repaint

The soffit and fascia of the roof overhang are peeling and damaged. The probable project cost for this scope of work is $2,000.

GT4-A3: Exterior Door/Window Replacement

Seals on several windows appear to have failed and the entire system appears to have reached the end of its useful life. The sill flashing is rusted in several locations and would be replaced as part of this work. The probable project cost for this scope of work is $16,000.

GT4-A4: Reseal Building Cracks

Several cracks on the building were observed. Many of these cracks have been sealed, but the sealant is beginning to crack and fail. These cracks should be resealed. The probable project cost for this scope of work is $1,500.

GT4-S1: Spalled Concrete Slab

Spalled areas shall have any loose concrete removed and then be prepped for patching with a non-shrink cementitious patching compound. The probable project cost for this scope of work is $2,000.

GT4-S2: Concrete Map Cracking

Map Cracking was noted in approximately 5% of the tower wall area. This repair is generally performed by removing all loose material and patching with a trowel applied, non-shrink, cementitious grout. The probable project cost for this scope of work is $10,000.

GT4-S3: Concrete Deterioration at Window

The spalled and concrete requires repair. This is typically achieved through removal of loose material and patching with a non-shrink cementitious patching grout. We recommend cracks larger than .03 inches below-pressure epoxy injected. The probable project cost for this scope of work is $4,400.

GT4-S4: Pipe Chase

If the pipe chase is no longer used, we recommend it be removed for safety reasons. If it is still needed, then replacement with new CMU is recommended. The probable project cost for this scope of work is $14,500.

GT4-M1: HVAC System Replacement

The ductless split system is from 2002 which makes it about 19 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years while the heat pump has a median service life of about 15 to 20 years. As a result, the existing equipment is operating beyond its expected useful life. It is recommended to replace the ductless split system with a new one. The probable project cost for this scope of work is $11,600.

GT4-E1: Power Distribution System Replacement

The power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $65,000.

GT4-E2: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT4-E3: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT4-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT4-T1: Grounding of Telecommunication Cabinet

Provide telecommunication grounding per BISCI standards for telecommunications pathways, cabinet and internal equipment. The probable project cost for this scope of work is $5,000.

Guard Tower No. 5 Observations

Photo GT5-1: Guard Tower No. 5

Guard Tower No. 5 (GT5) was built in 1953 and has an area of 279 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The east exterior of the building is shown in Photo GT5-1.

Architectural

Envelope

The tower is a solid concrete building with aluminum frame windows at the guard station. The lower portion of the tower is open air with no windows or doors. The roof is asphalt shingles and has been recently replaced. It was noted that there are several cracks in the wall that have been filled with caulk. One of the doors at the guard station appeared to be a replacement and is painted wood. There is a wood soffit and trim under the overhang of the roof over the windows. The tower ties into the concrete wall that forms a portion of the secure perimeter.

Interior

The interior is all bare concrete floors with painted concrete walls. The ceiling is ACT. There is an open toilet and vanity in the center of the guard station. The base of the tower is all bare concrete with no finishes and is open to the exterior.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT4 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT5 is a concrete structure. Spalling is present in small areas on the bottom of the observation level floor where utilities were run through the floor. Random cracking is present at various locations on the tower walls and observation level. Additionally, concrete has spalled from the bottom of the beam located at the edge of the intermediate landing exposing the reinforcing.

Photo GT5-S1: Spalled Concrete

Photo GT5-S2: Random Cracking

Photo GT5-S3: Spalled Concrete Beam

Mechanical

Plumbing Systems

GT5 is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush tank water closet are both over 20 years old.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one ductless split system and a natural gas unit heater. The ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. The fan coil is installed low on a sidewall of the tower as shown in Photo GT5-M1. Ventilation air is provided via operable windows. The ductless split system is brand new from this summer.

Photo GT5-M1: Existing Wall Mounted Fan Coil

The gas unit heater was installed in the last ten years or so, but it produces too much heat. The gas unit heater delivers hot air in a very directional pattern so, it can overheat one side of GT5 and under heat the other side. As a result, the guards only use this on either very cold days or when the fan coil fails.

Electrical

Power Systems

Power distribution equipment within this tower is in very poor condition and is serving well beyond its useful service life and needs to be replaced. The equipment manufacturer, Frank Adam, has long since ceased to be in business. Any failure of equipment would require replacement parts that, if available, are only found on the secondary market. This particular equipment is well-known for developing dangerous electrical problems throughout its lifetime. Convenience receptacles are fewer quantities than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting systems are old, in poor condition, and are serving beyond their useful service life.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount lockable telecommunication cabinet located on the lower level that serves data for the entire guard tower. The guard tower is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications cabinet located on the lower level of GT6. The data cabling serving the guard tower phone is Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications cabinet that supports the telecommunication network. The telecommunication cabinet is not grounded per BISCI standards. There appears to be a little water damage on the exterior of the cabinet.

Photo GT5-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There is one existing Panasonic PTZ camera.

Guard Tower No. 5 Deficiencies

This section presents deficiencies for GT5. A summary of the GT5 deficiencies analyzed for this study is presented in Table GT5-1.

Table GT5-1: Guard Tower No. 5 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT5-A1	Ceiling Replacement	$ 3,000	NA	No	Medium
GT5-A2	Soffit And Fascia Repair And Repaint	$ 2,000	NA	No	Medium
GT5-A3	Exterior Door / Window Replacement	$ 16,000	NA	No	Medium
GT5-S1	Spalled Slab	$ 3,600	GT5-S1	No	Low
GT5-S2	Random Cracking	$ 27,000	GT5-S2	No	Medium
GT5-S3	Spalled Concrete Beam	$ 3,600	GT5-S3	No	High
GT5-E1	Power Distribution System Replacement	$ 65,000	NA	No	High
GT5-E2	Lighting System Replacement	$ 22,000	NA	No	High
GT5-E3	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT5-E4	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT5-T1	Grounding of Telecommunications Cabinet	$ 5,000	GT5-T1	No	Medium
GT5-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 12,500	NA	No	Medium
Guard Tower No. 5 Deficiencies Total Costs:		**$ 184,700**			

GT5-A1: Ceiling Replacement

The ceiling in the guard station is heavily damaged and needs to be replaced. The probable project cost for this scope of work is $3,000.

GT5-A2: Soffit and Fascia repair and repaint

The soffit and fascia of the roof overhang are peeling and damaged. The probable project cost for this scope of work is $2,000.

GT5-A3: Exterior Door/Window Replacement

Seals on several windows appear to have failed and the entire system appears to have reached the end of its useful life. The sill flashing is rusted in several locations and would be replaced as part of this work. The probable project cost for this scope of work is $16,000.

GT5-A4: Reseal Building Cracks

Several cracks on the building were observed. Many of these cracks have been sealed, but the sealant is beginning to crack and fail. These cracks should be resealed. The probable project cost for this scope of work is $1,500.

GT5-S1: Spalled Concrete

Spalled areas shall have any loose concrete removed and then be prepped for patching with a non-shrink cementitious patching compound. The probable project cost for this scope of work is $2,000.

GT5-S2: Random Cracking

Random cracking was noted in approximately 10% of the tower wall area. This repair is generally performed by removing all loose material and patching with a trowel applied, non-shrink, cementitious grout. The probable project cost for this scope of work is $15,000.

GT5-S3: Spalled Concrete Beam

Spalled areas shall have any loose concrete removed to sound material and proper clearance around reinforcing bars and then be prepped for patching with a non-shrink cementitious patching compound. The probable project cost for this scope of work is $2,000.

GT5-E1: Power Distribution System Replacement

The power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $65,000.

GT5-E2: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT5-E3: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT5-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT5-T1: Grounding of Telecommunication Cabinet

Provide telecommunication grounding per BISCI standards for telecommunications pathways, cabinet and internal equipment. The probable project cost for this scope of work is $5,000.

GT5-SEC1:

One existing camera (discontinued) should be replaced to improve video coverage around the tower. Two additional multi-sensor/PTZ, high-resolution cameras should be mounted on the GT5 to provide better video coverage of the facility perimeter. The probable project cost for this scope of work is $12,500.

Guard Tower No. 6 Observations

Photo GT6-1: Guard Tower No. 6

Guard Tower No. 6 (GT6) was built in 1953 and has an area of 279 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The west exterior of the building is shown in Photo GT6-1.

Architectural

Envelope

The tower is a solid concrete building with aluminum frame windows at the guard station. The lower portion of the tower is open air with no windows or doors. The roof is asphalt shingles and needs to be replaced. It was noted that there are several cracks in the wall that have been filled with caulk. One of the doors at the guard station appeared to be a replacement and is painted wood. There is a wood soffit and trim under the overhang of the roof over the windows. The tower ties into the concrete wall that forms a portion of the secure perimeter.

Interior

The interior is all bare concrete floors with painted concrete walls. The ceiling is ACT. There is an open toilet and vanity in the center of the guard station. The base of the tower is all bare concrete with no finishes and is open to the exterior.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT6 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT6 is a concrete structure. Spalling is present in random areas on tower walls.

Photo GT6-S1: Cracked/Spalled Concrete at Slab Edge

Similar to the previous towers, map cracking is present in portions of the tower walls. See Photo GT6-S2.

Spalling is present at the bottom of the concrete beam at the edge of the intermediate landing. See Photo GT6-S3.

Photo GT6-S2: Map Cracking in Walls

Photo GT6-S3: Spalled Concrete Beam

Concrete around the floor hatches is spalling and deteriorated. See Photo GT6-S4.

Photo GT6-S4: Deteriorated Concrete at Floor Hatches

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush tank water closet are both over 20 years old.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one ductless split system and a natural gas unit heater. The ductless split system has an indoor fan coil, an outdoor air-source heat pump, and one stand-alone thermostat. The fan coil is installed low on a sidewall of the tower as shown in Photo GT6-M1. Ventilation air is provided via operable windows.

Photo GT6-M1: Existing Wall Mounted Fan Coil

The gas unit heater was installed in the last ten years or so, but it produces too much heat. The gas unit heater delivers hot air in a very directional pattern so, it can overheat one side of GT6 and under heat the other side. As a result, the guards only use this on either very cold days or when the fan coil fails.

Electrical

Power Systems

Power distribution equipment within this tower is in very poor condition and is serving well beyond its useful service life and needs to be replaced. The equipment manufacturer, Frank Adam, has long since ceased to be in business. Any failure of equipment would require replacement parts that, if available, are only found on the secondary market. This particular equipment is well-known for developing dangerous electrical problems throughout its lifetime. Convenience receptacles are fewer quantities than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting systems are old, in poor condition, and are serving beyond their useful service life.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount lockable telecommunication cabinet located on the lower level that serves data for the entire guard tower. The guard tower is served by a 144-strand, single mode fiber optic cable that runs back to the Telecom Room 2A18 located on the second level of the Ancillary building. The data cabling serving the guard tower phone is Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications cabinet that supports the telecommunication network. The telecommunication cabinet is not grounded per BISCI standards. The fiber optic cabling for towers 4, 5, and 8 distributes from GT6 telecommunications cabinet.

Photo GT6-T1: Existing Telecommunications Cabinet

Security

Video Surveillance Systems

There is one existing Panasonic PTZ camera.

Guard Tower No. 6 Deficiencies

This section presents deficiencies for GT6. A summary of the GT6 deficiencies analyzed for this study is presented in Table GT6-1.

Table GT6-1: Guard Tower No. 6 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT6-A1	Ceiling Replacement	$ 3,000	NA	No	Medium
GT6-A2	Soffit And Fascia Repair And Repaint	$ 2,000	NA	No	Medium
GT6-A3	Exterior Door / Window Replacement	$ 16,000	NA	No	Medium
GT6-A4	Roof Replacement	$ 7,500	NA	No	Medium
GT6-S1	Crakced/Spalled Concrete	$ 6,300	GT6-S1	No	Medium
GT6-S2	Map Cracking	$ 27,000	GT6-S2	No	Medium
GT6-S3	Spalled Concrete Beam	$ 3,600	GT6-S3	No	High
GT6-S4	Floor Hatches	$ 28,800	GT6-S4	No	Medium
GT6-M1	HVAC System Replacement	$ 23,000	GT6-M1	No	High
GT6-E1	Power Distribution System Replacement	$ 65,000	NA	No	High
GT6-E2	Lighting System Replacement	$ 22,000	NA	No	High
GT6-E3	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT6-E4	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT6-T1	Grounding of Telecommunications Cabinet	$ 5,000	GT6-T1	No	Medium
GT6-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 12,500	NA	No	Medium
Guard Tower No. 6 Deficiencies Total Costs:		**$ 246,700**			

GT6-A1: Ceiling Replacement

The ceiling in the guard station is heavily damaged and needs to be replaced. The probable project cost for this scope of work is $3,000.

GT6-A2: Soffit and Fascia repair and repaint

The soffit and fascia of the roof overhang are peeling and damaged. The probable project cost for this scope of work is $2,000.

GT6-A3: Exterior Door/Window Replacement

Seals on several windows appear to have failed and the entire system appears to have reached the end of its useful life. The sill flashing is rusted in several locations and would be replaced as part of this work. The probable project cost for this scope of work is $16,000.

GT6-A4: Reseal Building Cracks

Several cracks on the building were observed. Many of these cracks have been sealed, but the sealant is beginning to crack and fail. These cracks should be resealed. The probable project cost for this scope of work is $1,500.

GT6-A5: Roof Replacement

The asphalt roof of this tower leaks and needs to be replaced. The probable project cost for this scope of work is $7,500.

GT6-S1: Cracked/Spalled Concrete

Spalled areas shall have any loose concrete removed and then be prepped for patching with a non-shrink cementitious patching compound and isolated cracks epoxy injected. The probable project cost for this scope of work is $3,500.

GT6-S2: Map Cracking

Map cracking was noted in approximately 10% of the tower wall area. This repair is generally performed by removing all loose material and patching with a trowel applied, non-shrink, cementitious grout. The probable project cost for this scope of work is $15,000.

GT6-S3: Spalled Concrete Beam

Spalled areas shall have any loose concrete removed to sound material and proper clearance around reinforcing bars and then be prepped for patching with a non-shrink cementitious patching compound. The probable project cost for this scope of work is $2,000.

GT6-S4: Floor Hatches

Concrete around the hatches either require repair or complete replacement of the hatches, depending on the extent of deterioration. Assuming full replacement, the probable project cost for this scope of work is $16,000.

GT6-M1: HVAC System Replacement

The ductless split system is from 2002 which makes it about 19 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years while the heat pump has a median service life of about 15 to 20 years. As a result, the existing fan coil is operating beyond its expected useful life. It is recommended to replace the ductless split system with two new systems, with one at the upper tower level and the other near the ground level. The probable project cost for this scope of work is $23,000.

GT6-E1: Power Distribution System Replacement

The power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $65,000.

GT6-E2: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT6-E3: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT6-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT6-T1: Grounding of Telecommunication Cabinet

Provide telecommunication grounding per BISCI standards for telecommunications pathways, cabinet and internal equipment. The probable project cost for this scope of work is $5,000.

GT6-SEC1: Video Surveillance System

One existing camera (discontinued) should be replaced to improve video coverage around the tower. Two additional multi-sensor/PTZ, high-resolution cameras should be mounted on the GT6 to provide better video coverage of the facility perimeter. The probable project cost for this scope of work is $12,500.

Guard Tower No. 7 Observations

Guard Tower No. 7 (GT7) was built in 1965 and has an area of 152 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The north exterior of the building is shown in Photo GT7-1.

Photo GT7-1: Guard Tower No. 7

Architectural

Envelope

The tower is a solid concrete building with aluminum frame windows at the guard station. The lower portion of the tower is open air with no windows or doors. The roof is asphalt shingles and needs to be replaced. It was noted that there are several cracks in the wall that have been filled with caulk. There is a wood soffit and trim under the overhang of the roof over the windows. The tower ties into the concrete wall that forms a portion of the secure perimeter.

Interior

The interior is all bare concrete floors with painted concrete walls. The ceiling is ACT. There is an open toilet and vanity in the center of the guard station. The base of the tower is all bare concrete with no finishes and is open to the exterior.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT7 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT7 is a concrete structure. No items of structural concern were observed on this tower.

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush valve water closet are both over 20 years old.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of one natural gas furnace split system with an Air-Cooled Condensing Unit (ACCU). The furnace split system has an indoor furnace, an outdoor ACCU, and one stand-alone thermostat. The furnace is located below the observation level and sends ducted supply air to floor registers at the perimeter of the tower as shown in Photo GT7-M1. Return air flows back to the furnace through a grate in the floor. Ventilation air is provided via operable windows.

Photo GT7-M1: Existing Floor Mounted Supply Air Register

Electrical

Power Systems

Power distribution equipment within this tower is in fair condition and is serving beyond its useful service life. The distribution equipment needs to be replaced. The electrical panels are load center construction which is not suitable for long-term use in a prison. Convenience receptacles are fewer in quantity than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting on the ground floor level and intermediate floor level is surface mounted incandescent fixtures. Fixtures in the top floor Guard observation area are very old, flush, ceiling mounted square down lights with incandescent lamps. These fixtures have all served beyond their useful service life and are an ongoing maintenance issue for lamp replacement and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to reduce ongoing maintenance for facility staff as well as improving energy efficiency.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is no existing wall mount telecommunication rack located in the guard tower. The existing telephone in the tower is connected to existing backbone copper lines running to the ancillary building. There is a telephone in the guard tower control room. This guard tower has not been updated like GT4,5,6,&8 were with new fiber optic cabling, telecom rack, and new horizontal data cabling.

Security

Video Surveillance Systems

There is one existing Panasonic PTZ camera.

Guard Tower No. 7 Deficiencies

This section presents deficiencies for GT7. A summary of the GT7 deficiencies analyzed for this study is presented in Table GT7-1.

Table GT7-1: Guard Tower No. 7 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT7-A1	Ceiling Replacement	$ 3,000	NA	No	Medium
GT7-A2	Soffit And Fascia Repair And Repaint	$ 2,000	NA	No	Medium
GT7-A3	Exterior Door / Window Replacement	$ 16,000	NA	No	Medium
GT7-A4	Roof Replacement	$ 7,500	NA	No	Medium
GT7-M1	HVAC System Replacement	$ 23,000	GT7-M1	No	High
GT7-E1	Power Distribution System Replacement	$ 65,000	NA	No	High
GT7-E2	Lighting System Replacement	$ 22,000	NA	No	High
GT7-E3	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT7-E4	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT7-T1	Add Fiber to Guard Tower and Lockable Telecom Cabinet	$ 90,000	NA	No	Medium
GT7-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 12,500	NA	No	Medium
Guard Tower No. 7 Deficiencies Total Costs:		**$ 266,000**			

GT7-A1: Ceiling Replacement

The ceiling in the guard station is heavily damaged and needs to be replaced. The probable project cost for this scope of work is $3,000.

GT7-A2: Soffit and Fascia repair and repaint

The soffit and fascia of the roof overhang are peeling and damaged. The probable project cost for this scope of work is $2,000.

GT7-A3: Exterior Door/Window Replacement

Seals on several windows appear to have failed and the entire system appears to have reached the end of its useful life. The sill flashing is rusted in several locations and would be replaced as part of this work. The probable project cost for this scope of work is $16,000.

GT7-A4: Reseal Building Cracks

Several cracks on the building were observed. Many of these cracks have been sealed, but the sealant is beginning to crack and fail. These cracks should be resealed. The probable project cost for this scope of work is $1,500.

GT7-A5: Roof Replacement

The asphalt roof of this tower leaks and needs to be replaced. The probable project cost for this scope of work is $7,500.

GT7-M1: HVAC System Replacement

The furnace split system is about 20 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years while the heat pump has a median service life of about 15 to 20 years. As a result, the existing equipment is operating beyond its expected useful life. It is recommended to replace the furnace split system with two new ductless air-source heat pump split systems. One system would be located at the upper tower level and the other near the ground level. The probable project cost for this scope of work is $23,000.

GT7-E1: Power Distribution System Replacement

The power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $65,000.

GT7-E2: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT7-E3: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT7-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT7-T1: Add Fiber to Guard Tower and Lockable Telecom Cabinet

Provide new 24 stand single mode fiber optic cabling to the GT7 to align with the similar approach to GT4,5,6,&8. Fiber optic cabling can be routed to GT6. Provide a lockable telecommunications cabinet within the guard tower and provide new Category 6 cabling for the existing phones. Provide power and grounding for telecommunications cabinet. The probable project cost for this scope of work is $90,000.

GT7-SEC1: Video Surveillance System

One existing camera (discontinued) should be replaced to improve video coverage around the tower. Two additional multi-sensor/PTZ, high-resolution cameras should be mounted on the GT7 to provide better video coverage of the facility perimeter. The probable project cost for this scope of work is $12,500.

Guard Tower No. 8 Observations

Guard Tower No. 8 (GT8) was built in 1969 and has an area of 160 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The north and east exteriors of the building are shown in Photo GT8-1.

Photo GT8-1: Guard Tower No. 8

Architectural

Envelope

The tower is a solid concrete building with aluminum frame windows at the guard station. The lower portion of the tower is open air with no windows or doors. The roof is asphalt shingles and needs to be replaced. It was noted that there are several cracks in the wall that have been filled with caulk. There is a wood soffit and trim under the overhang of the roof over the windows. The tower ties into the concrete wall that forms a portion of the secure perimeter.

Interior

The interior is all bare concrete floors with painted concrete walls. The ceiling is ACT. There is an open toilet and vanity in the center of the guard station. The base of the tower is all bare concrete with no finishes and is closed to the exterior.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The GT8 was built pre-ADA. The toilet and lavatory do not meet ADA. The ships ladder does not provide access for a person with disabilities.

Structural

GT8 is a concrete structure. A previous opening had been infilled, as seen above the door in photo GT8-1 above. The landing at the walkway level is deteriorated.

Photo GT8-S1: Deteriorated Walkway Landing

Mechanical

Plumbing Systems

This tower is served with domestic cold water, but does not have domestic hot water. The lavatory and the flush tank water closet are both at least 20 years old.

Photo GT8-M1: Existing Gas Furnace

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two furnace split systems. Each furnace split system has an indoor natural gas furnace, an outdoor Air-Cooled Condensing Unit (ACCU), and one stand-alone thermostat. One furnace is located on a stair landing at mid-height of the tower with supply air ductwork serving floor mounted registers at the observation level and the other one is located down at the entry level near the door. The furnace located at the mid-height level is shown in Photo GT8-M1. Ventilation air is provided via operable windows.

Electrical

Power Systems

Power distribution equipment within this tower is in fair condition and is serving beyond its useful service life. See Photo GT8-E1. The distribution equipment needs to be replaced. The electrical panels are load center construction which is not suitable for long-term use in a prison. Convenience receptacles are fewer in quantity than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo GT8-E1: Electrical Equipment

Lighting Systems

Lighting on the ground floor level and intermediate floor level is surface mounted incandescent fixtures. Fixtures in the top floor Guard observation area are very old, flush, ceiling mounted square down lights with incandescent lamps. These fixtures have all served beyond their useful service life and are an ongoing maintenance issue for lamp replacement and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to reduce ongoing maintenance for facility staff as well as improving energy efficiency. Emergency lighting fixtures are battery operated, wall mounted “bug-eyes.” These fixtures appear to be newer vintage and are in serviceable condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount lockable telecommunication cabinet located on the lower level that serves data for the entire guard tower. The guard tower is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications cabinet located on the lower level of GT6. The data cabling serving the guard tower phone is Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications cabinet that supports the telecommunication network. The telecommunication cabinet is not grounded per BISCI standards.

Photo GT8-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There is one existing Panasonic PTZ camera.

Guard Tower No. 8 Deficiencies

This section presents deficiencies for GT8. A summary of the GT8 deficiencies analyzed for this study is presented in Table GT8-1.

Table GT8-1: Guard Tower No. 8 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT8-A2	Ceiling Replacement	$ 3,000	NA	No	Medium
GT8-A1	Exterior Door / Window Replacement	$ 16,000	NA	No	Medium
GT8-S1	Deteriorated Walkway Landing	$ 20,700	GT8-S1	No	High
GT8-M1	HVAC System Replacement	$ 23,000	GT8-M1	No	High
GT8-E1	Power Distribution System Replacement	$ 65,000	GT8-E1	No	High
GT8-E2	Lighting System Replacement	$ 22,000	NA	No	High
GT8-E3	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT8-E4	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
GT8-T1	Grounding of Telecommunications Cabinet	$ 5,000	GT8-T1	No	Medium
GT8-T2	UPS for Telecommunications Cabinet	$ 12,000	GT8-T1	No	Medium
GT8-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 12,500	NA	No	Medium
Guard Tower No. 8 Deficiencies Total Costs:		**$ 204,200**			

GT8-A1: Ceiling Replacement

The ceiling in the guard station is heavily damaged and needs to be replaced. The probable project cost for this scope of work is $3,000.

GT8-A2: Exterior Door/Window Replacement

Seals on several windows appear to have failed and the entire system appears to have reached the end of its useful life. The sill flashing is rusted in several locations and would be replaced as part of this work. The probable project cost for this scope of work is $16,000.

GT8-A3: Reseal Building Cracks

Several cracks on the building were observed. Many of these cracks have been sealed, but the sealant is beginning to crack and fail. These cracks should be resealed. The probable project cost for this scope of work is $1,500.

GT8-S1: Deteriorated Walkway Landing

This landing exhibits extensive cracking and delamination. Repair is unlikely and replacement should be planned. The probable project cost for this scope of work is $11,500.

GT8-M1: HVAC System Replacement

The furnace split systems are both about 20 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years while the heat pump has a median service life of about 15 to 20 years. As a result, the existing equipment is operating beyond its expected useful life. It is recommended to replace the furnace split systems with two new ductless air-source heat pump split systems. One system would be located at the upper tower level and the other near the ground level. The probable project cost for this scope of work is $23,000.

GT8-E1: Power Distribution System Replacement

The power distribution system is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $65,000.

GT8-E2: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT8-E3: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT8-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

GT8-T1: Grounding of Telecommunication Cabinet

Provide telecommunication grounding per BISCI standards for telecommunications pathways, cabinet and internal equipment. The probable project cost for this scope of work is $5,000.

GT8-T2: UPS for Telecommunication Cabinet

Provide rack mount UPS for telecommunication cabinet to support IT networks and equipment. The probable project cost for this scope of work is $5,000.

GT8-SEC1: Video Surveillance System

One existing camera (discontinued) should be replaced to improve video coverage around the tower. Two additional multi-sensor/PTZ, high-resolution cameras should be mounted on the GT8 to provide better video coverage of the facility perimeter. The probable project cost for this scope of work is $12,500.

Guard Tower No. 10 Observations

Guard Tower No. 10 (GT10) was built in 1981 along with the ANC and has an area of 144 gross square feet. It is functionally used for monitoring activity inside and outside the NSP. The south and west exteriors of the building are shown in Photo GT10-1.

Please note that a GT9 does not exist so, it is skipped on purpose.

Photo GT10-1: Guard Tower No. 10

Architectural

Envelope

The envelope of the building is brick veneer with CMU back-up. Most of the brick appears to be in good condition. The windows on the building are double paned aluminum frame and in good condition. The roof appears to be a modified bitumen roof and is roughly 20-25 years old, an age when this type of roof typically reaches the end of its useful life.

Interior

The interior of the guard tower is painted CMU with a VCT floor and an open-air toilet and vanity. There is an ACT ceiling. No major damage was documented in the tower.

Life Safety

The central stair in the facility that connects all three floors of the building is open and has been noted to be a life safety hazard.

Americans with Disabilities Act

The GT10 was built pre-ADA. The toilet and lavatory do not meet ADA. The stair to the tower does not provide access for a person with disabilities.

Structural

GT10 is a concrete tower with concrete stairs and landings. No structural items of concern were noted.

Mechanical

Plumbing Systems

This tower is served with domestic cold and hot water. The lavatory and the flush valve water closet are both original from 1981.

Fire Protection Systems

This tower does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of chilled water fan coil and perimeter heating hot water finned tube. The fan coil is shown in Photo GT10-M1. The finned tube stopped working many years ago so, an electric space heater was installed and still functions. Ventilation air is provided via operable windows.

Photo GT10-M1: Existing Ceiling Mounted Fan Coil

Electrical

Power Systems

Power distribution equipment within this tower is in fair condition and serving beyond its useful service life. Convenience receptacles are fewer quantities than what should be available for the occupancy and use of the tower. Convenience receptacle mounting heights are not compliant with modern ADA standards. There is a switch box at the top of the stairway that has open knock-outs which is dangerous and not code compliant.

Lighting Systems

Lighting on the ground floor level and intermediate floor level is a combination of surface mounted fluorescent and incandescent fixtures. Fixtures in the top floor Guard observation area are ceiling mounted down lights with incandescent lamps. These fixtures are original to the tower construction and are serving beyond their useful service life. They are an ongoing maintenance issue for lamp replacement and are not energy efficient. Replacement of all lighting fixtures within this tower is recommended to reduce ongoing maintenance for facility staff as well as improving energy efficiency. Emergency lighting fixtures are battery-operated, wall-mounted “bug-eyes.” These fixtures appear to be newer vintage and are in serviceable condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is a telephone located in the guard tower which is served from the ancillary building. There is not a separate network for the guard tower since it is attached to the Ancillary building.

Guard Tower No. 10 Deficiencies

This section presents deficiencies for GT10. A summary of the GT10 deficiencies analyzed for this study is presented in Table GT10-1.

Table GT10-1: Guard Tower No. 10 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
GT10-A1	Roof Replacement (1)	$ -	NA	No	Medium
GT10-M1	HVAC System Replacement	$ 11,600	GT10-M1	No	High
GT10-E1	Lighting System Replacement	$ 22,000	NA	No	High
GT10-E2	Convenience Receptacle Upgrade for ADA	$ 17,500	NA	No	High
GT10-E3	Replace Fire Detection and Alarm System	$ 7,500	NA	No	High
Guard Tower No. 10 Deficiencies Total Costs:		**$ 58,600**			

Notes:
(1) Roof replacement cost is included in the roof replacement deficiency item for the ANC.

GT10-A1: Roof Replacement

A full roof replacement should be considered due to the age of the roof. This would be done at the same time as the ancillary building. The cost of this is included in the roof replacement of the ANC.

GT10-M1: HVAC System Replacement

The hydronic fan coil unit and finned tube system is about 40 years old. According to ASHRAE, most fans and coils have a median service life of about 20 years. As a result, the existing equipment is operating beyond its expected useful life. It is recommended to replace the existing equipment with a new ductless air-source heat pump split system. The probable project cost for this scope of work is $11,600.

GT10-E1: Lighting System Replacement

The lighting system is serving beyond its useful service life and needs to be replaced. Replacement fixtures should consist of energy efficient, low-maintenance LED fixtures. The probable project cost for this scope of work is $22,000.

GT10-E2: Convenience Receptacles Replacement for Americans with Disabilities Act

Existing convenience receptacles need to be revised to meet ADA guidelines. The probable project cost for this scope of work is $17,500.

GT10-E3: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $7,500.

Housing Units No. 1 through 5 Observations

Housing Units No. 1 through No. 4 (HU1-4) were built in 1981. HU5 was built in 1993. HU1 through HU4 have an area of 16,934 gross square feet each and HU5 has an area of 20,240 gross square feet. HU1 was observed for typical conditions, but all five Housing Units (HU1-5) are grouped together for the purposes of this study. They are functionally used for housing maximum security inmates. The north and northwest exteriors of HU1 are shown in Photo HU1-5-1.

Photo HU1-5-1: Housing Unit No. 1

Architectural

Envelope

HU1-5 are masonry with CMU back-up. The exterior windows and doors are all security hollow metal with security glazing. At the entry for HU1-4 there is a metal panel wall fascia. All the roofs on these buildings are 30-year-old EPDM. HU5 is similar in construction to the others but has a mechanical mezzanine in lieu of a basement level mechanical room. The mezzanine envelope is metal panel that matches the wall fascia from all the other units.

Interior

The interior of these units is all hard surfaces with CMU walls, VCT floors, and hard lid gypsum board ceilings. There are several areas with exposed sprinkler piping which is deteriorating and needs to be replaced. The showers are 1x1 tile on the floors with 4x4 subway tile on the walls and show significant amounts of damage. All the interior doors are painted security hollow metal doors. The control stations have millwork that needs to be replaced.

Photos HU1-5-A2-A3: Typical Shower

Life Safety

These buildings do not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system and fire sprinkler system.

Americans with Disabilities Act

HU1 through HU4 were built pre-ADA. However, HU5 was built in 1993 just after the ADA was signed into law. None of these units meet ADA. The typical main entry is at a landing at the midpoint between the lower and upper galleries necessitating stairs to any housing level. At HU1, a ramp was cut into the grade that accesses the end of the lower gallery on the southeast wing of the unit. While this does provide ADA access to the building, there are no ADA compliant cells or showers. The facility has added grab bars and accommodations as best they can within the spaces that they have, but they still do not meet current standards. HU5 has similar issues.

Photo HU1-5-A4: Typical non-compliant ADA Modifications for Inmate Cell

Photo HU1-5-A1: ADA Ramp to HU-1

Elevators

There are no elevators at these buildings.

Structural

HU1 is concrete slab structure supported by concrete masonry (CMU) bearing walls above grade and concrete walls below grade. Narrow cracks were present in a small area of the lower-level mechanical room basement walls. There is staining indicating moisture has passed through these joints.

A horizontal crack near the top of the north wall of the northeast wing is nearly continuous. It appears previous repairs were attempted and those have also failed.

Photo HU1-5-S2: Cracked Brick at Parapet

Photo HU1-5-S1: Cracks in Mechanical Room Wall

Mechanical

Plumbing Systems

A steam water heater exists in the basement which is original from 1981. See Photo HU1-5-M1. The water heater has a pneumatic steam control valve which serves a steam tube bundle in this water tank. There is only one tube bundle in this water heater so, there is no redundancy in the case of equipment failure.

Photo HU1-5-M1: Existing Steam Water Heater

The plumbing fixtures are original from 1981. See Photo HU1-5-M2 for typical plumbing fixtures. This building was built before the EPAct of 1992 and before ADA so, the plumbing fixtures, flush valves, and shower heads are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements. For a discussion on ADA issues, see architectural.

Photo HU1-5-M2: Existing Security Plumbing Fixtures

The inmate showers have problems with water drainage. See Photo HU1-5-M3. The water then leaks into the adjacent security guard office. The sanitary piping is likely corroding and getting plugged up.

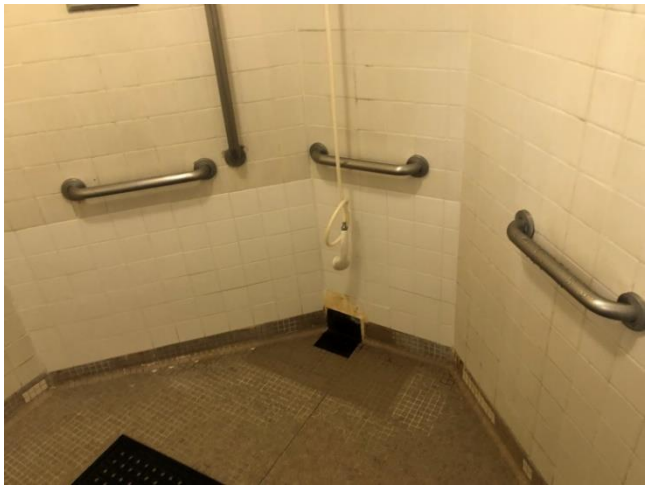


Photo HU1-5-M3: Existing Shower Floor Drains

Fire Protection Systems

This building has a wet-pipe fire sprinkler system. The piping and heads are installed exposed and low in the corridors leading to the inmate rooms. The piping and sprinkler heads are low and not ligature resistant. The piping near the shower rooms has visible corrosion on it. See Photo HU1-5-M4.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC systems are composed of one large multi-zone AHU system, a steam to heating hot water shell and tube heat exchanger, perimeter finned tube heating, hydronic cabinet unit heaters at the entries, and base-mounted end-suction pumps. See Photo HU1-5-M5, with most equipment still original from 1981.

Photo HU1-5-M4: Exposed and Rusting Fire Sprinkler Piping

The AHU is constant volume with ducted supply and return air systems, a steam humidifier, heating hot water coil, and chilled water coil. See Photo HU1-5-M6 for a typical existing AHU. The AHU fans have a belt-driven fan motor. Ventilation air is provided via outdoor air louvers mounted in the exterior walls at the roof level.

The temperature controls are still pneumatic, but there are direct digital control panels installed in each mechanical room which are interfaced with the pneumatic controls to allow for remote monitoring and control of the building via the Honeywell building automation system.

Photo HU1-5-M5: Typical Existing Pump

Photo HU1-5-M6: Existing AHU

There is a lack of exhaust air noticed, particularly in the shower rooms. The moisture remains in the air and travels out of the shower rooms into the corridors and causes corrosion on steel items. The security type exhaust grilles are not easy to see through, but this exhaust grille in the security office is and the dirty exhaust air ductwork can be observed. See Photo HU1-5-M7. It is likely that the supply air and return air ducts are also dirty after 40 years of use.

Photo HU1-5-M7: Existing Pneumatic Controls

Photo HU1-5-M8: Dirty Exhaust Air Ductwork

Electrical

Power Systems

The majority of the electrical distribution system is original to the building construction. This equipment is serving beyond its useful service life and needs to be replaced. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting systems throughout the building are very aged and are serving beyond their useful service life. These lighting systems need to be replaced.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in the lower level Mechanical Room 28 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located on the second telecommunications room 2A18 of the Ancillary building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. There is a telecommunication ground bar that provides grounding to the telecommunications rack. There is existing coaxial cabling routed to televisions within the building from Mechanical Room 28. The paging amplifier for the building paging system is located in Mechanical Room 28. The JPAY network equipment and UPS are located in the telecommunication rack as well. The existing phone lines in the building are still on analog lines.

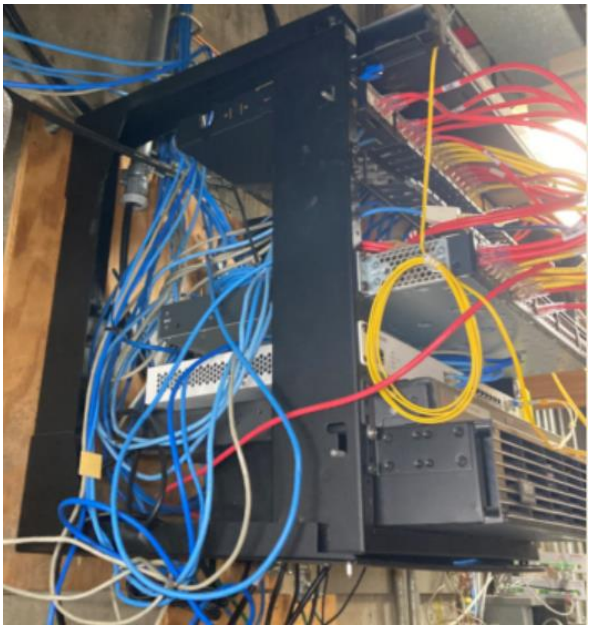


Photo HU1-5-T1: Existing Telecom Cabinet

Security

Detention Door Control Systems

There are two control locations in HU1 that control and monitor all doors in the building.

1. Control Room for Wings A and C
2. Control Room for Wings B and D

Photo HU1-SEC1: Control Panels in A Wing

Both control locations use obsolete control panels to control and monitor their areas. Control panels consist of rotary switches and old type LED indicators installed on composite board (plastic/steel) with text engraved on their surface. Both panels are installed on desk mounted turrets. The system does have capability to transfer control to Central Control. The existing doors are hard wired into door control relays and switches that are installed in the wall mounted enclosure. The enclosures are installed in the Mechanical space/chase below the control rooms. The room/chase is very difficult to access and does not meet National Electrical Code required work clearance space in front of the security enclosures.

Photo HU1-SEC2: Control Panels in B Wing

Photo HU1-SEC3: Existing Door Control Enclosures-Typical for both A and B Wing

Intercom and Paging Systems

The housing control officers are using paging system speakers to communicate to inmates. The paging speakers are strategically placed and recessed into ceilings in corridors between cells. The system allows two-way communication between officers and inmates. There is one intercom station in front of the main housing entrance door.

Photo HU1-SEC4: Existing Communication Console-Typical for both A and B Wing

Video Surveillance Systems

There are five Panasonic, fixed cameras installed on the second level and five Panasonic, fixed cameras installed on the first level. All cameras are high resolution cameras and were updated in 2021.

Housing Units No. 1 through No. 5 Deficiencies

This section presents deficiencies for HU1-5. A summary of the HU1-5 deficiencies analyzed for this study is presented in Table HU1-5-1.

Table HU1-5-1: Housing Units No. 1 Through 5 Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost (1)**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
HU1-5-1	Full Demolition & Replacement of HU1-5	$ 96,723,390	All HU1-5 Photos	Yes	High
Housing Units No. 1 Through 5 Deficiencies Total Costs:		**$ 96,723,390**			

Notes:
(1) Cost is the total needed for all five housing units.

HU1-5-A1: Full Replacement of Housing Units No.1 through No. 5

HU1-5 are old-style, indirect supervision housing units. These buildings are set up with the control station at the midpoint between the two housing unit floors. This was done to allow for supervision from the housing control station without interaction between staff and inmates. This is an old-model, housing configuration and does not meet current standards. Due to all the stairs and different levels, there is no way to ensure that all areas of the building are ADA accessible for staff or inmates. With the current configuration of the units, there is no real cost-effective way to make the housing control stations or housing levels accessible. Elevators would need to be added, which are not recommended in high security housing areas. It is for these reasons that it is the recommendation of this report that these units be systematically replaced. The first step would be to build a new modern housing unit that would replace HU1. Once this unit is completed, inmates from HU1 would move into this unit. Then HU1 would be demolished and replaced with a new housing Unit that would become HU2. Once this unit is complete, Inmates would move from HU2 would move into this new unit. This cycle would then repeat itself for all the other housing units so that by the end of the project, there would be five new housing units that have replaced the existing five units. The probable project cost for this scope of work would be as follows:

New HU-1-	$17,110,000
Demolition of Existing HU-1	$410,575
New HU-2	$17,965,500
Demolition of Existing HU-2	$422,900
New HU-3	$18,863,775
Demolition of Existing HU-3	$435,580
New HU-4	$19,806,975
Demolition of Existing HU-4	$448,650
New HU-5	$20,797,325
Demolition of Existing HU-5	$462,110
Total Cost	$96,723,390

Housing Unit No. 6 Observations

Housing Unit No. 6 (HU6) was built in 1954 and has an area of 61,361 gross square feet. It is also known as the Medium Security Unit. It is functionally used for housing medium security inmates. The south exterior is shown in Photo HU6-1.

Photo HU6-1: Housing Unit No. 6

Architectural

Envelope

The building is a masonry building with CMU back-up. The windows have recently been replaced with double paned aluminum frame storefront. The roof is a standing seam metal roof and appears to be in good condition. The main entry was an addition to the building and consists of storefront framing and standing seam metal roof and is in poor condition with some significant damage.

Interior

Photo HU6-A1: Weather Vestibule with Worn Door Hardware and Damaged Window Framing

Photo HU6-A2: Floor Tile Damage and Missing in Kitchen

.

The interior of the building houses multiple functions along with the housing. On the main level there is some administrative space along with a kitchen and dining area that serves this population. The administrative area is an old open dorm wing that has been filled with office partitions. The ceiling is hard lid with several exposed pipes hanging below the ceiling plane. This area has carpet for flooring. The dining area is an open floor plan with VCT flooring and hard lid ceiling with exposed piping. The kitchen has a quarry tile floor that has deteriorated in many locations. The location of the kitchen is problematic due to housing units being located above. When water backs up in the toilet rooms above, soiled water migrates down to the kitchen creating unsanitary conditions for the kitchen. This happens frequently enough to really consider getting the kitchen out of the building. The housing units themselves are dorms with hard lid ceilings and exposed piping. The toilet

rooms have deteriorated completely and require a complete renovation at the very least. There is exposed piping everywhere and none of the toilet rooms meet ADA. The showers have tile missing and need to be completely renovated.

Life Safety

The largest life safety issue in this building is the open stair in the middle of the building. The exposed piping in the dorm areas also poses a risk due to ligature concerns. An inmate can reach the piping at the ceiling while standing on his bunk. The unsanitary conditions of the kitchen are also an issue. The building is protected by a functional fire alarm system and fire sprinkler system.

Americans with Disabilities Act

The HU6 was built pre-ADA. None of the toilet areas meet current ADA standards, and the housing areas on the second floor are inaccessible due to the lack of an elevator. A chair lift is available for access from the main entry level up six steps to the Canteen and the Barber Shop.

Elevators

There are no elevators in the building; however, there is a chair lift from the main entry level to the first-floor Canteen and Barber Shop.

Structural

HU6 is a concrete slab and frame building with concrete masonry (CMU) infill. Cracks were present in the lower-level mechanical room walls. A portion of the steam tunnel lid was damaged from previous work and the historic metal lathe was unsupported.

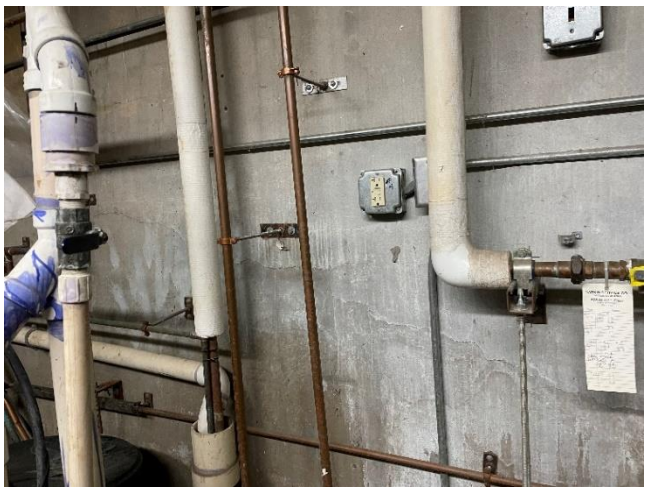


Photo HU6-S1: Crack in Mechanical Room Wall

Photo HU6-S2: Damaged Lathe at Steam Tunnel Ceiling

Foodservice

HU6 contains the "External Kitchen," which is the secondary kitchen and dining room to the main kitchen and dining room located in the ANC. They currently serve three meals per day to 550 people at this location. The food service manager noted that this kitchen was last designed to serve three meals per day to 240 people in 1992. The majority of the equipment appears to be original from 1992 and is nearing the end of its serviceable life.

The walk-in cooler and freezer compartments appear to be original equipment from 1992. The freezer door has been previously replaced with a replacement door and frame, and the cooler door has numerous dents and damaged viewport frame. See Photos HU6-FS1 and HU6-FS2. The evaporator coils appear to be deteriorating from their age and humid operating conditions. See Photos HU6-FS3 and HU6-FS4. The food service manager noted that there is a gap in the cooler wall where it meets the floor, but the gap is located behind the storage racks and not easy to get to for repairs.

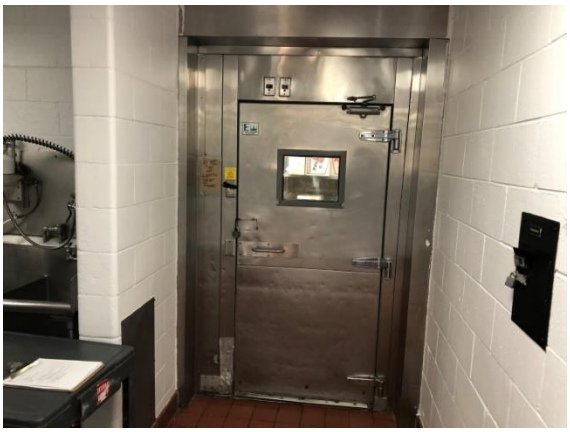


Photo HU6-FS1: Existing Walk-in Cooler Door

Photo HU6-FS2: Existing Walk-in Freezer Door

Photo HU6-FS3: Existing Cooler Evaporator Coil

Photo HU6-FS4: Existing Freezer Evaporator Coil

All reach-in refrigerator and milk coolers are older units and have sagging doors and numerous dents on exterior of units. See Photos HU6-FS5 and HU6-FS6. These units also require a discontinued refrigerant to operate.

Photo HU6-FS5: Existing Reach-in Refrigerator

Photo HU6-FS6: Existing Milk Cooler

The fryers and tilt skillet are older units and show signs of extensive use with high heat. See Photos HU6-FS7 and HU6-FS8.

Photo HU6-FS7: Existing Fryers

Photo HU6-FS8: Existing Tilt Skillet

The hot and cold serving counters appear to be original equipment from 1992 and show signs of extensive use and nearing the end of its serviceable life. See Photos HU6-FS9 and HU6-FS10.

Photo HU6-FS9: Existing Hot Serving Counter

Photo HU6-FS10: Existing Cold Serving Counter

Mechanical

Plumbing Systems

A steam water heater exists in the basement which is from 1995. See Photo HU6-M1. The water heater has a pneumatic steam control valve which serves a steam tube bundle in this water tank. There is only one tube bundle in this water heater so there is no redundancy in the case of equipment failure.

The inmate restrooms have exposed plumbing piping and vitreous china plumbing fixtures. See Photo HU6-M2. The inmates can easily damage the piping and it is not ligature resistant. The plumbing fixtures are easily broken for use as weapons.

Photo HU6-M1: Existing Steam Water Heater

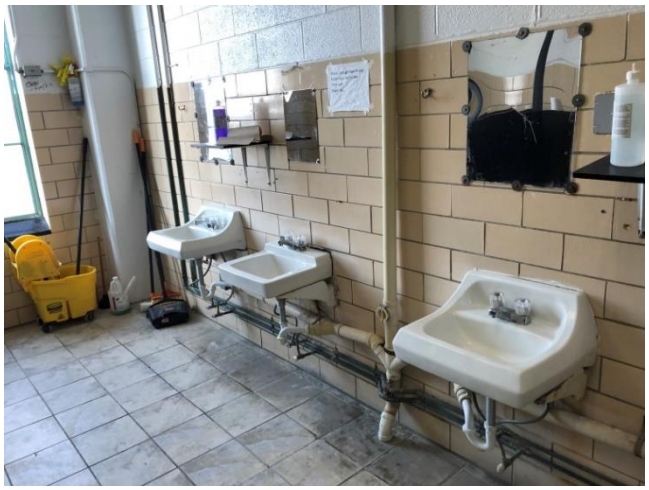


Photo HU6-M2: Exposed Restroom Plumbing

The restrooms get washed down once a week. The floor tiles are an ongoing maintenance issue with regard to grout joints and caulking to contain the water on the floor. The water closets on second floor are difficult to keep sealed to the floor so, the water follows the sanitary piping down to the ceiling cavity of first floor. This also occurs whenever the water closets overflow, by accident or intentionally.

Fire Protection Systems

This building has a wet-pipe fire sprinkler system. The piping and heads are installed exposed in most spaces. The sprinkler main in a janitor's closet, next to a shower room on second floor, has excessive corrosion on it. See Photo HU6-M4. The janitor's closets are poorly ventilated and are humid thus leading to the growth seen on the walls and ceiling in Photo HU6-M4. The maintenance staff indicates that this has been occurring for so long that the they've tried to paint the vertical piping white several times, but it keeps rusting through. The white pipe is now actively leaking onto the floor and a constant puddle exists.

Photo HU6-M4: Rusting and Leaking Fire Sprinkler Piping on Second Floor

The same piping from Photo HU6-M4 continues down to first floor where the water follows it and continues to cause corrosion and humidity problems. This room is so damp and humid that the horizontal sprinkler piping in it rusted through and started leaking so, that red section of piping in Photo HU6-M5 was replaced in the last two years. However, the newer red sprinkler piping already has rust forming on it again and there is extensive water damage to the other piping and pipe insulation in this room.

Photo HU6-M5: Rusting Fire Sprinkler Piping on First Floor

Heating, Ventilating, and Air-Conditioning Systems

The HVAC systems are composed of three large AHU systems, two steam to heating hot water shell and tube heat exchangers, four-pipe fan coils, two kitchen exhaust hoods, a make-up air unit, and base-mounted end-suction pumps with most equipment installed in 2000.

The AHUs are all constant volume with ducted supply and return air systems, heating hot water coils, and chilled water coils. See Photo HU6-M6 for a typical existing AHU. The AHUs have plenum fans. Ventilation air is provided via outdoor air louvers mounted in the exterior walls on second floor.

The kitchen make-up air unit does not work because it's heating coil froze a couple of years ago, so it no longer is interlocked to run with the kitchen exhaust hoods causing excessive negative air pressure inside the building during most of the day.

Photo HU6-M6: Typical Existing AHU

Photo HU6-M7: Existing Kitchen Make-Up Air Unit

The temperature controls are all DDC and allow for remote monitoring and control of the building via the Honeywell building automation system.

Electrical

Power Systems

The majority of the electrical distribution system is original to the building construction. See Photo HU6-E1. This equipment is serving beyond its useful service life and needs to be replaced. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo HU6-E1: Main Electrical Service

Lighting Systems

Lighting systems throughout the building are very aged and are serving beyond their useful service life. These lighting systems need to be replaced.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There are several telecommunication spaces throughout the building. Telecom Room 003 located in the basement houses the CATV services for the NSP site. There are 3 racks that contain multiple receivers, amplifiers, distribution equipment, power supplies, and other associated CATV equipment. If Housing Unit 6 will be demolished, all of this equipment would need to be relocated to another location on the premises. There appears to be fiber that routes to HU1,2,3,4,5,7,&8 plus the Ancillary building and the control unit for distribution of the CATV systems.

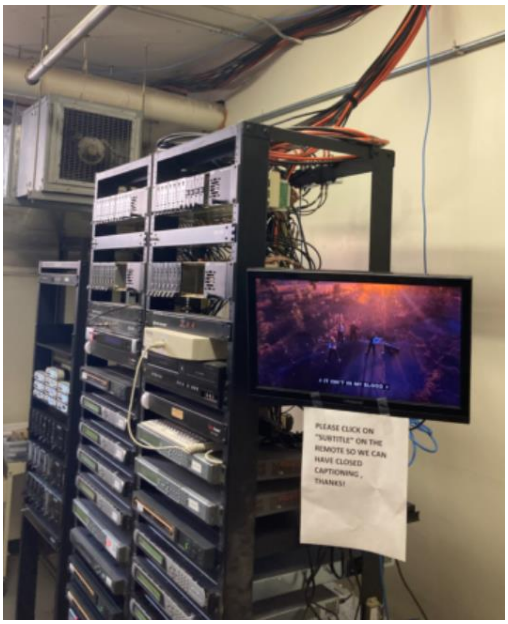


Photo HU6-T1: Existing Telecom Room 003

The main telecommunications room that services the building for data, wireless, and telephone is located in Telecom Room 008 located on the basement floor. There is a 2-post in the room that house fiber optic shelves, copper patch panels, networking equipment, and a UPS. There appears to be fiber that routes to HU1,2,3,4,5,7,&8 plus the Ancillary building and the control unit for distribution of the CATV systems. There is a 24-stand, single mode fiber optic cable that routes back to the Ancillary building. The horizontal data cabling to work area outlets is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. The telecommunications rack is not grounded per BISCI standards.

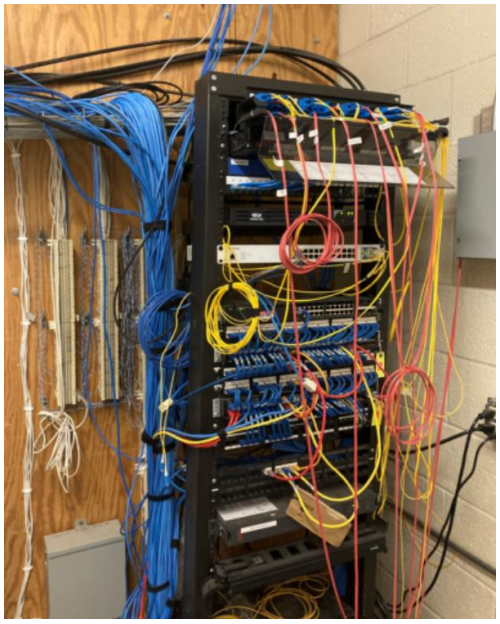


Photo HU6-T2: Existing Telecom Room 008

Security

Detention Door Control Systems

There is one control location in HU6 that controls and monitors all doors in the building (movement/exterior doors).

The control location uses an obsolete control panel to control and monitor security devices. The control panel consists of rotary switches and old type LED indicators installed on composite board (plastic/steel) with text engraved on their surface. The panel is installed on a desk mounted turret. The system does not have capability to transfer control to any other control location. The existing doors are hard wired into door control relays and switches that are installed inside the control panel turret.

Photo HU6-SEC1: Existing Control Panel

Photo HU6-SEC2: Existing Video Viewing Station

Video Surveillance Systems

There are five Panasonic, PTZ cameras and three Panasonic, fixed cameras installed on the first level. There are six Panasonic, PTZ cameras and one Panasonic, fixed cameras installed on the second level. All fixed cameras are low resolution cameras (1.3MP) and PTZ cameras are discontinued. There is one video viewing stations in the HU6 control room.

Housing Unit No. 6 Deficiencies

This section presents deficiencies for HU6 A summary of the HU6 deficiencies analyzed for this study is presented in Table HU6-1.

Table HU6-1: Housing Unit No. 6 Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
HU6-1	Full Demolition & Replacement of Building	$ 40,300,000	All HU6 Photos	No	High
Housing Unit No. 6 Deficiencies Total Costs:		**$ 40,300,000**			

HU6-A1: Full Demolition and Replacement of the Building

HU6 is the oldest housing unit on the campus and has several major issues. The kitchen really needs to be removed from the building and the bathrooms have exposed piping and vitreous china plumbing fixtures. There are multiple stairs without good sightlines for staff. All the exposed piping is dangerous to the inmates and needs to be covered. With the amount of work that needs to go into the building along with its age, it is the opinion of this report that this building should be demolished, and a new, modern dorm be built in its place. This conclusion was also reached in the Nebraska State Penitentiary (NSP) Expansion and Security Modifications Program Statement completed for the Department of Corrections in January of 2021. The probable project cost for this scope of work is $40,300,000.

Housing Units No. 7 and 8 Observations

Housing Units No. 7 and 8 (HU7&8) were built in 1998 and have an area of 14,409 gross square feet each. HU7 was observed for typical conditions, but both of the housing units are grouped together for the purposes of this study. They are functionally used for housing medium security inmates. The northwest and southwest exteriors of HU7&8 are shown in Photo HU7&8-1.

Photo HU7&8-1: Housing Units No. 7 and No. 8

Architectural

Envelope

HU7&8 are masonry with CMU back-up. The roof is EPDM and the windows are hollow metal. It was noted that the doors need painting and several of the windows seals have broken.

Interior

The interior of the building consists of 4 units. Each unit consists of a sleeping area and a dayroom. The sleeping area is a dorm with exposed concrete structure and painted walls and VCT flooring. There are several tiles missing in the dayrooms. The room is separated from the dayroom by a hollow metal window wall. These window walls appear to have a fair amount of damage due to heavy use. The dayroom opens to a toilet and shower area with 2x2 tile floors and 4x4 subway tile walls. The tile is missing in several areas and the hand lavatories have exposed piping. The toilet accessories have a fair amount of calcium build up and rust. Between the units is a control station with VCT floors and an ACT ceiling. The windows between the control station and the dayroom are hollow metal. The millwork at this control station should be considered for replacement.

Photo HU7&8-A1: Flooring in Dayroom of HU7&8

Life Safety

These buildings do not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system and fire sprinkler system.

Americans with Disabilities Act

HU7 and HU8 were built after the ADA was signed into law. The toilet rooms appear to have the space to meet ADA; however, the toilets are not positioned correctly in the ADA stall.

Structural

HU7 and 8 are framed with precast concrete Flexicore planks at the roof supported by interior precast concrete beams and columns and exterior concrete masonry CMU bearing walls. No structural items of note were observed in this building.

Mechanical

Plumbing Systems

A steam water heater exists in the basement which is original from 1998. See Photo HU7&8-M1. The water heater has a pneumatic steam control valve which serves a steam tube bundle for this water tank. There is only one tube bundle serving this water heater. There is not an existing water softener serving this system.

The inmate population for these housing units is about double what they were designed for, so the showers are in constant use during the day which puts extra stress on the sanitary piping system, ventilation, and exhaust systems, and often leads to clogs in the piping. See Photo HU7&8-M2.

Photo HU7&8-M1: Existing Steam Water Heater

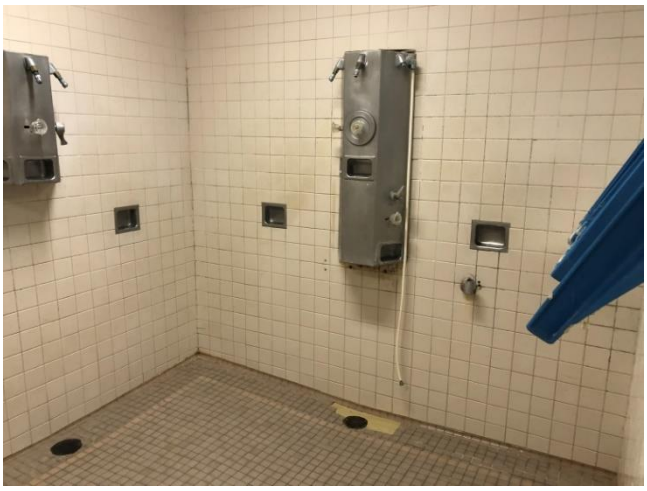


Photo HU7&8-M2: Typical Showers

Fire Protection Systems

This building has a wet-pipe fire sprinkler system. The piping and heads are installed exposed in most spaces. See Photo HU7&8-M3.

Photo HU7&8-M3: Exposed Fire Sprinkler Piping and Heads

Heating, Ventilating, and Air-Conditioning Systems

The HVAC systems are composed of one multi-zone AHU system serving each housing unit, a steam condensate return pump, two exhaust fans, and one base-mounted end-suction pump with most equipment still original from 1998.

The AHUs are both constant volume with ducted supply and return air systems, steam heating coils, and chilled water coils. See Photo HU7&8-M4 for a typical existing AHU. Ventilation air is provided via outdoor air intake hoods mounted on the roof. The housing units are humid and have moisture damage on walls and ceilings.

The steam condensate return pump was observed to be leaking. See Photo HU7&8-M5.

Photo HU7&8-M4: Typical Existing AHU

Photo HU7&8-M5: Leaking Steam Condensate Return Pump

The temperature controls are still pneumatic, but there are direct digital control panels installed in the mechanical room which are interfaced with the pneumatic controls to allow for remote monitoring and control of the building via the Honeywell building automation system.

Electrical

Power Systems

The power distribution system is a mixture of original building equipment and some newer replacement equipment. See Photo HU7&8-E1. The original building equipment is in good operational condition, but is getting within a few years of reaching its end of useful service life. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo HU7&8-E1: Main Electrical Service

Lighting Systems

Lighting throughout the building is fluorescent type. See Photo HU7&8-E2. In areas where inmates are present, the fixtures are confinement rated type. All of the fixtures appear to date to the original building construction and are in need of replacement.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Photo HU7&8-E2: Rusted Lighting Fixture in Shower Area

Technology

There is are two existing wall mount telecommunication racks located in the Mechanical Room 126 that serves data for both HU7&8. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located on the lower level telecommunications room 008 of Housing Unit 6 building. The horizontal data cabling serving the buildings are a mixture of Category 5 and 6 copper cabling. Current industry standards for data cabling would be a minimum of Category 6 for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. There is a telecommunication ground bar that provides grounding to the telecommunications rack. There is existing coaxial cabling routed to televisions within the building from Mechanical Room 126. The paging amplifier for the building paging system is located in Mechanical Room 126. The JPAY network equipment and UPS are located in the telecommunication rack as well.

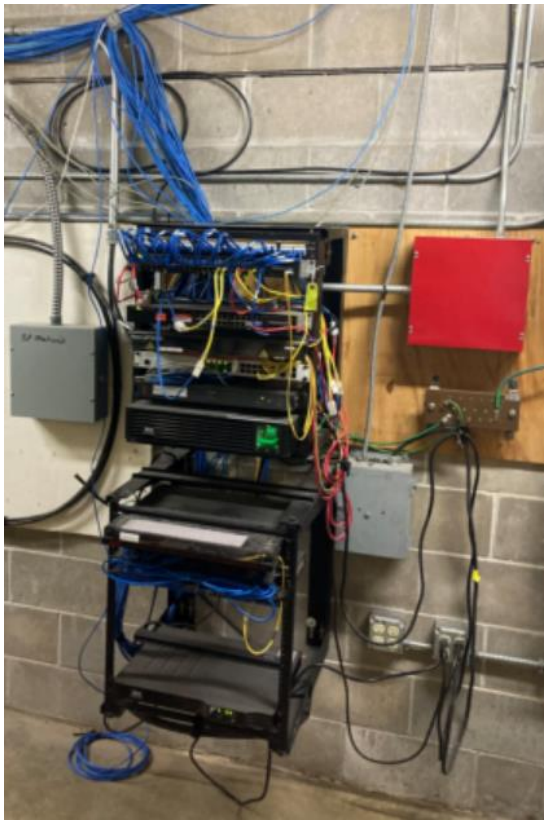


Photo HU7&8-T1: Existing Telecom Cabinet

Security

Detention Door Control Systems

There are two control locations in HU7&8 that control and monitor all doors in the building.

1. Control Room for Housing 7
2. Control Room for Housing 8

Both control locations use obsolete control panels to control and monitor security devices in their areas. Control panels consist of rotary switches and old type LED indicators installed on composite board (plastic/steel) with text engraved on their surface. Both panels are installed on desk mounted turrets. The system does not have capability to transfer control to any other control location. The existing doors are hard wired into door control relay boards and controlled via Crestron Professional Media Controller. The door control equipment is installed in wall mounted cabinets in Security Equipment Closet 125. The Security Equipment Closet is conveniently located between two housings.

Photo HU7&8-SEC1: Existing Control Panel

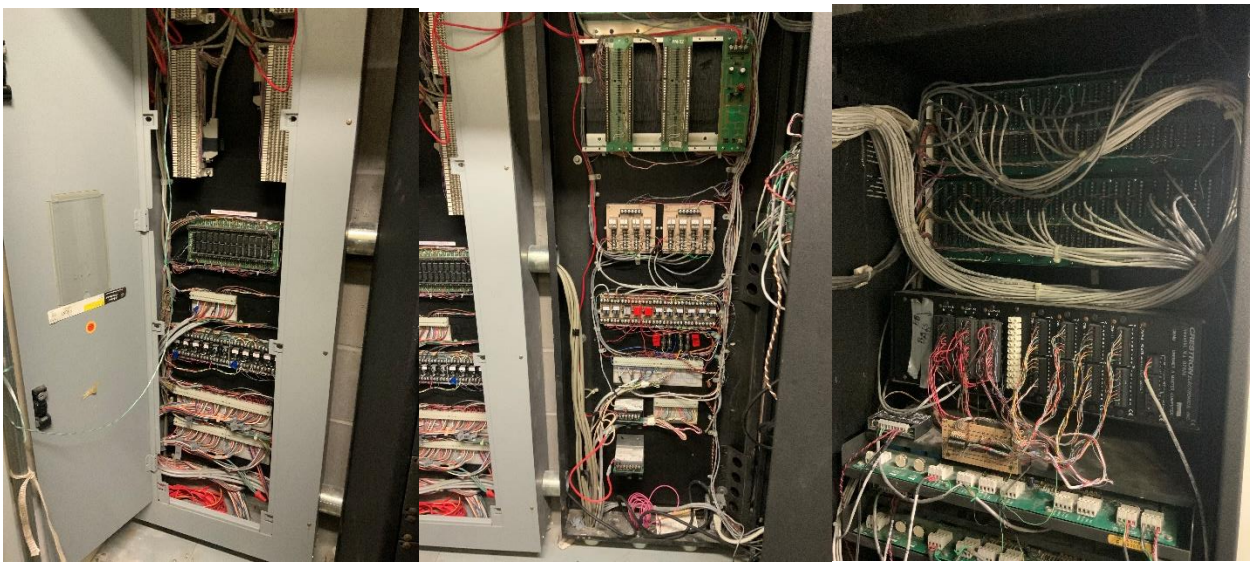


Photo HU7&8-SEC2: Existing Door Control System Head-End Equipment

Intercom and Paging Systems

The existing intercom and paging system for HU7 and HU8 is not integrated with the door control system equipment. The system uses Dukane relay boards for field devices (intercoms and paging speakers) interface with Crestron Professional Media Controller. Dukane amplifiers are used for intercoms and paging speakers' amplification.

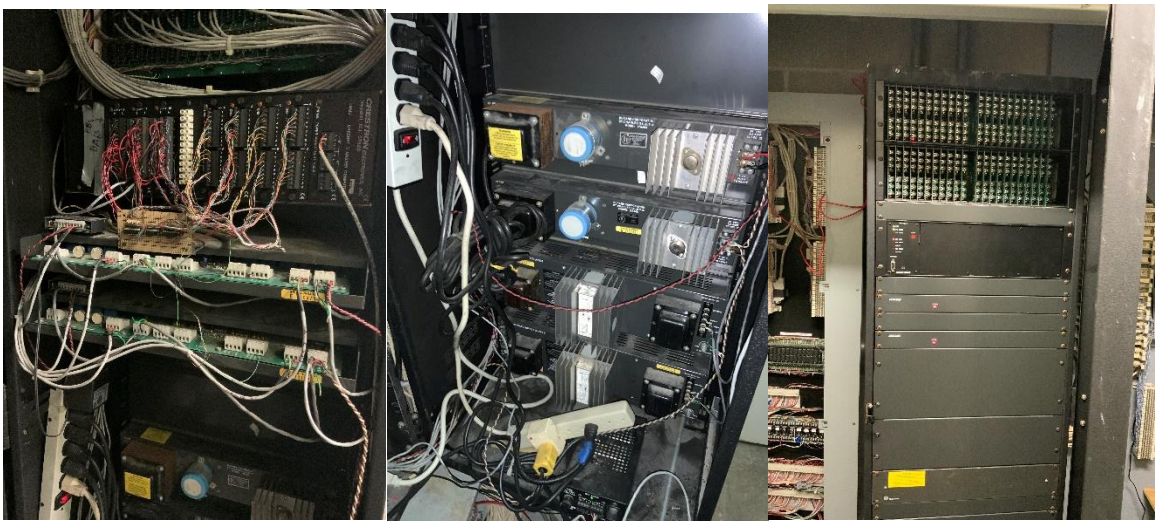


Photo HU7&8-SEC3: Existing Intercom and Paging System Head-End Equipment

Video Surveillance Systems

There are 16 Panasonic, fixed cameras installed in both housing units. All fixed cameras are low resolution cameras (1.3MP).

Housing Units No. 7 and 8 Deficiencies

This section presents deficiencies for HU7&8. A summary of the HU7&8 deficiencies analyzed for this study is presented in Table HU7&8-1.

Table HU7&8-1: Housing Units No. 7 and 8 Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost (1)	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
HU7&8-A1	Exterior Window Replacement HU7 & HU8	$ 275,520	NA	Yes	Medium
HU7&8-A2	Interior Window Wall Replacement HU7 & HU8	$ 250,000	NA	Yes	Medium
HU7&8-A3	Interior Bathroom Remodel	$ 808,185	NA	No	High
HU7&8-M1	Water Heater Replacement	$ 698,000	HU7&8-M1	No	High
HU7&8-M2	Replace Exposed Fire Sprinkler Piping and Install Soffit Steel Containment System	$ 312,000	HU7&8-M3	No	High
HU7&8-M3	HVAC Systems Replacement	$ 2,720,000	HU7&8-M4 thru M5	No	High
HU7&8-E1	Power Distribution System Replacement	$ 1,734,000	HU7&8-E1	No	High
HU7&8-E2	Lighting System Replacement	$ 1,445,000	NA	No	Medium
HU7&8-E3	Convenience Receptacle Upgrade for ADA	$ 375,000	NA	No	High
HU7&8-E4	Replace Fire Detection and Alarm System	$ 202,000	NA	No	High
HU7&8-T1	Lockable Telecom Cabinet with integrated HVAC	$ 100,000	HU7&8-T1	No	Medium
HU7&8-T2	Replace Cat 5 Cabling	$ 60,000	NA	No	Medium
HU7&8-SEC1	Detention Door Control Systems Repacement	$ 42,000	HU7&8-SEC1	No	Medium
HU7&8-SEC2	Intercom System Addition	$ 46,000	HU7&8-SEC3	No	Low
HU7&8-SEC3	Video Surveillance System - Cameras Replacement and Addition	$ 72,200	NA	No	Medium
Housing Units No. 7 and 8 Deficiencies Total Costs:		**$ 9,139,905**			

Notes:
(1) Each cost is the total needed for both housing units unless noted otherwise.

HU7&8-A1: Exterior Window Replacement for HU7 and HU8 (NDCS 2021 Biennium Item)

The HU7&8 was constructed in 1998 and the existing steel windows are showing signs of deterioration. This project would replace the existing with new aluminum framed, insulated windows.

The HU7&8 was constructed in 1998 and the existing steel windows are showing signs of deterioration. The frames on all the windows are heavily rusted. Over the years, the window frames have been repainted and are a continual maintenance problem. The replacement of these windows would greatly improve the efficiency of the HVAC system. The probable project cost for this scope of work is $137,760 per building or $275,520 for both buildings.

HU7&8-A2: Interior Window Wall Replacement for HU7 and HU8 (NDCS 2021 Biennium Item)

The interior HM glass window wall between the dorm area and the dayroom has deteriorated and needs to be replaced. The probable project cost for this scope of work is $125,000 per building or $250,000 for both buildings.

HU7&8-A2: Interior Bathroom Remodel

The finishes in the toilets and showers are deteriorated and need to be remodeled. While this is done the ADA toilet stall should be modified to meet code. Also, the toilet partitions, hand lavatories, and toilet accessories should be replaced. The plumbing fixtures need to be replaced with new fixtures. The probable project cost for this scope of work is $808,185.

HU7&8-M1: Water Heater Replacement

The steam water heater is original from 1998 which makes it about 23 years old. According to ASHRAE, a steam tube bundle heat exchanger, which is part of this water heater, has a median service life of about 24 years. As a result, the existing water heater is at the end of its useful life and needs to be replaced. The water heater also has no redundancy so, if the steam tube bundle should fail, the building would be without domestic hot water until it can be repaired.

It is recommended to replace this water heater with two storage tank steam water heaters and two equally sized pumps which are piped in parallel. Each water heater would be capable of providing 100% of the heating load so, there is full domestic hot water heating redundancy. A water softener, digital mixing valve, and two inline hot water circulation pumps would also be provided. The probable project cost for this scope of work is $349,000 per building or $698,000 for both buildings.

HU7&8-M2: Replace Fire Sprinkler Piping and Install Soffit Steel Concealment System

The piping needs to be installed in a ligature-resistant manner in housing units. It is recommended to replace the exposed fire sprinkler piping and heads and install a manufactured soffit concealment system made from painted steel. The probable project cost for this scope of work is $156,000 per building or $312,000 for both buildings.

HU7&8-M3: HVAC Systems Replacement

The HVAC systems are original from 1998 which makes them about 23 years old. According to ASHRAE, most fans, coils, pumps, and controls have a median service life of about 20 years. As a result, the existing equipment is operating at about 3 years beyond its expected useful life and needs to be replaced. The building occupancy has doubled since 1998 and the HVAC systems are not keeping up with current demands. The AHUs also have no redundancy on their air-side so, if the single supply fan for each system should fail, portions of the building would be without HVAC until it can be repaired.

It is recommended to replace the existing HVAC equipment, clean and reuse ducts, install new security supply air registers and return air grilles, and to upgrade the building to a full digital Building Automation System (BAS). The new AHU will be provided with a fan array which is composed of multiple direct drive fans which can automatically speed up to provide redundancy in the event that one fan should fail. The AHUs will also include MERV 13 filters, UV lights at the cooling coils, and humidifiers to provide improved indoor air quality for the occupants. The exhaust fans will be replaced with larger capacity exhaust fans. The probable project cost for this scope of work is $1,360,000 per building or $2,720,000 for both buildings.

HU7&8-E1: Power Distribution System Replacement

Equipment original to the building should be replaced as it approaches its end of useful life. The probable project cost for this scope of work is $432,500 per building or $865,000 for both buildings.

HU7&8-E2: Lighting System Replacement

Lighting throughout the building is serving beyond its useful service life and needs to be replaced. The probable project cost for this scope of work is $722,500 per building or $1,445,000 for both buildings.

HU7&8-E3: Convenience Receptacles Replacement

Convenience receptacles in various locations need to be updated. The probable project cost for this scope of work is $187,500 per building or $375,000 for both buildings.

HU7&8-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $101,000 per building or $202,000 for both buildings.

HU7&8-T1: Lockable Telecom Cabinet with integrated HVAC

The existing telecommunications racks in mechanical room 126 are in a shared space with other mechanical equipment and have no cooling. BICSI standards recommend that the telecommunications equipment cabinets should be control against unauthorized access. It is recommended that the existing telecommunications wall mounted racks be replaced with a telecommunication lockable wall mounted cabinet that has integrated cooling for the equipment. The replacement of this cabinet would require down time for the network it serves and a level of risk that existing equipment or cabling may get damaged during the move. The probable project cost for this scope of work is $40,000 per building or $80,000 for both buildings.

HU7&8-T2: Replace Cat 5 cabling

The housing units have a mixture of Category 5 and 6 horizontal data cabling. A current industry standard is for Category 6 cabling for data networks. It is recommended to replace the existing Category 5 cabling with Category 6 cabling. The probable project cost for this scope of work is $20,000 per building or $40,000 for both buildings.

HU7&8-SEC1: Detention Door Control Systems

The door control technology used to control and monitor existing field devices is obsolete and does not provide any flexibility necessary to provide a more secure and efficient system.

The replacement of the existing control panels and the existing relays should be considered as a high priority considering the age and present condition of the existing door control equipment. New door control systems shall consist of a single PLC and two touch screen control station. New PLC based head-end equipment (included but not limited to CPU, Ethernet communication modules, I/O modules, power supplies, relays, etc.)

shall be provided in place of the existing and obsolete Crestron Professional Media Controller. All new electronic security system head-end equipment and TS shall communicate over a new security system network.

Operation of the new touch screen control system must be supported with a new upgraded intercom and paging system. Improved video coverage would be required to allow safe and secure operation of the new touch screen control system. The probable project cost for this scope of work is $21,000 per building or $42,000 for both buildings.

HU7&8-SEC2: Intercom and Paging System

The existing intercom and paging system head-end equipment shall be replaced with the new digital intercom and paging system. All existing intercom and paging system field devices and their associated wiring should be reused (intercom stations, paging speakers and call buttons). The Intercom system would be integrated into the new touch screen control system. The probable project cost for this scope of work is $23,000 per building or $46,000 for both buildings.

HU7&8-SEC3: Video Surveillance System

Sixteen existing cameras should be replaced to improve video coverage in HU7&8. Fourteen new high-resolution cameras should be installed in HU7&88 to provide better video coverage in these two housing units. A new video viewing station should be provided in both HU7&8 control rooms to support the operation of the TS control system. The probable project cost for this scope of work is $36,100 per building or $72,200 for both buildings.

Laundry Building Observations

Photo LAUN-1: Laundry Building

The Laundry Building (LAUN) was built in 1949 and has an area of 23,328 gross square feet. It is functionally used to clean laundry as well as to provide a work opportunity for the inmates. The west exterior of the building is shown in Photo LAUN-1.

Architectural

Envelope

The LAUN is a single-story building with painted single wythe exterior masonry walls and a steel joist super structure with metal deck and an EPDM roof. There is a lower-level basement with concrete walls and floors. The structure of the floor above is concrete. All the exterior windows are original steel frame single pane windows. It was noted that the exterior of the building had several cracks that need to be tuckpointed. The roof had a few minor leaks at penetrations.

Interior

The interior walls are painted CMU and the floor is sealed concrete. The ceiling is all exposed metal structure.

Photo LAUN-A1: Typical Window in Laundry Building

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system

Americans with Disabilities Act

The LAUN was built pre-ADA. The toilet rooms do not have adequate space and are missing grab bars to meet current standards.

Elevators

There is one elevator in the building. It is a freight elevator and needs upgrades. It is listed in the current NDCS Biennium Budget.

Structural

The Laundry building is a cast-in-place concrete (CIPC) building with precast roof members. Exterior walls are a combination of concrete and concrete masonry units (CMU). The first floor framing is a combination of CIPC concrete joists and slabs supported by beams and columns. Areas of cracked and spalling concrete are present around old utilities passing through the floor. See Photo LAUN-S1.

Photo LAUN-S1: Spalled Concrete at Floor Penetrations

Mechanical

Plumbing Systems

The plumbing systems for this building appear to be in good working order.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC systems are composed of two VAV AHU systems, one make-up air unit (MAU), a steam condensate return pump, roof mounted exhaust fans, and a base-mounted end-suction pump with most equipment, from 2014, except for the MAU which was installed in 2006.

The AHUs have ducted supply and return air systems, heating hot water heating coils, and chilled water coils. See Photo LAUN-M1 for a typical existing AHU. Ventilation air is provided via outdoor air wall louvers. The occupants note that when there is a thunderstorm outside that the variable frequency controller (VFC) for the supply fan of the north AHU, trips off.

Photo LAUN-M1: Typical Existing AHU

The roof mounted MAU can be seen in Photo LAUN-M2. It has ducted supply and return air systems, steam heating coils, and chilled water coils. Ventilation air is provided via the intake end of the MAU on the roof.

Photo LAUN-M2: Existing MAU

The temperature controls are all DDC and allow for remote monitoring and control of the building via the Honeywell building automation system.

Electrical

Power Systems

The power distribution system is a combination of newer and older equipment. See Photo LAUN-E1. Several panels are newer, replacement vintage, while older panels are still in use in various locations. The overall condition of the distribution system is fair to good. The older panels are of an age where they are serving beyond their useful service life and need to be replaced. It was observed that some convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo LAUN-E1: Electrical Panel

Lighting Systems

The lighting in this facility is a combination of newer LED fixtures, fluorescent fixtures, and newer exit and emergency lighting. There are various locations where old original fixtures remain. These remaining fixtures need to be replaced.

Fire Detection and Alarm System

There are persistent, reoccurring troubles with some of the HVAC duct detectors, that to date have not been able to be corrected. Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

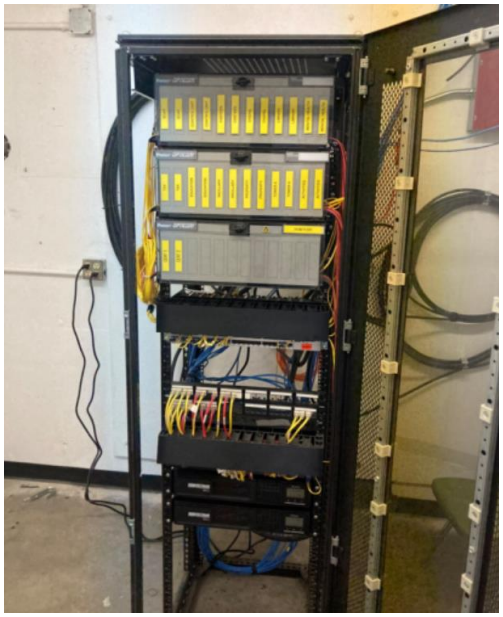


Photo LAUN-T1: Existing Telecom Cabinet

Technology

There is an existing 4-post telecommunication rack located in a telecommunications room located in the basement that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the second floor telecommunications room of the Ancillary building. The laundry building distributes fiber to multiple building including a 24-strand, single mode fiber optic cable to each of the following buildings: SOAP, CON, CAN, CHAP, LIB, MENT, FTO,

EDU, PEB, GT4, and ACT. There is also a 144-stand OS2 fiber optic cable that routes from Laundry to the CERT building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Security

Video Surveillance Systems

There are two Panasonic, PTZ cameras and six Panasonic, fixed cameras installed on the first level. All fixed cameras are low resolution cameras (1.3MP) and PTZ cameras are discontinued.

Laundry Building Deficiencies

This section presents deficiencies for the LAUN. A summary of the LAUN deficiencies analyzed for this study is presented in Table LAUN-1.

Table LAUN-1: Laundry Building Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
LAUN-A1	Freight Elevator Upgrade	$ 332,416	NA	Yes	High
LAUN-A2	Window Replacement	$ 433,440	NA	Yes	Medium
LAUN-A3	Exterior Paint And Tuckpointing	$ 65,000	NA	No	Low
LAUN-S1	Spalled Concrete at Floor Penetrations	$ 6,660	LAUN-S1	No	Low
LAUN-M1	Add Fire Sprinkler System	$ 335,000	NA	No	High
LAUN-M2	Replace VFC at North AHU	$ 11,900	LAUN-M1	No	High
LAUN-E1	Power Distribution System Replacement	$ 935,000	LAUN-E1	No	Medium
LAUN-E2	Lighting System Replacement	$ 468,000	NA	No	Low
LAUN-E3	Convenience Receptacle Upgrade for ADA	$ 210,000	NA	No	High
LAUN-E4	Replace Fire Detection and Alarm System	$ 164,000	NA	No	High
LAUN-T1	Grounding of Telecommunications Rack	$ 5,000	LAUN-T1	No	Medium
LAUN-SEC1	Video Surveillance System - Cameras Replacement and Addition	$ 16,600	NA	No	Low
Laundry Building Deficiencies Total Costs:		**$ 2,983,016**			

LAUN-A1: Freight Elevator Upgrade (NDCS 2021 Biennium Item)

ELEVATOR UPGRADE/FREIGHT ELEVATOR - This project would replace the single bottom hydraulic cylinder with a new cylinder system that would meet existing code. If this cylinder should fail, we would contaminate the soil with hydraulic fluid. The elevator was installed when the building was built in 1949 and it is the only elevator in the building. This system is not leaking at the present time and the use on the elevator is moderate. This project would also resolve the minimum head clearance, which would comply with current elevator code. The pump, cab, operator controls and a conditioning pump room will be part of this project. It may be feasible at this time, depending on the use of the building to convert this to a passenger elevator. The 309 Task Force funded a similar project at the Double "Y" Building on the Lincoln Regional Center Campus. This project would include design fees by a consultant. The probable project cost for this scope of work is $332,416.

LAUN-A2: Window Replacement (NDCS 2021 Biennium Item)

Window repair/replacement - The Laundry building was constructed in 1949 and the existing steel windows are showing signs of deterioration. This project would replace the existing with new aluminum framed, insulated windows. In addition, the Department renovated the interior first floor and this project would complement the building. The probable project cost for this scope of work is $433,440.

LAUN-A3: Exterior Paint and Tuckpointing

The exterior of the building needs to be painted and tuckpointed to prevent further deterioration. The probable project cost for this scope of work is $65,000.

LAUN-S1: Spalled Concrete at Floor Penetrations

Spalled areas shall have any loose concrete removed to sound material and proper clearance around reinforcing bars and then be prepped for patching with a non-shrink cementitious patching compound. The probable project cost for this scope of work is $3,700.

LAUN-M1: Add Fire Sprinkler System

A fire sprinkler system is recommended to be installed to minimize the risk of life-threatening fires in this building. The probable project cost for this scope of work is $335,000.

LAUN-M2: Replace VFC at North AHU

The existing north AHU has an issue with the VFC. During thunderstorms, the VFC will trip off until the maintenance staff can reset it. It is recommended to replace this VFC. The probable project cost for this scope of work is $11,900.

LAUN-E1: Power Distribution System Replacement

Equipment original to the building needs to be replaced as it is beyond its useful life. The probable project cost for this scope of work is $935,000.

LAUN-E2: Lighting System Replacement

Lighting systems that have not already been updated to LED type fixtures need to be replaced. The probable project cost for this scope of work is $468,000.

LAUN-E3: Convenience Receptacles Replacement

Convenience receptacles need to be updated to meet ADA requirements. The probable project cost for this scope of work is $210,000.

LAUN-E4: Fire Detection and Alarm System Replacement

The existing fire alarm system has become deficient and has ongoing maintenance issues with regard to system support and availability of new and replacement parts. The system needs to be replaced. The probable project cost for this scope of work is $164,000.

LAUN-T1: Grounding of Telecommunication Rack

Provide telecommunication grounding per BISCI standards for telecommunications pathways, cabinet and internal equipment. The probable project cost for this scope of work is $5,000.

LAUN-SEC1: Video Surveillance System

Eight existing cameras should be replaced to improve video coverage in the laundry building. The probable project cost for this scope of work is $16,600.

Library and Barber Shop Observations

Photo LIB-1: Library and Barber Shop

The Library and Barber Shop (LIB) was built in 1974 and has an area of 3,680 gross square feet. It is functionally used as library and barber shop for the inmates. The north and west exteriors of the building are shown in Photo LIB-1.

Architectural

Envelope

The exterior envelope consists of pre-finished metal building panels on the walls and roof. The windows are all double hung single-pane aluminum frame windows. The roof is a metal standing seam roof that is part of the pre-finished metal building. The building sits on a slab on grade.

Interior

The building consists of Stud walls with gypsum board finish with carpet flooring and VCT in the toilet rooms. The ceilings are gypsum board ceilings and there is a large built-in desk in the center with library stacks in rows around it.

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system.

Americans with Disabilities Act

The LIB was built pre-ADA.

Photo LIB-A1: Main Entry Doors at Library

Structural

The LIB building is a pre-engineered metal building manufactured by Armco. Cracks were present in the gypsum ceiling; however, there were no control joints present to accommodate the flexibility of the PEMB system. No structural concerns were observed.

Photo LIB-S1: Cracked Gypsum Sheathing

Mechanical

Plumbing Systems

An electric water heater exists which is about 10 years old.

The plumbing fixtures are original from 1974. This building was built before the EPAct of 1992 and before ADA so, the plumbing fixtures and flush valves are operating beyond their useful life and not conforming to modern water flow rates or ADA requirements.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two natural gas furnaces, two Air-Cooled Condensing Units (ACCUs) with one from 1998 and the other one brand new this summer, two thermostats, above ceiling supply air ductwork serving ceiling diffusers, a return air ceiling plenum, and one restroom exhaust fan. The furnaces are both over 20 years old and have a DX refrigerant cooling coil. See Photo LIB-M1.

Photo LIB-M1: Typical Existing Gas Furnace

The ACCU from 1998 is about 23 years old. See Photo LIB-M2. There is not an outdoor air louver in the exterior wall for ventilation purposes. As a result, the building's only source of ventilation air is from operable windows which are only used during mild weather conditions.

According to ASHRAE, most fans and coils have a median service life of about 20 years while the ACCU has a median service life of about 15 to 20 years. As a result, the furnaces and the 1998 ACCU existing equipment is operating beyond its expected useful life.

Photo LIB-M2: Existing ACCU

Electrical

Power Systems

The electrical panel is old and serving beyond its useful service life. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Lighting Systems

Lighting fixtures in this building are generally old fluorescent fixtures with exposed lamps. The fixtures are surface mounted to the low ceiling and are within arm's reach. See Photo LIB-E2. This creates a security concern since the fixtures and glass bulbs are exposed and accessible to inmates. These fixtures need to removed and replaced with new fixtures rated for confinement use. The exit signs at the north and south ends of the building are difficult to see. Due to the low ceiling height, they are tucked up into a ceiling pocket to get them out of the doorway.

Photo LIB-E2: Exposed Lighting in Main Stack Area

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in Mechanical 109 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

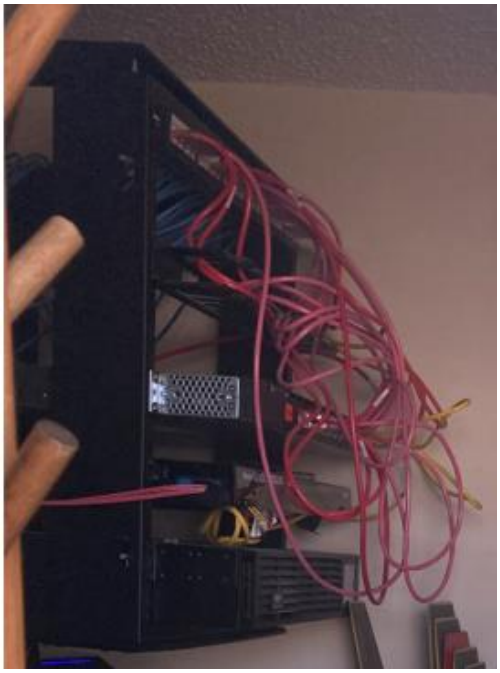


Photo LIB-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There are two Panasonic, fixed cameras installed in the building. Both fixed cameras are low resolution cameras (1.3MP).

Library and Barber Shop Deficiencies

This section presents deficiencies for the LIB. A summary of the LIB deficiencies analyzed for this study is presented in Table LIB-1.

Table LIB-1: Library and Barber Shop Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
LIB-1	Full Demolition & Replacement of Building	$ 1,860,000	All LIB Photos	No	High
Library and Barber Shop Deficiencies Total Costs:		**$ 1,860,000**			

LIB-1: Full Demolition and Replacement of the Building

The building roof leaks, and the windows do not meet current standards for energy code. There were several rust spots noted on the metal panels and gutters. Sealant at the windows is dry and cracked. If the building is to continue being used, new windows and a new roof with gutter and downspouts is recommended, and all the exterior walls should be repainted. This type of construction is not recommended as a permanent solution in a correctional environment.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged from water infiltration and walls need a fresh coat of paint. The carpet has reached the end of its useful life and should be replaced. If the building is to continue being used, a complete interior renovation is recommended. The millwork for the book return desk has reached the end of its useful life and has significant damage. The ceilings are low and accessible to inmates.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult, expensive, and would reduce programming space. The probable project cost for this scope of work is $1,860,000.

Mental Health Building Observations

Photo MENT-1: Mental Health Building

The Mental Health Building (MENT) was built in 1974 and has an area of 2,825 gross square feet. It is functionally used as a mental health therapy building for the inmates. The south and east exteriors of the building are shown in Photo MENT-1.

Architectural

Envelope

The building is a single-wythe CMU block building with hollow metal windows and doors. There is significant damage to the block and many cracks and leaks coming through the walls. The membrane roof also leaks and has stained several ceiling pads in the facility. The windows are all single pane hollow metal and the exterior doors are hollow metal and showing their age.

Interior

The interior walls are CMU and the flooring is carpet with VCT in the bathrooms. The ceiling is ACT and has several spots that show damage from roof leaks. The interior paint is peeling at several spots on the exterior walls due to water intrusion.

Photo MENT-A1: Interior Wall Damage Above Window

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system and fire suppression system.

Americans with Disabilities Act

The MENT was built pre-ADA. The restrooms are very small and would be costly and difficult to remodel to allow for ADA and would reduce programming space area.

Structural

The MENT building is constructed with concrete masonry (CMU) bearing walls with roof framing constructed with hollow core planks at the original portion and hollow core planks at the addition. There is evidence of moisture infiltration which is coming from the roof. It was not clear whether this is active, or old. Staining suggests this is an historic issue.

Random cracking in the exterior masonry walls is present, some of which have evidence of previous repairs.

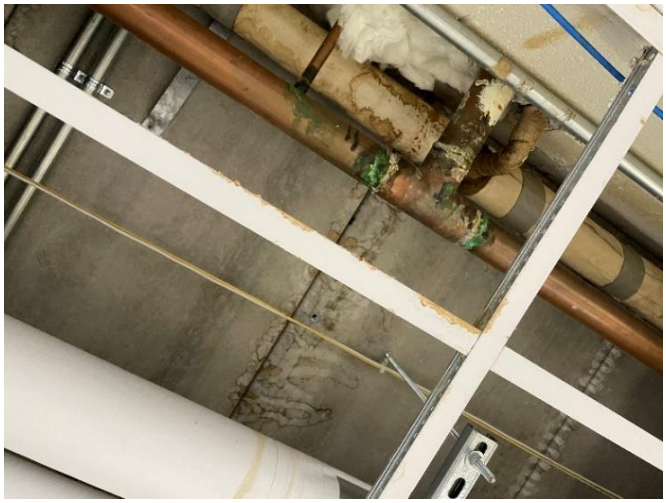


Photo MENT-S1: Water Staining at Roof

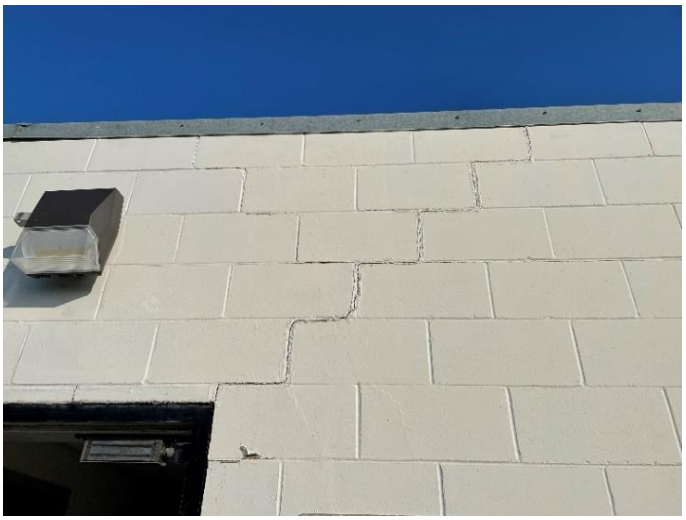


Photo MENT-S2: Previously Repaired Masonry Cracks

Mechanical

Plumbing Systems

An electric water heater exists which is about 10 years old. The plumbing fixtures were replaced in the last 10 years.

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of multiple horizontal and vertical four pipe fan coil units, one steam to heating hot water shell and tube heat exchanger, see Photo MENT-M1, supply air and return air ductwork, and one restroom exhaust fan.

Photo MENT-M1: Existing Steam to Heating Hot Water Shell and Tube Heat Exchanger

The fan coil units are all constant volume and are about 10 years old. See Photo MENT-M2. There is an outdoor air louver in the exterior wall for ventilation purposes which is directly ducted to the return air ductwork of some of the fan coil units.

The temperature controls are all DDC and allow for remote monitoring and control of the building via the Honeywell building automation system.

According to ASHRAE, fan coil units have a median service life of 20 years and shell and tube heat exchangers have a median service life of 24 years. As a result, the existing 10-year old fan coil units and shell and tube heat exchanger still have useful life left in them.

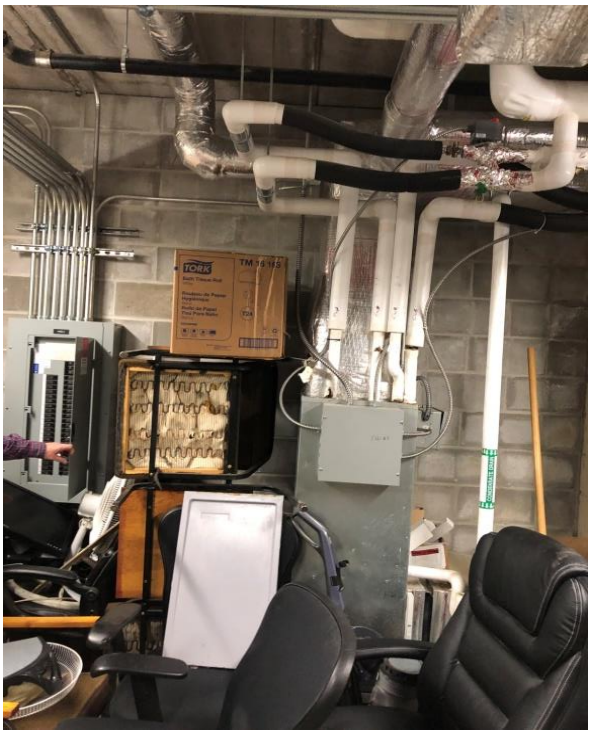


Photo MENT-M2: Typical Existing Vertical Fan Coil Unit

Electrical

Power Systems

The electrical distribution system in this building was renovated in approximately 2011. The electrical equipment is in good, serviceable condition. See Photo MENT-E1. Convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo MENT-E1: Main Electrical Panel

Lighting Systems

Lighting systems throughout the building are fluorescent and appear to be in good working condition.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in Office 101 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Photo MENT-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There are two Panasonic, fixed cameras installed in the building. Both fixed cameras are low resolution cameras (1.3MP).

Mental Health Building Deficiencies

This section presents deficiencies for the MENT. A summary of the MENT deficiencies analyzed for this study is presented in Table MENT-1.

Table MENT-1: Mental Health Building Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
MENT-1	Full Demolition & Replacement of Building	$ 1,430,000	All MENT Photos	No	High
Mental Health Building Deficiencies Total Costs:		**$ 1,430,000**			

MENT-A1: Full Demolition and Replacement of the Building

The MENT has reached the end of its useful life. The exterior paint is peeling and cracking and the walls no longer keep water out of the building. The roof leaks. The windows are old and do not meet current standards for energy code.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged from water infiltration and walls need a fresh coat of paint once exterior wall repairs have been made. The carpet has reached the end of its useful life and should be replaced.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult and expensive. The probable project cost for this scope of work is $1,430,000.

Old Central Utility Plant Observations

The Old Central Utility Plant (OCUP) was built in 1980 and has an area of 7,693 gross square feet. It is functionally used as an electrical room and for storage, since the completion of the New Central Utility Plant in 2018. The south exterior of the building is shown in Photo OCUP-1.

The OCUP was originally excluded from this study, but is only being listed now since NDCS has provided previously identified deficiencies for the building.

Photo OCUP-1: Old Central Utility Plant

Old Central Utility Plant Deficiencies

This section presents deficiencies for the OCUP. A summary of the OCUP deficiencies provided by NDCS for this study is presented in Table OCUP-1.

Table OCUP-1: Old Central Utility Plant Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
OCUP-A1	Roof Replacement	$ 232,064	NA	Yes	High
Old Central Utility Plant Deficiencies Total Costs:		**$ 232,064**			

OCUP-A1: Roof Replacement (NDCS 2021 Biennium Item)

The existing built-up roofing system is original with the 1980 construction of the building. The roof is showing significant blistering, exposed felt and "soft spot" at various locations. the roof sits on a metal deck with steel trusses. The roofing system has reached the end of its useful life.

This project would tear off and remove the approximately 3,500 SF of the existing roofing system down to the deck. New insulation and a fully adhered EPDM would then be installed. Also, all perimeter tie-ins would be replaced. Installing new insulation would provide the added benefit of increasing the energy efficiency of the building envelope and improved drainage, thus qualifying this as a combination project. The probable project cost for this scope of work is $232,064.

Pre-Employment Building Observations

The Pre-Employment Building (PEB) was built in 1956 and has an area of 9,900 gross square feet. This building was originally used to service and repair vehicles, but it is now functionally used for inmate property control, recycling, Prison Fellowship, and ABC Construction training for the inmates. It is also used to house the NSP canines. The west exterior of the building is shown in Photo PEB-1.

Photo PEB-1: Pre-Employment Building

Architectural

Envelope

The building is a single-wythe CMU block building with hollow-metal windows and doors. There is significant damage to the block and many cracks and leaks coming through the walls. The membrane roof also leaks and has stained several ceiling pads in the facility. The windows are all single pane hollow-metal and the exterior doors are hollow-metal and showing their age. Several of the overhead doors were observed to have damage from truck traffic. The roof is a membrane roof with concrete deck over steel bar joists.

Interior

There is a mix of CMU and metal stud walls on the interior depending on the use of the spaces. The inmate property control area is mainly open storage with some stud walls that divide the open area from a mechanical room. Several other rooms are divided up by interior CMU walls. The flooring in this area is sealed concrete and the ceiling is open to the structure.

Photo PEB-A1: Overhead Door Damage at Pre-Employment Building.

The prison fellowship room has metal stud with gypsum board walls with a drop ACT ceiling. The room is carpeted. The adjacent area also houses ABC Construction. This area is open with several cage type walls, no ceiling and sealed concrete floors.

The recycling area is open and more industrial in nature. Several other rooms are divided up by interior CMU walls. The flooring in this area is sealed concrete and the ceiling is open to the structure.

Life Safety

The building does have a couple of life safety concerns. There are areas that are being used for storage above offices or other rooms that do not have guard rails and don't appear to be designed for storage. There is no fire suppression system in this building; however, it is protected by a functional fire alarm system.

Americans with Disabilities Act

The PEB was built pre-ADA. The building is all one level, but the toilet rooms are not compliant, and it would be difficult and expensive to upgrade these to become compliant. Expansion of the toilet rooms would also reduce the program space area.

Structural

The PEB building is constructed with concrete masonry (CMU) bearing walls. The roof is framed with precast roof panels supported by steel open-webbed bar joists. Some of the roof panels are spalled and stair-stepping cracks are present in some wall locations.

Previous roof leaks were noted which resulted in rusting of the top chord of some of the roof joists.

There is spalled CMU at the top of some of the masonry pilasters on the building exterior.

Photo PEB-S1: Spalled Roof Panels and Cracked Masonry Walls

Photo PEB-S2: Rusted Roof Joist

Photo PEB-S3: Spalled CMU at Pilasters

Mechanical

Plumbing Systems

A gas water heater exists which is about 8 years old. See Photo PEB-M1. The hot water piping insulation is missing on all of the piping.

With exception of the electric water coolers, the plumbing fixtures are generally 20 years old or older and exist as a combination of flush valve and flush tank fixtures.

Photo PEB-M1: Existing Electric Water Heater

Fire Protection Systems

This building does not have a fire sprinkler system.

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of four horizontal fan coil split systems with Air-Cooled Condensing Units (ACCUs), steam heating coils, steam unit heaters, stand-alone thermostats, directly exposed supply air ductwork with sidewall registers, and restroom exhaust fans. The fan coil units range is size and age, but the one in the recycling center was installed in 1998 so it is about 23 years old with a steam heating coils and has a DX refrigerant cooling coil served by an ACCU of the same age. See Photo PEB-M2. Most of the steam piping is uninsulated.

The steam unit heaters were reported to not be functional. There is not an outdoor air louver or roof hood for ventilation purposes, but there are operable windows.

According to ASHRAE, fan coil units have a median service life of 20 years and ACCUs have a median service life of about 15 to 20 years. As a result, the existing fan coil unit and associated ACCU in the recycling center are operating beyond their expected useful life. The other systems in this building are similar in age and condition except for the system serving Prison Fellowship and ABC Construction which is from 2019.

Photo PEB-M2: Existing Fan Coil Unit with Steam Heating Coil

Electrical

Power Systems

This building has an electrical distribution panel in three of the four separate use spaces. See Photos PEB-E1, PEB-E2, and PEB-E3. Each of the panels is older vintage, serving beyond its useful service life. In general, convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo PEB-E1: Electrical Panels in Recycling Area

Photo PEB-E2: Electrical Panel in Property Control Area

Lighting Systems

Lighting systems within this building are varied as follows:

The Property Control area has old exposed fluorescent lighting fixtures. These fixtures are serving beyond their useful service life and need to be replaced. Exit and emergency lighting is old, in poor condition, and needs to be replaced.

The Recycling area has old exposed fluorescent lighting fixtures. These fixtures are serving beyond their useful service life and need to be replaced. Exit and emergency lighting is old, in poor condition, and needs to be replaced.

Photo PEB-E3: Electrical Panel in Canine Area

The ABC Construction Training area has old exposed fluorescent lighting fixtures. These fixtures are serving beyond their useful service life and need to be replaced. Emergency lighting is old, in poor condition, and needs to be replaced. The light fixture in the restroom is an improperly used grid fixture mounted to the surface of the ceiling. This fixture is not confinement rated and is within reach of inmates which creates a security risk. The west exit out of this space is not properly marked with an exit light.

The Prison Fellowship area has new, recently installed LED lighting fixtures. These fixtures are in good, serviceable condition. Exit and emergency lighting is new and in good, serviceable condition.

The Canine area has old exposed fluorescent lighting fixtures. These fixtures are serving beyond their useful service life and need to be replaced. Exit and emergency lighting is old, in poor condition, and needs to be replaced.

Fire Detection and Alarm System

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing wall mount telecommunication rack located in Office 116 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is a UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Photo PEB-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There is one Panasonic, fixed camera installed in the building. The existing fixed camera is a low-resolution camera (1.3MP).

Pre-Employment Building Deficiencies

This section presents deficiencies for the PEB. A summary of the PEB deficiencies analyzed for this study is presented in Table PEB-1.

Table PEB-1: Pre-Employment Building Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
PEB-1	Full Demolition & Replacement of Building	$ 3,800,000	All PEB Photos	No	High
Pre-Employment Building Deficiencies Total Costs:		**$ 3,800,000**			

PEB-1: Full Demolition and Replacement of the Building

The PEB has reached the end of its useful life. The exterior paint is peeling and cracking and the walls no longer keep water out of the building. The roof leaks. The windows are old and do not meet current standards for energy code.

All the interior finishes in the building need at least some repair. The ACT ceilings are damaged, and walls need a fresh coat of paint.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult and expensive. The probable project cost for this scope of work is $3,800,000.

Private Venture Building Observations

The Private Venture Building (PVB) (AKA "Old Gym") was built in 1972 and has an area of 13,250 gross square feet. It is functionally used as a factory to produce goods made by the inmates. The south and east exteriors of the building are shown in Photo PVB-1.

Photo PVB-1: Private Venture Building

Architectural

Envelope

The PVB is a pre-manufactured metal building that is close to 50 years old. This is typically the end of the useful life of these types of structures. The roof is leaking in a few areas and insulation at the roof appears to be coming down in some spots. The exterior walls are aged and dented in areas and are not easily replaceable. A lean-to addition was added to house a metal detector for inmates coming and going to the building. This addition needs to be painted and the roof needs to be replaced.

Interior

The interior of the building is mostly open storage and workstations for manufacturing. There is an office area on the west end of the building that is built out of wood studs with gypsum board walls. The building has one divider wall that is built from CMU that is cracked and damaged at several spots where doors have been added after it was built.

Photo PVB-A1: Tears in Insulation at Ceiling

Life Safety

The building does have a couple of life safety concerns. There are areas that are being used for storage above offices or other rooms that do not have guard rails and don't appear to be designed for storage. There is no fire suppression system in this building; however, it is protected by a functional fire alarm system.

Americans with Disabilities Act

The PVB was built pre-ADA. The building is all one level, but the toilet rooms are not compliant, and it would be difficult and expensive to upgrade these to become compliant. See Photo PVB-A2.

Structural

The PVB is a PEMB. CMU partition walls are present inside the building. There are offices at the west end of the building and their ceilings are being used as a storage mezzanine. No structural concerns were observed with the building. However, there is one opening in a CMU partition that appears to not have a lintel as there is cracking above it. See Photo PVB-S1.

Photo PVB-A2: Non-ADA Compliant Toilets

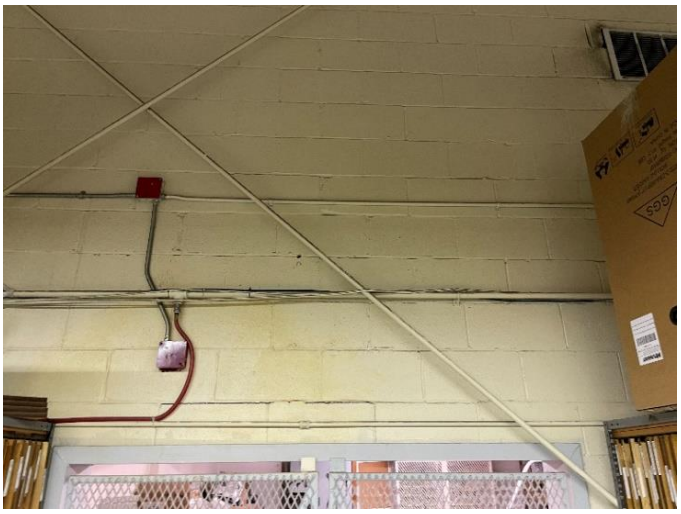


Photo PVB-S1: Cracked CMU Partition

Mechanical

Plumbing Systems

No plumbing fixtures or water heaters were observed. Natural gas piping exists to serve four unit heaters, but the unit heaters are disconnected. See Photo PVB-M1.

Fire Protection Systems

This building does not have a fire sprinkler system.

Photo PVB-M1: Gas Piping to Unit Heater

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two AHU split systems with ACCUs, steam heating coils, gas unit heaters, stand-alone thermostats, directly exposed supply air and return air ductwork with sidewall registers and grilles, a portable swamp cooler, and several ceiling and wall mounted fans. The large AHU, see Photo PVB-M2, is original from 1972 with a steam heating coil and a DX refrigerant cooling coil served by an ACCU. The return air ductwork is heavily damaged in the mechanical room. Most of the steam piping is uninsulated.

The ACCU is also from 1972 and has not worked in many years thus, no cooling except for what the occupants can get with their portable swamp cooler. See Photo PEB-M2.

There are sidewall hoods provided with propeller fans for ventilation purposes. The PEB manager indicates that the dampers on the hoods leak in water whenever it rains. The ceiling mounted fans have not worked in about 20 years. The temperature controls are still pneumatic and do not have any connection to the campus building automation system.

According to ASHRAE, AHUs have a median service life of about 20 years. As a result, the existing fan coil unit and associated ACCU in the recycling center are operating beyond the expected useful life.

Photo PVB-M2: Existing AHU

Photo PVB-M3: Existing Abandoned ACCU

Electrical

Power Systems

Electrical panels within this building are old and serving beyond their useful service life. In general, convenience receptacle mounting heights are not compliant with modern ADA standards.

Photo PVB-E1: Main Electrical Panels

Lighting Systems

Lighting fixtures in the main production area are old HID gymnasium type that are in poor condition. The remainder of the spaces have older fluorescent and some incandescent lighting fixtures. All of the lighting in this facility needs to be replaced. The ceiling fans in the main production area do not work.

Fire Detection and Alarm System

The fire alarm control panel in this building displays a constant 'Trouble' alarm with an audible tone. Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is an existing lockable wall mount telecommunication cabinet located in Mechanical 110 that serves data for the entire building. The building is served by a 24-strand, single mode fiber optic cable that runs back to the telecommunications rack located in the basement telecommunications room of the Laundry building. The horizontal data cabling serving the building is all Category 6 copper cabling, which is in line with current industry standards for horizontal copper cabling. There is an UPS within the telecommunications rack that supports the telecommunication network. The telecommunications cabinet is not properly grounded per BICSI standards.

Photo PVB-T1: Existing Telecom Cabinet

Security

Video Surveillance Systems

There are three Panasonic, PTZ cameras and five Panasonic, fixed cameras installed on the first level. All fixed cameras are low resolution cameras (1.3MP) and PTZ cameras are discontinued.

Private Venture Building Deficiencies

This section presents deficiencies for the PVB. A summary of the PVB deficiencies analyzed for this study is presented in Table PVB-1.

Table PVB-1: Private Venture Building Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
PVB-1	Full Demolition & Replacement of Building	$ 5,100,000	All PVB Photos	No	High
Private Venture Building Deficiencies Total Costs:		**$ 5,100,000**			

PVB-1: Full Demolition and Replacement of the Building

The PVB has reached the end of its useful life. The building is a pre-manufactured metal building that is close to 50 years old, an age where these types of buildings begin to fail even in the best environments. This type of construction is not recommended as a permanent solution in a correctional environment and the building shows it. The roof leaks, the interior walls have several cracks, and the lack of storage has led to areas above offices to be used for storage that should not be used. The lean-to addition for the metal detector is deteriorating and would need to be painted with a new roof. The toilet rooms do not meet current ADA and it would be difficult to upgrade these areas to meet code. The probable project cost for this scope of work is $5,100,000.

Soap Factory Observations

The Soap Factory (SOAP) was built in 1940 and has an area of 12,700 gross square feet. It is functionally used as a factory to produce soap made by the inmates. The north and west exteriors of the building are shown in Photo SOAP-1.

The SOAP was originally excluded from this study, but is only being listed now for demolition at the request of NDCS.

Photo SOAP-1: Soap Factory

Soap Factory Deficiencies

This section presents deficiencies for the SOAP. A summary of the SOAP deficiencies provided by NDCS for this study is presented in Table SOAP-1.

Table SOAP-1: Soap Factory Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
SOAP-1	Demolish SOAP and Return Grounds to Greenfield	$ 650,000	NA	No	High
Soap Factory Deficiencies Total Costs:		**$ 650,000**			

SOAP-1: Demolish Soap Factory and Return Grounds to Greenfield

The NDOC determined that the SOAP should be demolished, and the grounds returned to greenfield. The probable project cost to demolish the building and remove construction debris, as well as grading and seeding the grounds is $650,000.

Wellness Center Observations

The Wellness Center (WELL) was built in 1968 and has an area of 2,064 gross square feet. It is functionally used as fitness center for the staff. The southwest and southeast exteriors of the building are shown in Photo WELL-1.

Photo WELL-1: Wellness Center

Architectural

Envelope

The WELL is a pre-engineered metal building. The roof is metal panel and original to the building. The windows and doors are all hollow metal and single pane. The building sits on slab on grade. The exterior paint is peeling, the roof leaks, and the windows do not meet current energy standards.

Interior

The interior has recently been out fitted with new equipment sport flooring. The walls are painted and the ceiling is exposed structure. There is one toilet room and shower. There is a small office as well. These rooms are all built with stud walls and gypsum board.

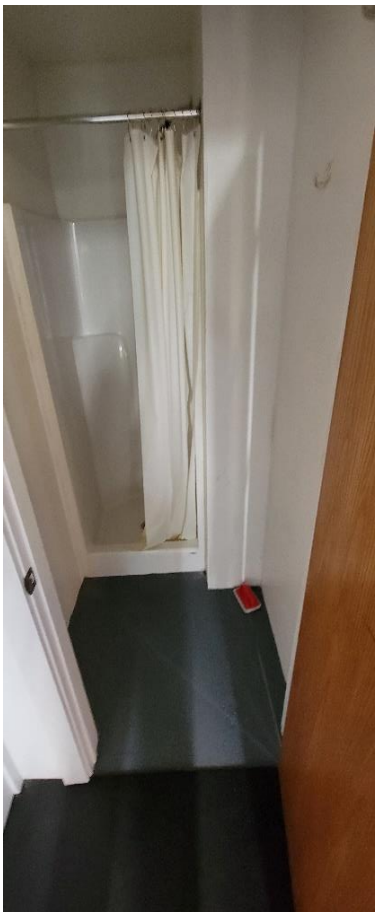


Photo WELL-1: Non-ADA Compliant Shower at Wellness

Life Safety

The building does not appear to have any readily apparent life safety issues currently. It is protected by a functional fire alarm system.

Americans with Disabilities Act

The WELL was built pre-ADA. The toilet and shower do not meet current standards.

Structural

The WELL is a PEMB. A make-shift ceiling consisting of plywood sheets connected with H-clips at various locations around their edges was observed. The ceiling is sagging in some locations.

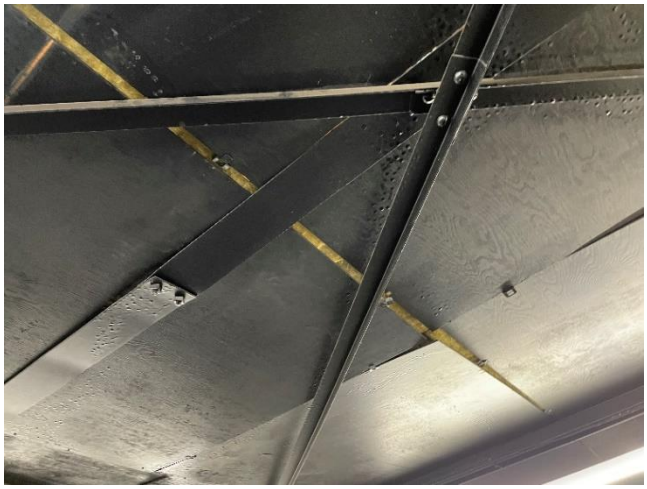


Photo WELL-S1: Sagging Ceiling

Photo WELL-S2: Damaged West Wall

The building is damaged on its southwest corner and along the west wall what appears to be multiple impacts, most likely vehicular.

The damaged west wall is the only structural concern observed.

Mechanical

Plumbing Systems

A natural gas water heater exists which is about four years old. See Photo WELL-M1. The building's plumbing fixtures appear to be about five years old.

Fire Protection Systems

This building does not have a fire sprinkler system and has an exposed plywood ceiling.

Photo WELL-M1: Existing Gas Water Heater

Heating, Ventilating, and Air-Conditioning Systems

The HVAC system is composed of two natural gas furnaces from 2016, two ACCUs from 2016, self-contained thermostats, exposed supply air ductwork serving registers and a return air plenum system. The gas furnaces have a DX refrigerant evaporator cooling coil and have sidewall flue and combustion air piping. See Photo WELL-M2.

The ACCUs are about five years old and the cooling coil condensate spills onto grade outside near the ACCUs. See Photo WELL-M3. There is not an outdoor air louver or hood for ventilation purposes and the windows are not operable so, there are no means to provide ventilation air to the occupants of the building in a controlled manner.

According to ASHRAE, most fans and coils have a median service life of about 20 years while the ACCU has a median service life of about 15 to 20 years. As a result, the furnaces and the ACCUs have remaining useful service life.

Photo WELL-M2: Typical Existing Gas Furnace

Photo WELL-M3: Typical Existing ACCU

Electrical

Power Systems

The power distribution system appears to be relatively new and in good condition. See Photo WELL-E1.

Photo WELL-E1: Main Electrical Panel

Lighting Systems

Lighting fixtures in the main exercise area are newer LED type. Lighting fixtures in toilet, shower, and mechanical areas are old incandescent type. Exit and emergency lighting is newer and in good condition.

Fire Alarm Systems

Fire alarm system initiation, audio, and visual devices generally appear to be in the correct locations. Existing system components are approximately 13 years old. This represents roughly two generations of manufacturer equipment upgrades. The particular components within this system have become hard to obtain as the manufacturer no longer supports these products. The parts are available only from secondary sources which makes them difficult to find and expensive. It is recommended that the fire alarm and detection system be replaced.

Technology

There is no existing fiber optic cabling or telecommunications racks located within the Wellness building. Currently there are 4 TVs on the wall that are served via wireless antennas mounted near the windows.

Wellness Center Deficiencies

This section presents deficiencies for the WELL. A summary of the WELL deficiencies analyzed for this study is presented in Table WELL-1.

Table WELL-1: Wellness Center Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
WELL-1	Full Demolition & Replacement of Building	$ 720,000	All WELL Photos	No	High
Wellness Center Deficiencies Total Costs:		**$ 720,000**			

WELL-1: Full Demolition and Replacement of the Building

The building roof leaks, and the windows do not meet current standards for energy code. The paint is peeling on the metal panels and gutters. Sealant at the windows is dry and cracked. If the building is to continue being used, new windows and a new roof with gutter and downspouts is recommended, and all the exterior walls should be repainted.

While the building is a single level and has no stairs, none of the toilet rooms meet modern ADA standards for clearances. To accomplish this, the bathrooms would need to be expanded into adjacent spaces which would be difficult and expensive. The probable project cost for this scope of work is $720,000.

Site Domestic Water and Fire Protection Water Systems Observations

The Site Domestic Water and Fire Protection Water Systems (DW&FP) layout is shown on the Campus Site Utility Plan – Site Domestic Water and Fire Protection Water Overview sheet in Appendix B.

Site Domestic Cold Water Systems

The NSP has experienced 16 breaks in the site domestic cold water piping over the past two years. The most recent breaks happened in October 2021 with three of them occurring at one time. This made the local news since the NSP domestic cold water systems had to be shut down for several days to isolate the leaking piping so, emergency repairs could be made. One of these most recent breaks was in the 67-year old piping located just to the south of HU6 as shown in Photo DW&FP-1.

Photo DW&FP-1: Domestic Cold Water Pipe Break Near Housing Unit No. 6

From review of the trenches and broken main sections it is apparent that the predominant water main material type is Ductile Iron\and or Cast Iron. These pipes were not wrapped in polywrap (thin plastic liner), which has been a standard for many years. The purpose of polywrap is to protect the pipe from corrosion. Soils in this area of Lincoln are highly corrosive. From review of recent pipe sections that have been repaired it is apparent that corrosivity of the water main pipe infrastructure within this complex is a major issue.

Water main pressures in this section of Lincoln are consistently around 100psi which is quite high and good for fire suppression, but weakened pipes are more susceptible to failure under such high pressures.

There are approximately 8,300 Lineal feet of water lines located within the campus ranging from 3/4-inch service lines to 10-inch diameter mains. See Appendix B for reference to general water main layout within the complex. Most of the north side of the complex was constructed around 1979 to 1981, while the south side of the complex is much older.

From available records the complex water supply is fed from the east side of South 14th street with a 4-inch main, which is very small. One would expect an 8-inch or 12-inch supply line to serve a complex of this size. There is also a feed from the south side of the complex with a 6-inch line which again seems quite small.

The south side of the campus has site domestic hot water piping installed in the utility tunnels to serve a variety of buildings from two centralized hot water heaters as shown in Photo DW&FP-2. The first steam hot water heater is located in the basement of HU6 and the second one is located in the basement of the SOAP. This piping was primarily installed between the 1950s and 1982.

The campus has site fire protection water piping installed to serve several, but not all of the buildings. The fire protection water taps off of the site domestic cold water piping outside of each building and then routes to a post indicator valve (PIV) before heading to the building's fire service entrance. The PIV is a manually controlled valve which is normally locked open and is monitored for position status by the campus's fire alarm system. One PIV is found by the WELL and is installed so, that it's handle barely clears the top of a concrete lid as shown in Photo DW&FP-3.

Photo DW&FP-2: Domestic Hot Water Piping (Top Left) in Tunnel SW of Chapel

Photo DW&FP-3: Post Indicator Valve Near Central Warehouse

Site Domestic Water and Fire Protection Water Systems Deficiencies

This section presents deficiencies for the site domestic water and fire protection water systems (DW&FP). A summary of the DW&FP deficiencies analyzed for this study is presented in Table DW&FP-1.

Table DW&FP-1: Site Domestic Water and Fire Protection Water Systems Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
DW&FP-1	Replacement of DW&FP Piping	$ 2,050,000	DW&FP-1	No	High
DW&FP Deficiencies Total Costs:		**$ 2,050,000**			

DW&FP-1: Replacement of Domestic Water and Fire Protection Water Piping

The main from the east side of South 14th Street proceeds to the west through the complex and farther west to a dead-end fire hydrant. To have better redundancy and control, it would have been wise to connect this line to the existing City 12-inch main on the west side of Pioneers Boulevard.

Continued and repetitive breaks and repairs to water main segments are expensive, not only to repairing the pipe, but also to the damage these breaks cause to surrounding infrastructure. For instance, a recent break just outside of the west sally port, near GT2, caused appreciable damage to the perimeter road and, therefore, also caused issues with utilizing the perimeter road to conduct routine and necessary perimeter fence security checks. Most of the south portion of the complex consists of older piping judging from observations during the piping breaks and from the age of the buildings.

It is recommended to provide full replacement of 7,000 linear feet of pipe over the next several years. Incidental demolition and replacement of sidewalks and pavement will be required and is included in this scope of work. The probable project cost for this scope of work is $2,050,000.

Site Natural Gas Systems Observations

The site natural gas systems (NG) layout is shown on the Campus Site Utility Plan – Site Natural Gas Overview sheet in Appendix C.

Nearly all of the NG piping is buried underground and not available to be inspected without excavating and therefore was not able to visually inspected as part of this study scope. It is estimated, from the available records, that there is approximately 3,720 linear feet of gas piping at the campus.

A very old gas meter is noted to exist at the Central Warehouse (CW) as shown in Photo NG-1.

Photo NG-1: NG Meter at CW

Site Natural Gas Systems Deficiencies

This section presents deficiencies for the site NG. A summary of the NG deficiencies analyzed for this study is presented in Table NG-1.

Table NG-1: Site Natural Gas Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
NG-1	Replacement of Natural Gas Piping	$ 390,000	NG-1	No	Medium
Site Natural Gas Systems Deficiencies Total Costs:		**$ 390,000**			

No major NG system deficiencies were noted by NSP staff when discussed during this study. NG lines are nearly all underground and therefore not accessible for inspection. Many segments are of unknown age in the southern section of the campus. Given the age of the records which show this piping as existing and the age of the buildings in this area of campus, it is believed that this piping is in excess of 50 years old. Therefore, it is recommended to incrementally replacing the NG piping system over the next 10 years to allow for safe continued operation of this system. The probable project cost for this scope of work is $390,000.

Site Sanitary Sewer Systems Observations

The site sanitary sewer systems (SAN) layout is shown on the Campus Site Utility Plan – Site Sanitary Sewer Overview sheet in Appendix D.

The site sanitary sewer system within the prison facility consists of a network of sanitary sewer pipes ranging in size from 4-inch building and guard tower service lines and mostly 8-inch and 10-inch diameter mains. There is one 30-inch sanitary sewer trunk line on the north side of the campus; however, that line is owned by the City of Lincoln.

The estimate of pipe segment ages has been determined from knowledge of the age of the buildings on the campus. Most of the buildings in the south middle to southeast portion of the campus range in date from the 1930s to the 1950s. That timeframe would make some of these pipes up to 90 years old.

Most sanitary pipe in this era tends to be vitrified clay pipe (VCP). VCP is a fairly durable pipe that generally wears well through the ages. However, several sections of reinforced concrete pipe (RCP) were observed which are not typically used for sanitary sewer piping. The concrete degrades over time in the presence of the sewer gases.

A representative sample of site sanitary piping was investigated with a video camera and the report for that work is located in the Site Sanitary Sewer and Storm Drainage Systems Investigation Report located in Appendix K.

A large amount of debris was found in this piping as shown in Photo SAN-1.

The required repairs to sanitary sewer pipes do not necessarily require the piping to be fully excavated and replaced. There are methods for inserting new materials within aging or deteriorating gravity sewer pipes such as cured in place pipe (CIPP). However much of this piping is significantly obstructed with debris and the pipe is old enough that there is concern that with traditional water jetting methods the pipe would be further weakened or destroyed.

Generally, manholes that need rehabilitation can be rehabilitated by means of applying a cementitious liner. General cost to apply a cementitious liner is $400 per vertical foot.

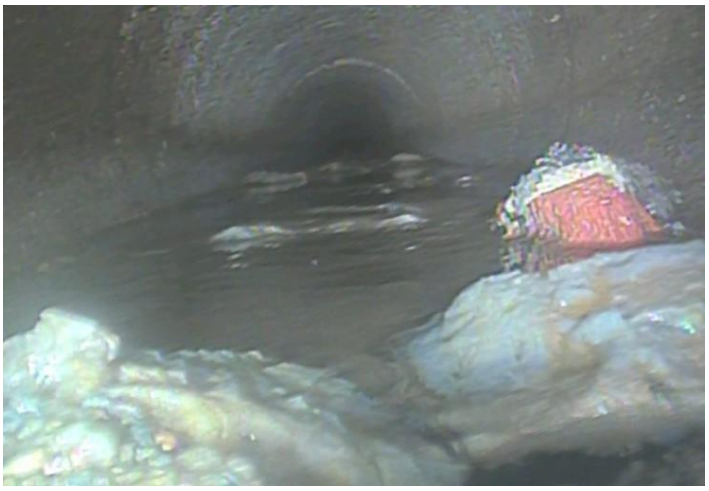


Photo SAN-1: Debris Found in SAN Piping

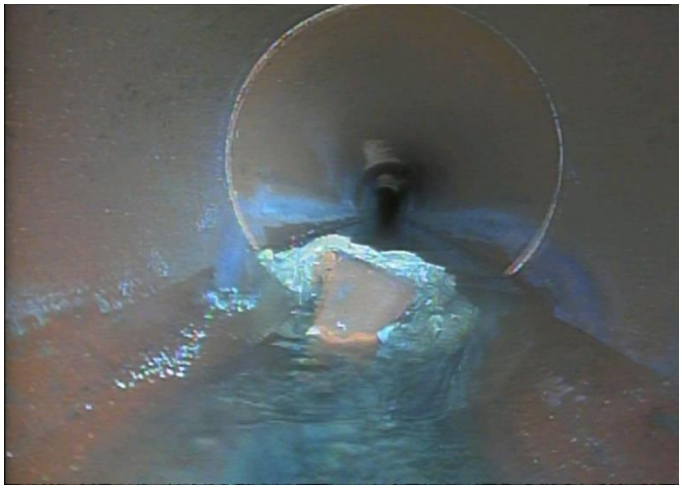


Photo SAN-2: Debris Found in SAN Piping

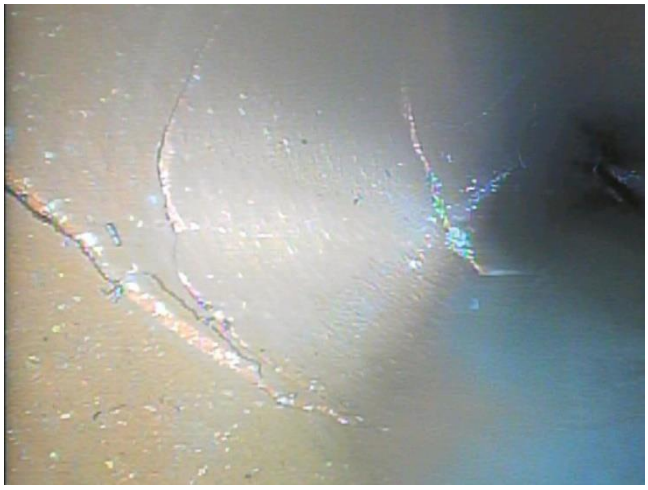


Photo SAN-3: Fractures Found in SAN Piping

Site Sanitary Sewer Systems Deficiencies

This section presents deficiencies for the SAN. A summary of the SAN deficiencies analyzed for this study is presented in Table SAN-1.

Table SAN-1: Site Sanitary Sewer Systems Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
SAN-1	Rehab SAN Piping and Manholes	$ 1,900,000	SAN-1	No	High
Site Sanitary Sewer Systems Deficiencies Total Costs:		**$ 1,900,000**			

SAN-1: Rehabilitation of SAN Piping and Manholes

From our representative review of segments of the sanitary sewer system via video investigation, the entire south half of the complex has over 50% of the pipe ways filled with debris and sediment. The general condition of the piping is poor with several pipe cracks and areas of deterioration observed and more expected in the next five years. There are approximately 30 site sanitary sewer manholes on the campus. The general condition of the manholes is fair and to expect failures in the next five to ten years. A major rehabilitation effort is imminently necessary.

Typical sanitary sewer pipe maintenance involves jetting with water. However, these pipes are too blocked with random concrete, sediment, and other debris that would make traditional maintenance methods unacceptable. Traditional methods of open cut remove and replace would also be very disruptive to paving and proximity to buildings. We would, therefore, suggest a method of pipe bursting to replace these pipes. Pipe bursting basically has a mechanical means of auguring out the existing pipe and then bursting and inserting a new pipe in its place. All of the associated manholes would be removed and replaced as part of this type of rehabilitation process. The probable project cost for this scope of work is $1,900,000.

Site Storm Drainage Systems Observations

The site storm drainage systems (STORM) layout is shown on the Campus Site Utility Plan – Site Storm Drainage Overview sheet in Appendix E.

There is approximately 8,900 linear feet of storm sewer piping on campus. Storm sewer materials appear to be predominantly reinforced concrete pipe (RCP).

In October 2021, three water main breaks occurred. When the piping was excavated for repair, existing storm sewer piping was also observed such as that shown in Photo STORM-1.

A representative sample of site storm piping was investigated with a video camera, and the report for that work is located in the Site Sanitary Sewer and Storm Drainage Systems Investigation Report located in Appendix K. Large debris was found in this piping near the PEB as shown in Photo STORM-2.

Photo STORM-1: Storm Piping (Top Pipe) Near Housing Unit No. 6

Photo STORM-2: Debris Found in STORM Piping which will Obstruct Water Flow

Photo STORM-3: Debris Found in STORM Piping which will Obstruct Water Flow

Photo STORM-4: Severely Broken STORM Piping which Needs Immediate Replacement

Site Storm Drainage Systems Deficiencies

This section presents deficiencies for the STORM. A summary of the STORM deficiencies analyzed for this study is presented in Table STORM-1.

Table STORM-1: Site Storm Drainage Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
STORM-1	Remove Sediment From STORM Piping	$ 800,000	STORM-1	No	High
Site Storm Drainage Systems Deficiencies Total Costs:		**$ 800,000**			

STORM-1: Remove Sediment from Storm Piping

Videos of a representative sample of storm sewers were taken. All of the sewer lines reviewed were physically over 50% obstructed with random debris and sediment. Additionally, an appreciable amount of storm sewer that is supposed to drain to the Beal Slough has been plugged at the outlet to the Beal Slough. That is resulting in ponding water near the LAUN, LIB, and PEB on a regular basis.

Much of the sediment in the storm sewer system can most likely be jetted out under high water pressure. Also, the main storm sewer system that drains out the west side of the facility by HU9 under the sally port is 75% obstructed with silt and needs to be cleaned out. The probable project cost for this scope of work is $800,000.

Site Steam Systems Observations

The site steam systems (STM) layout is shown on the Campus Site Utility Plan – Site Steam Overview sheet in Appendix F.

Steam and condensate lines are used on campus primarily for building heating and domestic hot water heating needs. Much of the 1981 era steam and steam condensate piping located on the north side of campus were replaced in 2012. This piping serves HU1-4. New steam lines were constructed for hu7 and HU8 in 1996.

In the south, central, and southeast portions of the campus, the exact ages of the steam and condensate pipes are not known; however, we estimate that judging from the age of the buildings in this area of the campus that these lines are dated back to at least 1940. On the south side of campus, much of the steam piping exists in utility tunnels and underground shallow chases as shown in Photo STM-1. The chases are difficult to access due their shallow nature.

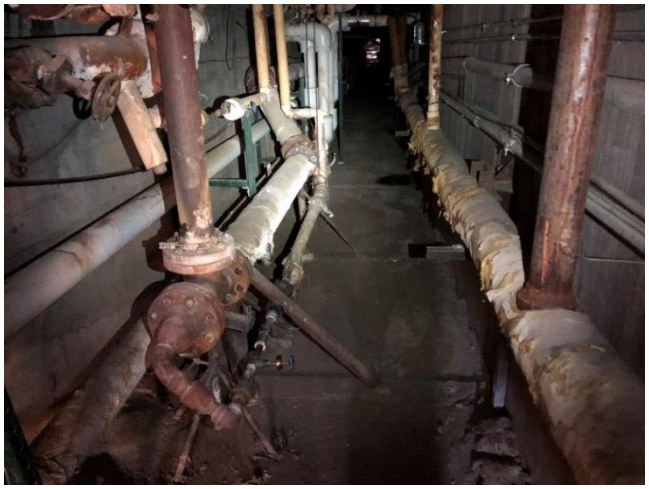


Photo STM-1: Steam Piping in Tunnel West of Chapel

Steam piping is subject to wide temperature differences and will expand a lot especially when steam systems are first turned on for the heating season. The piping must be designed to account for thermal expansion otherwise, piping failures can occur. An example of a pipe hanger being stressed by thermal expansion is shown in Photo STM-2.

Photo STM-2: Bent Steam Pipe Hanger in Tunnel West of Chapel

In general, the steam and steam condensate pipe insulation in the utility tunnels and chases is in bad shape, falling off the piping, or missing altogether. Humidity in the tunnels is contributing to insulation failures and to external corrosion of the piping. Humidity is coming from seasonal changes, site storm drainage issues, ground moisture, and from leaking steam piping systems. Evidence of steam piping leaks was observed during a tour of the tunnels where it was noted that the air temperatures were very high and humid in sections of the tunnels.

There is also a large amount of steam piping that is not in tunnels, but is direct buried. Direct buried steam piping is more susceptible to corrosion and pipe failures as is supported by the need for the 2012 steam piping replacement project for much of the north half of campus.

Site Steam Systems Deficiencies

This section presents deficiencies for the STM. A summary of the STM deficiencies analyzed for this study is presented in Table STM-1.

Table STM-1: Site Steam Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
STM-1	Replacement of Steam Piping Systems	$ 2,800,000	STM-1, STM-2	No	Medium
Site Steam Systems Deficiencies Total Costs:		**$ 2,800,000**			

STM-1: Replacement of Steam Piping Systems

The vast majority of steam piping on this campus is 40 years old or older. The expected life before replacement of this type of utility is a maximum of 50 years. Therefore, it is recommended to replace 16,000 linear feet of steam and steam condensate piping over the next several years. All new or existing steam piping to remain in tunnels shall have the pipe insulation replaced and have pipe jackets installed to help limit future pipe insulation deterioration. Incidental demolition and replacement of sidewalks, pavement, and tunnels will be required and is included in this scope of work. The probable project cost for this scope of work is $2,800,000.

Site Chilled Water Systems Observations

The site chilled water systems (CWS) layout is shown on the Campus Site Utility Plan – Site Chilled Water Overview sheet in Appendix G.

Chilled water piping is primarily utilized for air conditioning of the buildings on campus. Chilled water piping was installed to HU1-4 in 1979. In 1996, chilled water lines were constructed to serve HU6,7,&8. In 2003, chilled water lines were constructed to serve the EDU, LAUN, MENT, PVB, SOAP, and the CON.

About half of the chilled water piping is located in the tunnels, while the other half of the chilled water piping is direct buried. In general, the chilled water pipe insulation in the utility tunnels is in bad shape, falling off the piping, or missing altogether as shown in Photo CWS-1.

Humidity in the tunnels is contributing to insulation failures and to external corrosion of the piping. Humidity is coming from seasonal changes, site storm drainage issues, ground moisture, and from leaking steam piping systems.

Photo CWS-1: Chilled Water Piping (Left to Right, Down Low) in Tunnel NE of Laundry

Site Chilled Water Systems Deficiencies

This section presents deficiencies for the site CWS. A summary of the CWS deficiencies analyzed for this study is presented in Table CWS-1.

Table CWS-1: Site Chilled Water Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
CWS-1	Replacement of Chilled Water Piping	$ 325,000	CWS-1	No	Low
Site Chilled Water Systems Deficiencies Total Costs:		**$ 325,000**			

CWS-1: Replacement of Chilled Water Piping

Chilled water lines have not been flagged as a significant problem. In regards to future maintenance, we recommend to replace 25% of the chilled water piping over the next 10 years. All new or existing chilled water piping to remain in tunnels shall have the pipe insulation replaced with cellular glass insulation and have pipe jackets installed to help limit future pipe insulation deterioration. Incidental demolition and replacement of sidewalks, pavement, and tunnels will be required and is included in this scope of work. The probable project cost for this scope of work is $325,000.

Site Lighting Systems Observations

Photo LTG-1: Concrete Light Pole South of Housing Unit No. 5

The site lighting systems (LTG) consist of a combination of old concrete poles and newer steel poles. On these poles, approximately 60% are equipped with new, energy efficient LED lighting fixtures and approximately 40% are equipped with old technology HID lighting fixtures. The HID fixtures are serving beyond their useful service life and are in need of replacement. Nearly all of the poles north of the south wall of the LAUN are fed with aluminum conductors routed underground. The aluminum conductors often fail and are an ongoing problem for facility maintenance staff. Site lighting is an important part of the overall security infrastructure at the NSP. When these lighting components are off-line due to failure, security in that area is compromised. The concrete poles are generally in poor condition and in need of replacement. Many of these poles have developed stress fractures in the concrete which has allowed moisture to enter the poles and cause spalling, cracking, and failure. See Photos LTG-1, LTG-2, and LTG-3. This is a serious immediate safety issue due to a concrete pole failing and falling over. In addition, pieces of concrete spalling and falling off the poles create a safety hazard. The broken concrete presents a danger from falling as well as the potential for use as a weapon if it were picked up by an inmate.

Photo LTG-2: Enlarged Image of Concrete Light Pole South of Housing Unit No. 5. (Note Severe Pole Deterioration with Reinforcing and Interior Conduit Visible)

Photo LTG-3: Image of Concrete Light Pole North of Laundry Facility

Security lighting mounted on the exterior original prison walls is LED and appears to be in generally good, serviceable condition. See Photo LTG-4.

Photo LTG-4: Security Lighting at Wall Between Guard Tower 5 and Guard Tower 6

Site Lighting Systems Deficiencies

This section presents deficiencies for the site LTG systems. A summary of the LTG deficiencies analyzed for this study is presented in Table LTG-1.

Table LTG-1: Site Lighting Systems Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
LTG-1	Replace Concrete Light Poles	$ 700,000	LTG-1, 2, 3	No	High
LTG-2	Replace HID Light Fixtures With New LED	$ 290,000	NA	No	High
LTG-3	Replace U.G. Aluminum Wire	$ 210,000	NA	No	High
Site Lighting Systems Deficiencies Total Costs:		**$ 1,200,000**			

LTG-1: Replace Concrete Light Poles

Concrete high-mast lighting poles are deteriorating and are in poor condition. These deficient poles present safety and security hazards. These poles need to be replaced with new, steel poles and modern LED lighting fixtures. The probable project cost for this scope of work is $700,000.

LTG-2: Replace HID Lighting Fixtures With LED

Existing HID lighting fixtures are in poor condition, are old technology and are not energy efficient compared to modern LED area lighting fixtures. Replace HID lighting fixtures on a one-for-one basis with new LED lighting fixtures. The probable project cost for this scope of work is $290,000.

LTG-3: Replace Aluminum Conductors Serving Light Poles

Existing underground aluminum conductors that serve the high-mast security light poles are in poor condition and present a constant, ongoing maintenance issue. When the conductors fail, this leaves various areas within the Prison grounds without security lighting for a period of time, which creates a safety and security risk. These conductors need to be replaced with new copper conductors with the proper insulation rating for the underground environment they are installed in. The probable project cost for this scope of work is $210,000.

Site Security Systems Observations

The various site security systems (S-SEC) for the campus are presented in this section.

Video Surveillance Systems

Most of the site observation cameras are mounted on exterior walls or roofs of the buildings and towers inside the security perimeter of the NSP.

There are 13 Panasonic, PTZ cameras and three Panasonic, fixed cameras used to cover overall site.

Fence-Mounted Perimeter Detection Systems

Perimeter detection system, head-end equipment and monitoring station are installed in the Master Control room in the ANC. New Senstar, Fiber Patrol System was installed in late 2020. The detection sensors consist of fiber optic cables. The cables are connected to a signal processing module that detects and locates attempted intrusions by analyzing the changes in reflected energy that occur as a result of minute vibrations in the sensor cables.

Photo S-SEC-1: Fence Mounted Fiber Sensor Cable – Senstar Fiber Patrol System

The PDS also includes the bi-static microwave system consisting of separate microwave transmitter and receiver assemblies which between them create a roughly cylindrical zone of detection. The system detects intruders by sensing variations in the strength of the microwave signal arriving at the receiver when an intruder attempts to pass through the detection zone. The microwave PDS detects intruders attempting to cross the detection zone in any manner including walking, running, crawling, rolling, and jumping. The microwave devices are installed at all vehicle sallyport in the facility.

Photo S-SEC-2: Microwave Transmitters – Part of the Senstar Fiber Patrol System PDS

Perimeter Security Fencing

The security fencing layout is shown on the Perimeter Fence Overview in Appendix H. The fencing outlined in red does not meet current maximum-security facilities standards of 12-foot-high double row fencing with 20 feet of horizontal separation between them. The fencing also does not meet the appropriate number of rows of 30-inch diameter reinforced barbed obstacle security coils.

Approximately 3,370 linear feet of perimeter security fencing is non-compliant with current security standards. That includes fence height separation as well as electronic detection.

Site Security Systems Deficiencies

This section presents deficiencies for the Site Security Systems (S-SEC). A summary of the S-SEC deficiencies analyzed for this study is presented in Table S-SEC-1.

Table S-SEC-1: Site Security Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
S-SEC-1	Video Surveillance System - Cameras Replacement & Additior	$ 146,000	NA	No	Medium
S-SEC-2	Replace Perimeter Security Fencing	$ 1,350,000	NA	No	High
Site Security Systems Deficiencies Total Costs:		**$ 1,496,000**			

S-SEC-1: Video Surveillance System

16 existing cameras should be replaced and 20 new cameras should be added to improve video coverage around the site. All new cameras should be multi-sensor/PTZ cameras that would provide excellent coverage of all activities inside and outside the facility perimeter. The probable project cost for this scope of work is $146,000.

S-SEC-2: Replace Perimeter Security Fencing

It is recommended to remove the existing insufficient double perimeter security fencing and construct a new security fencing system for the deficient areas as noted in Appendix H. The probable project cost for this scope of work is $1,350,000.

Site Utility Tunnels Observations

The Site Utility Tunnels (UT) rough layout is shown on the Campus Plan – Site Utility Tunnels sheet in Appendix I.

Structural

Some of the walkable UT's were assessed, the condition of which varied. Approximately 400 linear feet of tunnel was observed. Of this, approximately 150 linear feet of the tunnel lid requires replacement. See Photo UT-S1. Approximately 40 feet of the observed wall requires repair or replacement. See Photo UT-S2. This sample tunnel observation results in approximately 38 percent of the lid needing replaced and 5 percent of the walls required repair or replacement. The tunnels are approximately 8-feet wide and 8-feet tall. The tunnel structure under the road between CFACT and Chapel is in such poor condition that recent construction work in that area required smaller than normal truckloads of debris, and lightly loaded material trucks in an effort to prevent tunnel collapse. This added significant time and cost to the work performed.

Photo UT-S1: Deteriorated Tunnel Lid

Photo UT-S2: Deteriorated Tunnel Wall

Electrical

Lighting Systems

Lighting in Utility Tunnels is installed inconsistently. Numerous locations where lighting is installed have damaged fixtures; many of them are not operational. Some of the fixtures are not suitable for use in a damp tunnel. See Photos UT-E1 and UT-E2. Lighting needs to be applied consistently throughout the tunnel system to provide a safe working environment for facility maintenance staff and contractors.

Photo UT-E1: Representative Photo of Rusted Tunnel Lighting and Receptacle Box, Lamp is Missing

Photo UT-E2: Representative Photo of Rusted Tunnel Lighting. Neither Fixture is Operational

Power Systems

There are locations in the tunnel system where there are open junction boxes with wires protruding from the box. This creates a dangerous condition for working in the tunnels. This is also a National Electrical Code violation. See Photo UT-E3. These locations need to be repaired to provide a safe working environment for facility maintenance staff and contractors.

Photo UT-E3: Representative Photo of Rusted Electrical Box with Exposed Conductors

Site Utility Tunnels Deficiencies

This section presents deficiencies for the Site Utility Tunnels (UT). A summary of the UT deficiencies analyzed for this study is presented in Table UT-1.

Table UT-1: Site Utility Tunnels Deficiencies Summary

Deficiency Number	Deficiency Description	Deficiency Cost	Photo No.	Included in NDCS 2021 Biennium Requests?	Priority Level
UT-S1	Repair Tunnel Lid And Wall Deterioration	$ 560,000	UT-S2	No	High
UT-E1	Replace Tunnel System Lighting	$ 115,000	UT-E1, UT-E2	No	High
UT-E2	Replace Tunnel System Power Receptacles	$ 45,000	UT-E3	No	High
Site Utility Tunnels Deficiencies Total Costs:		**$ 720,000**			

UT-S1: Tunnel Lid and Wall Deterioration

The deteriorated tunnel lid and walls require replacement. This is laborious, requiring controlled demolition to protect active piping in the tunnel, temporary shoring, new forming and new concrete and reinforcing. Given all of these and the work environment, it is difficult to determine repair costs. It is our understanding that there is approximately 2,000 linear feet of tunnel. Using the damaged percentage areas noted above, that suggests approximately 6,000 sf of tunnel lid and 2,000 sf of tunnel wall need repaired or replaced. The probable project cost for this scope of work is $560,000.

UT-E1: Tunnel System Lighting Replacement

Tunnel lighting is installed inconsistently and is mostly non-operational. This lighting needs to be replaced with modern LED fixtures rated for use in a tunnel. The probable project cost for this scope of work is $115,000.

UT-E2: Tunnel System Power Receptacles Replacement

Convenience receptacles are installed inconsistently in the tunnel system. New, ground-fault circuit interrupter (GFCI) type, wet location receptacles need to be installed. The probable project cost for this scope of work is $45,000.

Site Contaminated Soils Observations

The Site Contaminated Soils (CS) section of this report focuses on the remediation of possible fuel leaks at a previous underground fuel storage tank. There is also a need to remediate and decommission the coal unloading and stockpile area which is located to the south and west of the OCUP.

Soil at Underground Fuel Tank

When the OCUP was constructed in 1980 there was a 20,000 gallon underground storage tank on the south side of the plant. Then in 1998 the original 20,000 gallon underground storage tank was removed and replaced with a new 6,000 gallon fiberglass underground storage tank. Since the new District Energy Center has been constructed the old CUP has been repurposed and the underground storage tank is no longer useful. The State Fire Marshal has required that the tank be emptied. NSP Maintenance also directed that the tank be removed. Soils around the old tank area should be tested and removed if found to be contaminated by past fuel spills or leaks.

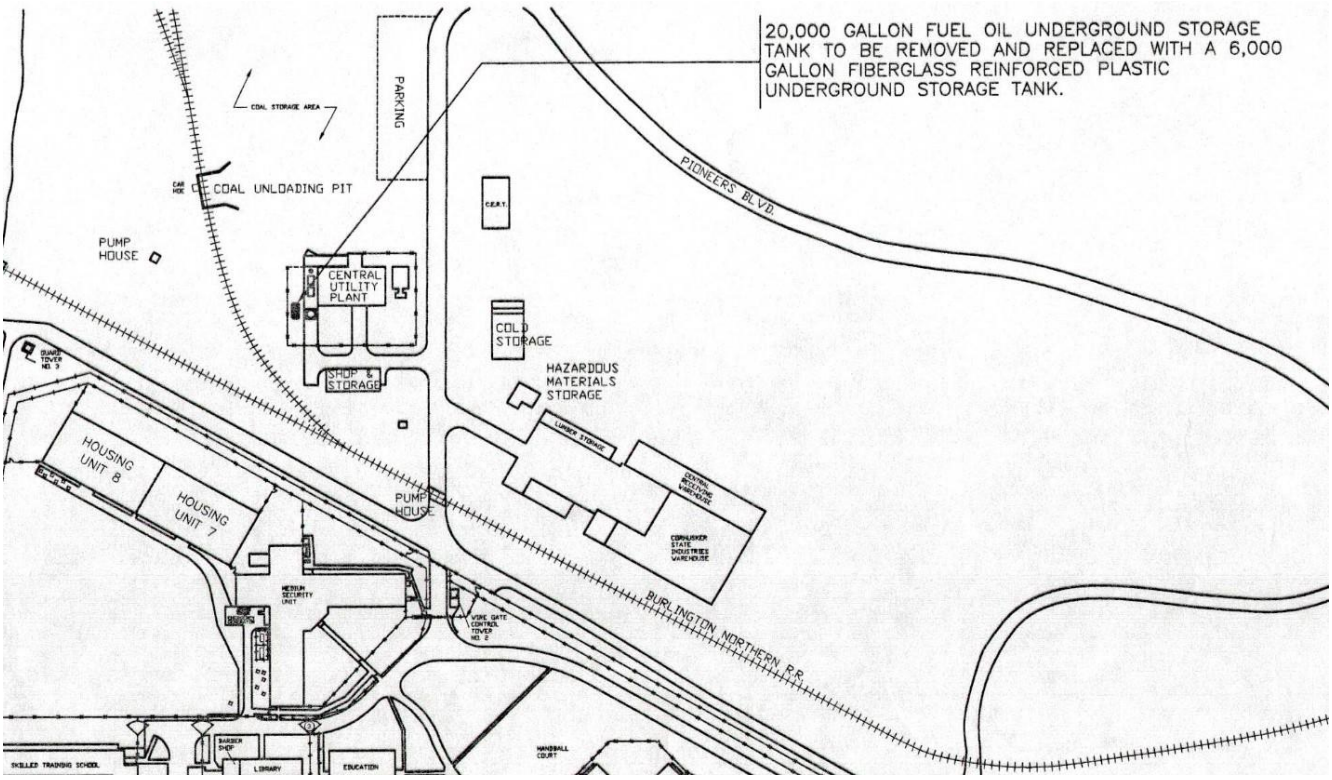


Figure CS-1: Fuel Oil Tank Location

Soil at Coal Pile

The location of the coal pile is shown on the Coal Unloading/Storage Areas sheet in Appendix J.

The OCUP built in 1980 utilized coal to generate heat through steam and condensate lines to the various buildings on the campus.

Coal was typically delivered to the plant by rail by BNSF Railway. Much of the track is private track owned by the NDCS. The OCUP was abandoned and stopped cooling and heating operations in 2018 when the new DEC was completed in 2019.

Photo CS-1: Coal Along Railroad Tracks

This left the coal off loading and coal storage piles obsolete and decommissioned. Coal was off-loaded by belly dump to a temp storage area below a structure that is no longer of value. The area at the bottom of the structure ponds a significant amount of water with nowhere to drain. It is assumed when operations were previously ongoing this low area may have been pumped out, but no visible pumps were apparent at the time of our review. This ponding of water can become stagnant and a possible mosquito breeding ground and health hazard. There is also another storm sewer pipe draining to the area that should be rerouted. The structure could be left in place and the sump area filled in with compacted soil.

There are two piles of coal remaining on site that should be disposed of. The volume of coal was estimated as 2000 Cubic Yards. Disposal of waste coal is regulated by the Nebraska Department of Energy & Environment (NDEE). The NDEE considers waste coal to be special waste. Waste coal may be disposed of in permitted municipal solid waste landfill or buried at the site. Burial on site is the preferred disposal method. Burial on site must have NDEE approval as required by Title 132. A disposal trench or pit must be excavated 4 to 10 feet deep. Trench or pits must be lined with 20-ml plastic liner sheet. Then the coal that is deposited must be covered with 20-Mil plastic liner sheet and covered with a minimum of 2 feet of earth material. Although NDEE would prefer it be buried on site we feel it would be better for any future site development to remove it from site and dispose of it at a permitted landfill. The existing rail tracks no longer serve a function now that the new District Energy Center plant has been constructed in 2018. To facilitate the Off Loading structure removal and coal waste cleanup it would be wise to remove all of the railroad tracks and regrade the area.

Photo CS-2: Coal Off Loading Area

Photo CS-3: Coal Pile

Site Contaminated Soils Deficiencies

This section presents deficiencies for the site CS. A summary of the CS deficiencies analyzed for this study is presented in Table CS-1.

Table CS-1: Site Contaminated Soils Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
CS-1	Coal Unloading Structure Removal	$ 35,000	CS-2	No	Medium
CS-2	Grading To Fill Unloading Area Sump	$ 50,000	NA	No	Medium
CS-3	Coal Disposal At Regulated Landfill	$ 50,000	CS-3	No	Medium
CS-4	Railroad Track Removal	$ 185,000	CS-1	No	Medium
CS-5	Remediation of Soil at Underground Tank	$ 30,000		No	Medium
Site Contaminated Soils Deficiencies Total Costs:		**$ 350,000**			

CS-1: Coal Unloading Structure Removal

The probable project cost for this scope of work is $35,000.

CS-2: Grading to Fill Unloading Area Sump

The probable project cost for this scope of work is $50,000.

CS-3: Coal Disposal at Regulated Landfill

The probable project cost for this scope of work is $50,000.

CS-4: Railroad Track Removal

The probable project cost for this scope of work is $185,000.

CS-5: Remediation of Soil in Vicinity of Underground Fuel Tank

The probable project cost for this scope of work is $30,000.

Site Pavement Observations

The site pavement (PAVE), including sidewalks and roadway pavements, can generally be observed on the NSP Campus Plan sheet in Appendix A.

Pavement areas throughout the campus are showing various levels of aging and defects. Several areas of cracked or heaved concrete pavement pose a tripping and ADA hazard if not corrected. Several areas have been patched in the past. A particularly poor pavement area is located to the south east of HU6 and the northwest of the PEB as shown in Photo PAVE-1. Dumpsters have been kept in this area of the facility.

Photo PAVE-1: Poor Pavement Near HU6

The disrepair of this pavement has caused an injury to a staff member pushing a dumpster here in the last couple of years. The dumpster was being moved when it lodged into one of the cracks and stopped suddenly, resulting in the staff member breaking their arm. Since that incident, the dumpsters have mostly been moved to the north, to an area with sloped pavement which is less ideal to store and move them.

Some areas of the campus's perimeter road were noted to be thin. This was particularly noticed when the recent water main break was repaired to the southwest of GT2 on the west side of the campus.

Site Pavement Deficiencies

This section presents deficiencies for the PAVE. A summary of the PAVE deficiencies analyzed for this study is presented in Table PAVE-1.

Table PAVE-1: Site Pavement Systems Deficiencies Summary					
Deficiency Number	**Deficiency Description**	**Deficiency Cost**	**Photo No.**	**Included in NDCS 2021 Biennium Requests?**	**Priority Level**
PAVE-1	Replacement of Site Pavement	$ 1,700,000	PAVE-1	No	Medium
Site Pavement Systems Deficiencies Total Costs:		**$ 1,700,000**			

PAVE-1: Replacement of Site Pavement

An overall campus pavement maintenance plan should be undertaken starting soon. It is recommended to rehabilitate or reconstruct 30% of the site pavement over the course of the next five years. The probable project cost for this scope of work is $1,700,000.

Deficiencies Cost Summary

A summary of the deficiency costs per building and per site system is presented in Table 3. Also, a total deficiency cost for the NSP Campus is presented in Table ES1. See the Cost Estimating Criteria section as well as the specific buildings and site systems sections of this study for information regarding how these costs were determined.

Table ES1: Deficiencies Cost Summary

Building Name or Site System	Building or Site System Abbreviation	Deficiency Cost
Activities Center	ACT	$ 940,000
Ancillary Building	ANC	$ 22,972,400
Canteen	CAN	$ 735,000
Central Warehouse	CW	$ 6,450,000
Control Unit	CON	$ 200,000
Cornhusker State Industries Factory	CFACT	$ 900,000
Corrections Emergency Response Team	CERT	$ 995,940
Chapel	CHAP	$ 4,509,600
Education Building	EDU	$ 3,091,000
Field Training Office	FTO	$ 545,000
Guard Tower No. 1	GT1	$ 268,040
Guard Tower No. 2	GT2	$ 339,640
Guard Tower No. 3	GT3	$ 268,040
Guard Tower No. 4	GT4	$ 217,620
Guard Tower No. 5	GT5	$ 184,700
Guard Tower No. 6	GT6	$ 246,700
Guard Tower No. 7	GT7	$ 266,000
Guard Tower No. 8	GT8	$ 204,200
Guard Tower No. 10	GT10	$ 58,600
Housing Unit No. 1 - 5	HU1-5	$ 96,723,390
Housing Unit No. 6	HU6	$ 40,300,000
Housing Unit No. 7 - 8	HU7&8	$ 9,139,905
Laundry Building	LAUN	$ 2,983,016
Library and Barber Shop	LIB	$ 1,860,000
Mental Health Building	MENT	$ 1,430,000
Old Central Utility Plant	OCUP	$ 232,064
Pre-Employment Building	PEB	$ 3,800,000
Private Venture Building	PVB	$ 5,100,000
Soap Factory	SOAP	$ 650,000
Wellness Center	WELL	$ 720,000
Site Domestic Water and Fire Protection Water Systems	DW&FP	$ 2,050,000
Site Natural Gas Systems	NG	$ 390,000
Site Sanitary Systems	SAN	$ 1,900,000
Site Storm Systems	STORM	$ 800,000
Site Steam Systems	STM	$ 2,800,000
Site Chilled Water Systems	CWS	$ 325,000
Site Lighting Systems	LTG	$ 1,200,000
Site Security Systems	S-SEC	$ 1,496,000
Site Utility Tunnels	UT	$ 720,000
Site Contaminated Soils	CS	$ 350,000
Site Pavement	PAVE	$ 1,700,000
Total NSP Campus Deficiency Cost		**$ 220,061,855**

Appendix A

NSP Campus Plan

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix A - NSP Campus Plan.dgn ~ 220.0000 ft / in. ~ 12/21/2021

SHEET
APPENDIX A

DATE 12/21/2021

PROJECT 112235.00

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

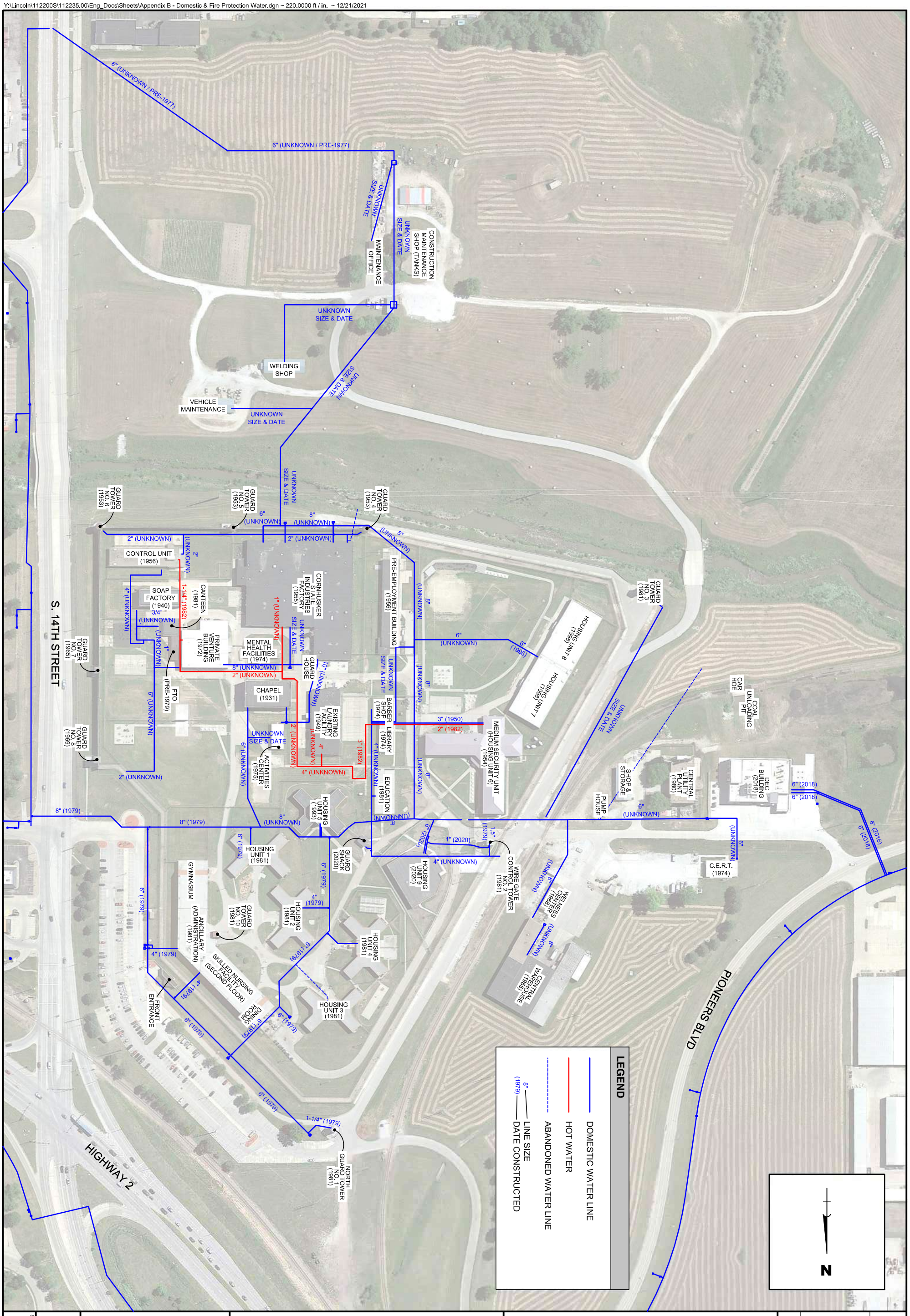
NSP CAMPUS PLAN

NO.	REVISIONS	DATE

Appendix B

Campus Site Utility Plan – Site Domestic Water and Fire Protection Water Overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix B - Domestic & Fire Protection Water.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX B

PROJECT 112235.00

DATE 12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

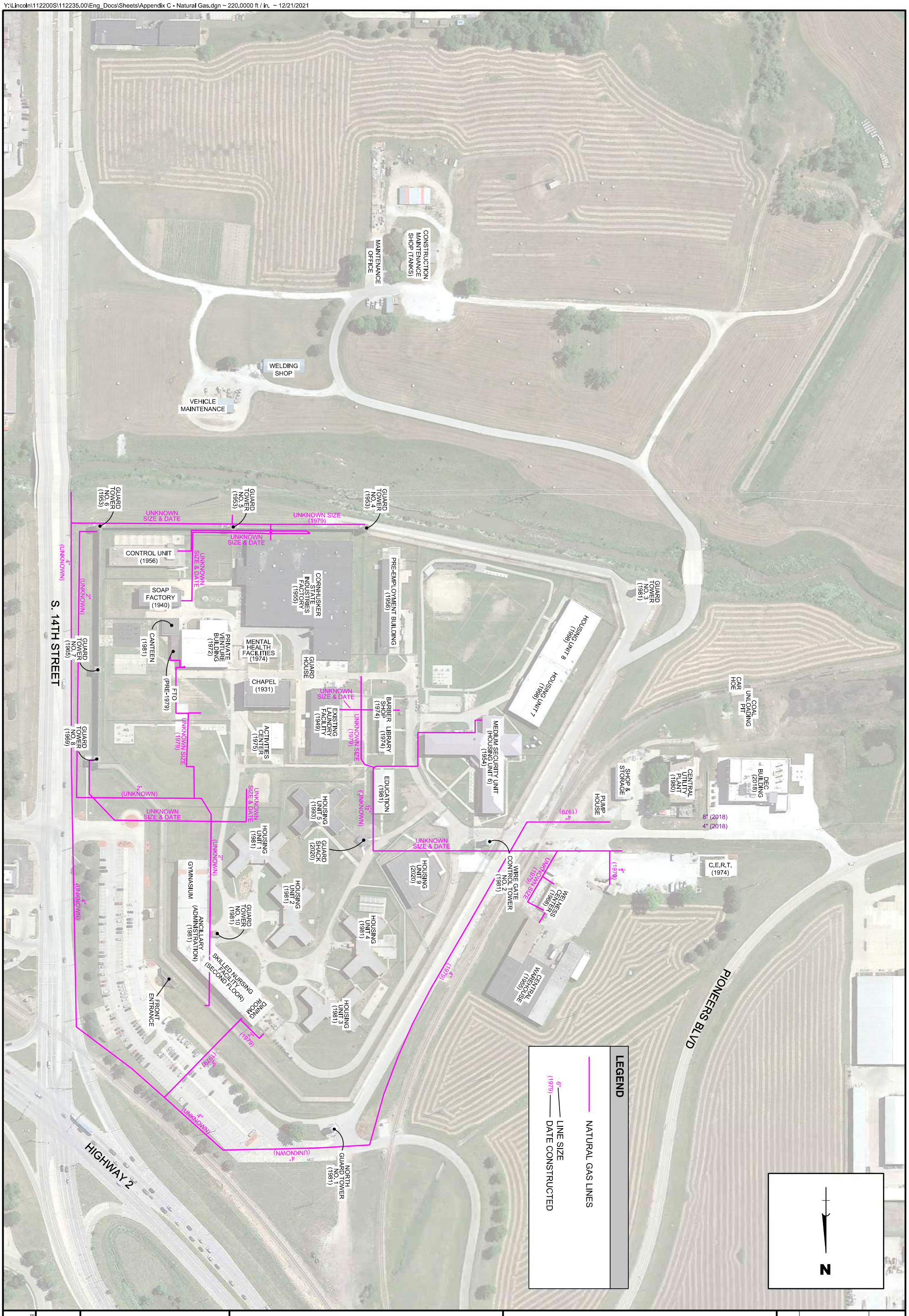
CAMPUS SITE UTILITY PLAN - SITE DOMESTIC WATER AND FIRE PROTECTION WATER OVERVIEW

NO.	REVISIONS	DATE

Appendix C

Campus Site Utility Plan – Site Natural Gas Overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix C - Natural Gas.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX C

PROJECT 112235.00
DATE 12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

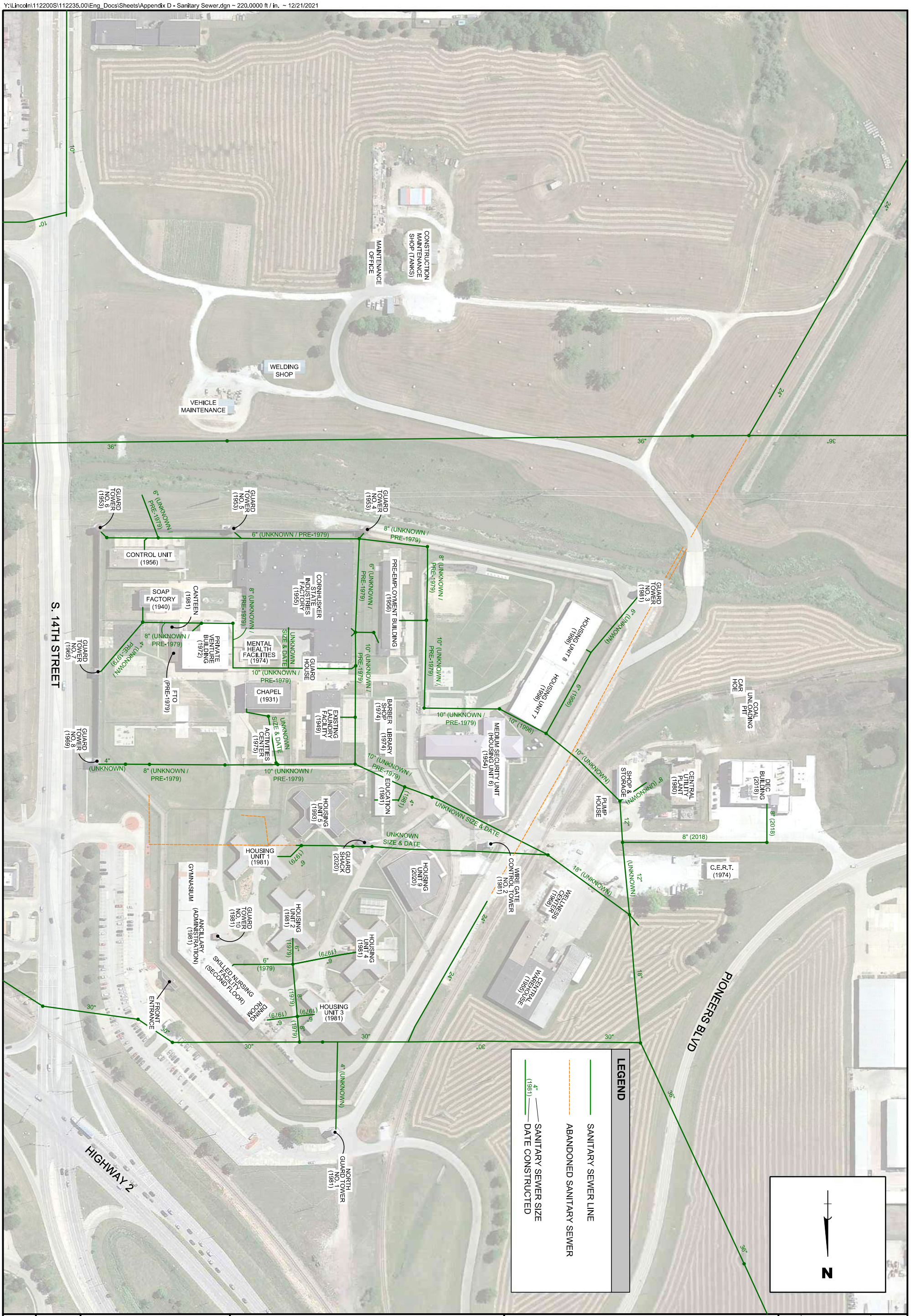
CAMPUS SITE UILITY PLAN - SITE NATURAL GAS OVERVIEW

NO.	REVISIONS	DATE

Appendix D

Campus Site Utility Plan – Site Sanitary Sewer Overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix D - Sanitary Sewer.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX D

PROJECT
112235.00

DATE
12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

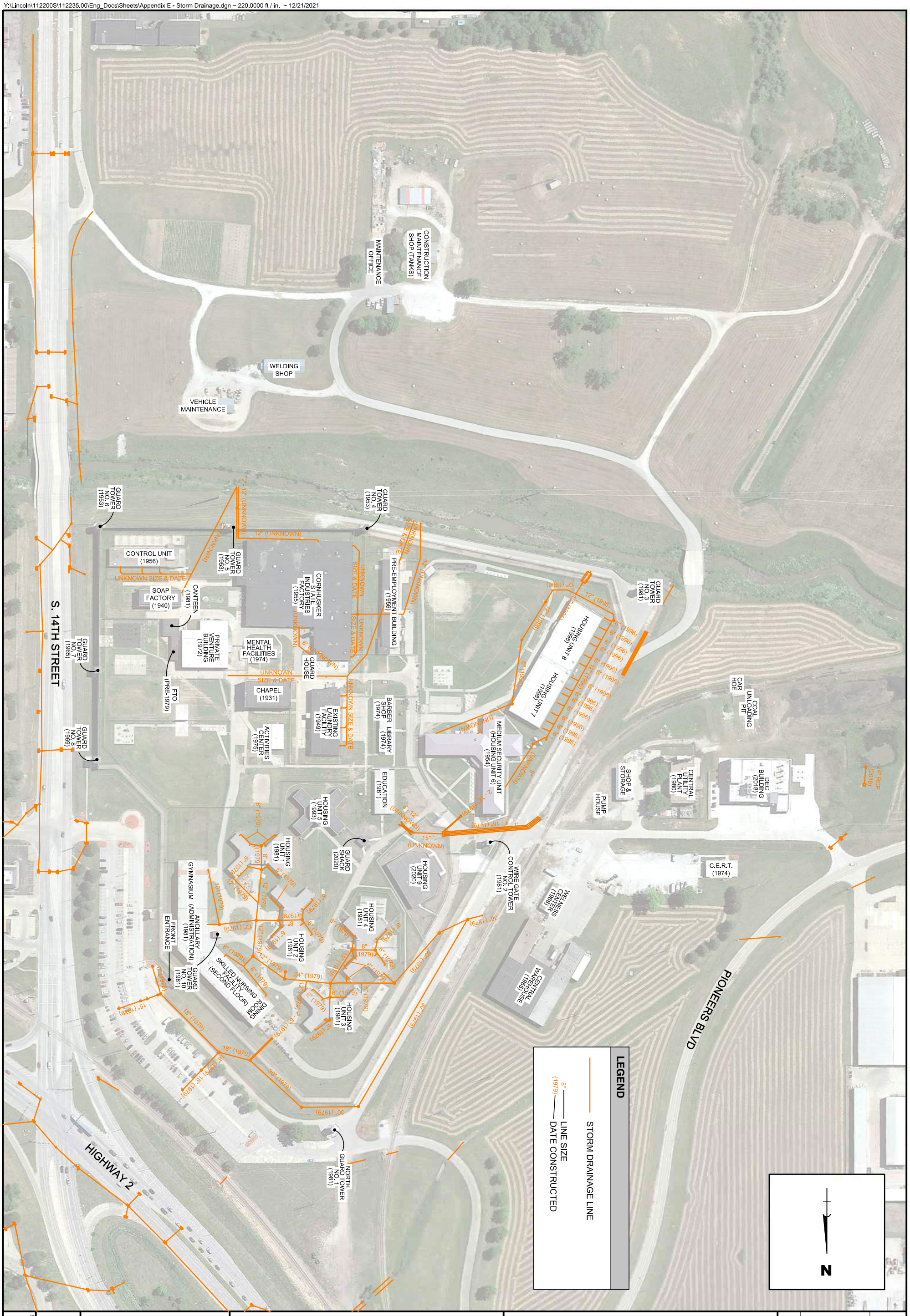
CAMPUS SITE UILITY PLAN - SITE SANITARY SEWER OVERVIEW

NO.	REVISIONS	DATE

Appendix E

Campus Site Utility Plan – Site Storm Drainage overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix E - Storm Drainage.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX E

PROJECT 112235.00
DATE 12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

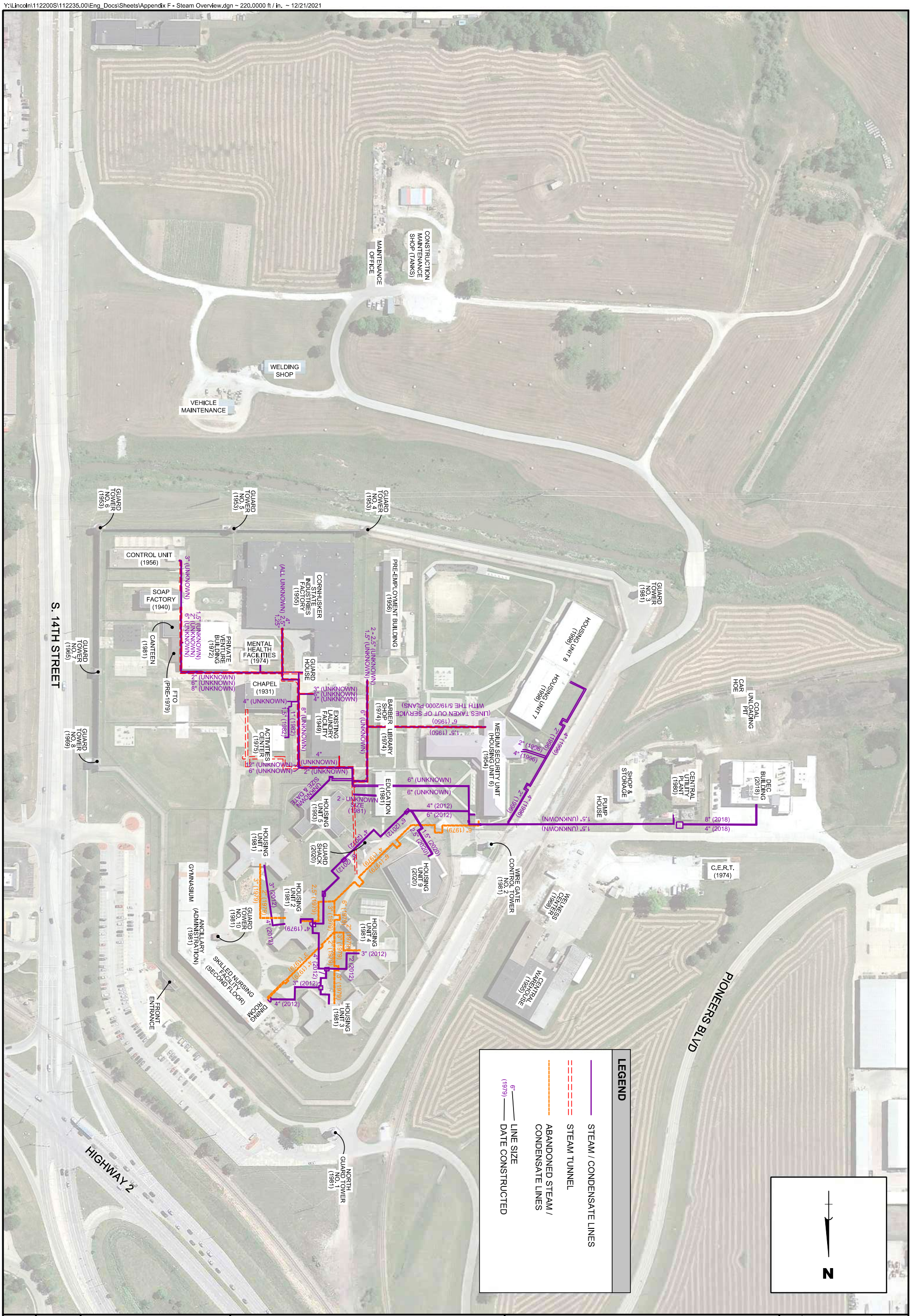
CAMPUS SITE UILITY PLAN - SITE STORM DRAINAGE OVERVIEW

NO.	REVISIONS	DATE

Appendix F

Campus Site Utility Plan – Site Steam Overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix F - Steam Overview.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET: APPENDIX F	PROJECT: 112235.00 DATE: 12/21/2021	benesch Alfred Benesch & Company 825 M Street, Suite 100 Lincoln, Nebraska 68508 402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

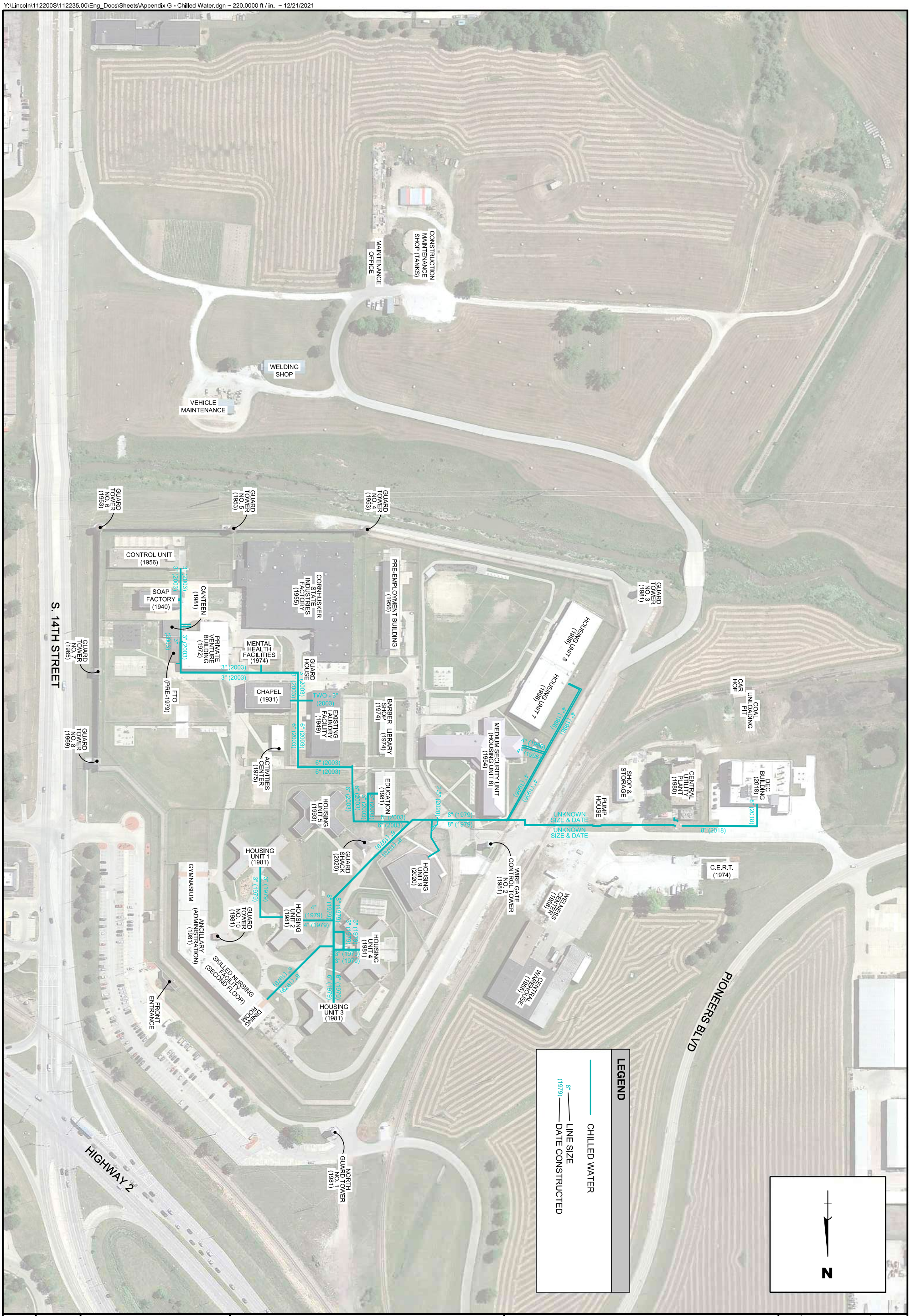
CAMPUS SITE UILITY PLAN - SITE STEAM OVERVIEW

NO.	REVISIONS	DATE

Appendix G

Campus Site Utility Plan – Site Chilled Water Overview

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix G - Chilled Water.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX G

PROJECT 112235.00
DATE 12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

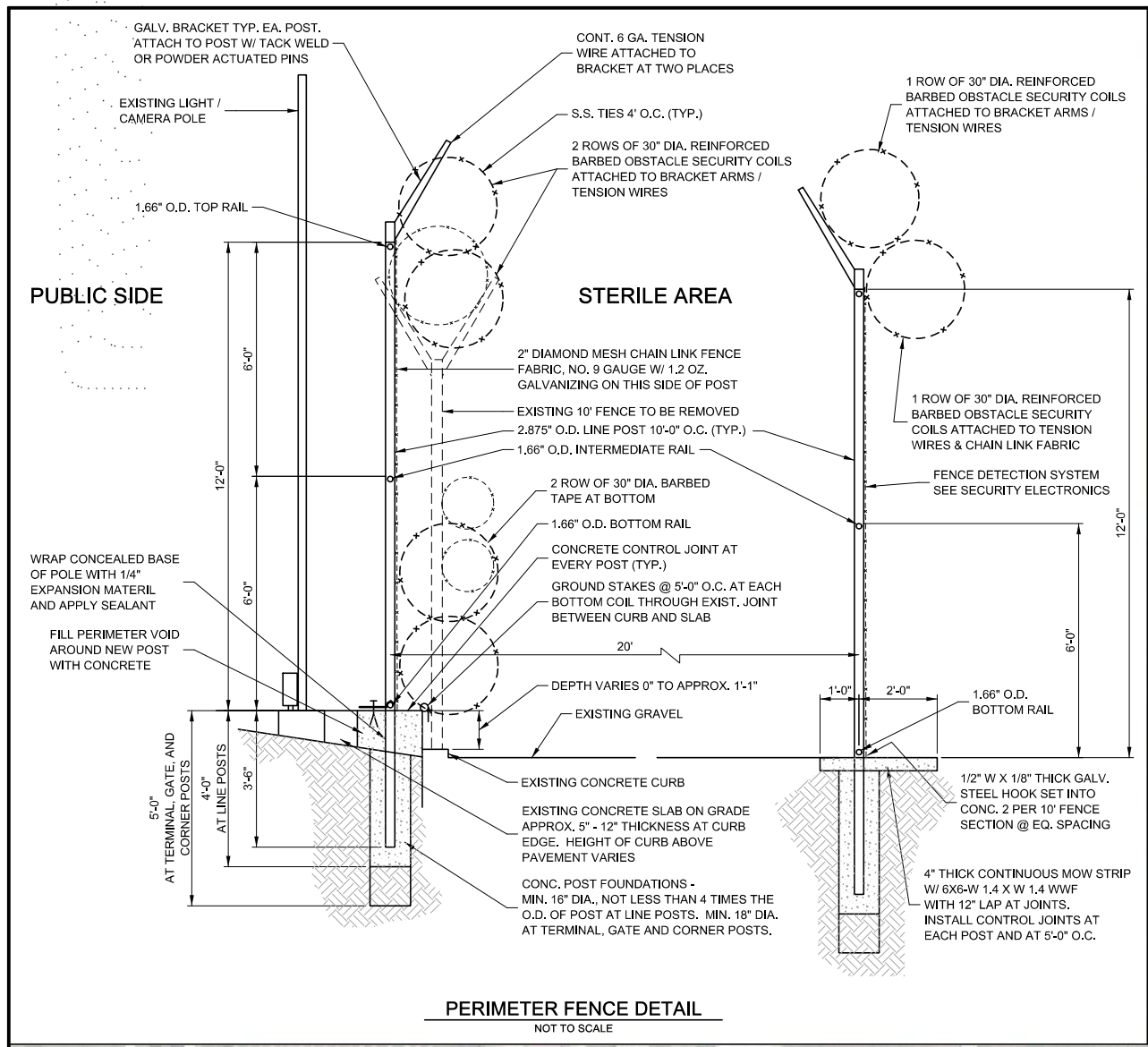
NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

CAMPUS SITE UILITY PLAN - SITE CHILLED WATER OVERVIEW

NO.	REVISIONS	DATE

Appendix H

Campus Plan –
Perimeter Fence Overview



PERIMETER FENCE DETAIL
NOT TO SCALE

LEGEND

- PERIMETER FENCE THAT MEETS STANDARDS
- PERIMETER FENCE THAT DOES NOT MEET STANDARDS
- PERIMETER WALL

NO.	REVISIONS	DATE

CAMPUS PLAN - PERIMETER FENCE OVERVIEW

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

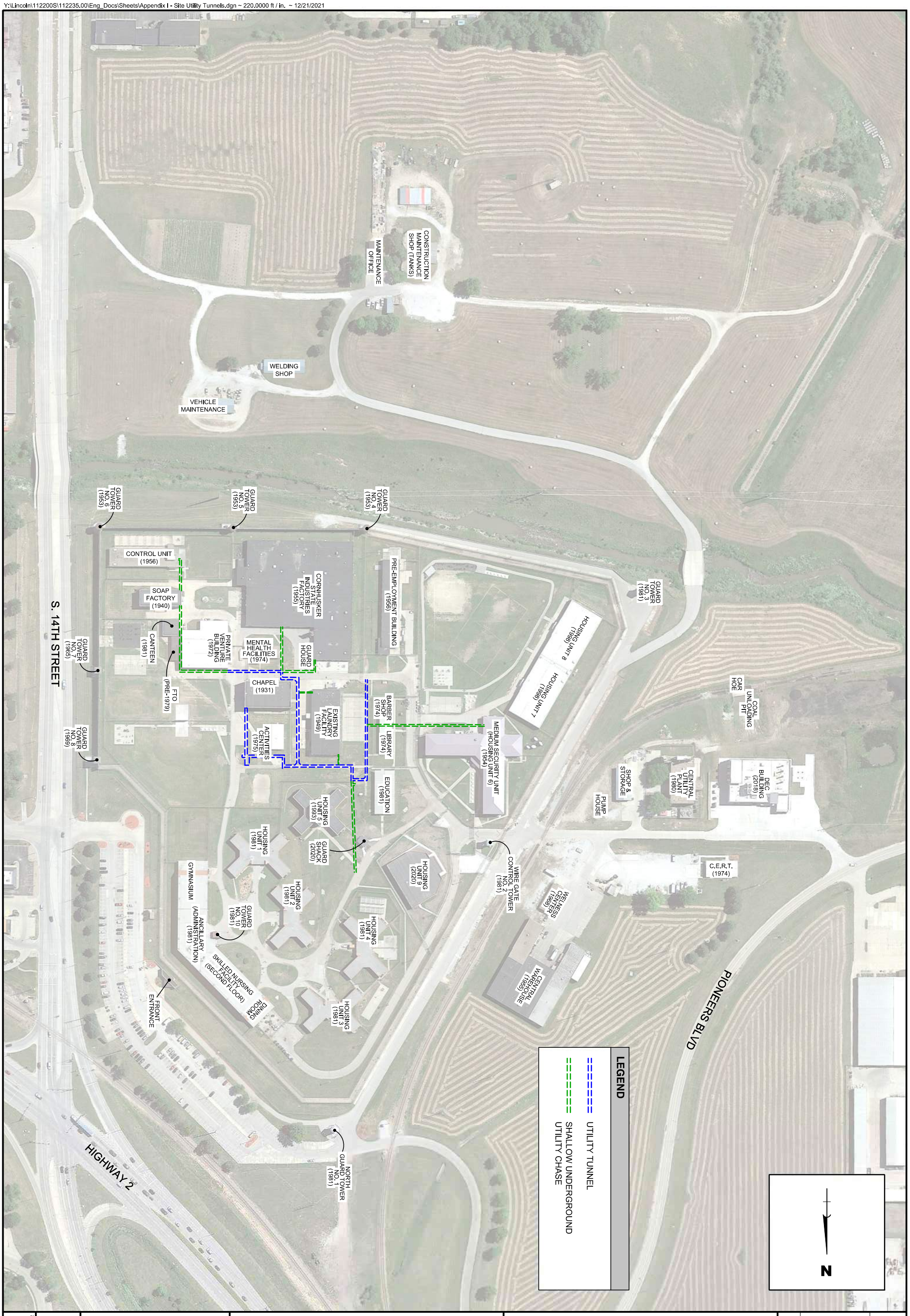
benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200
Job No. 112235.00

PROJECT 112235.00
DATE 12/21/2021
SHEET **APPENDIX H**

Appendix I

Campus Plan –
Site Utility Tunnels

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix I - Site Utility Tunnels.dgn ~ 220.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX I

PROJECT 112235.00
DATE 12/21/2021

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

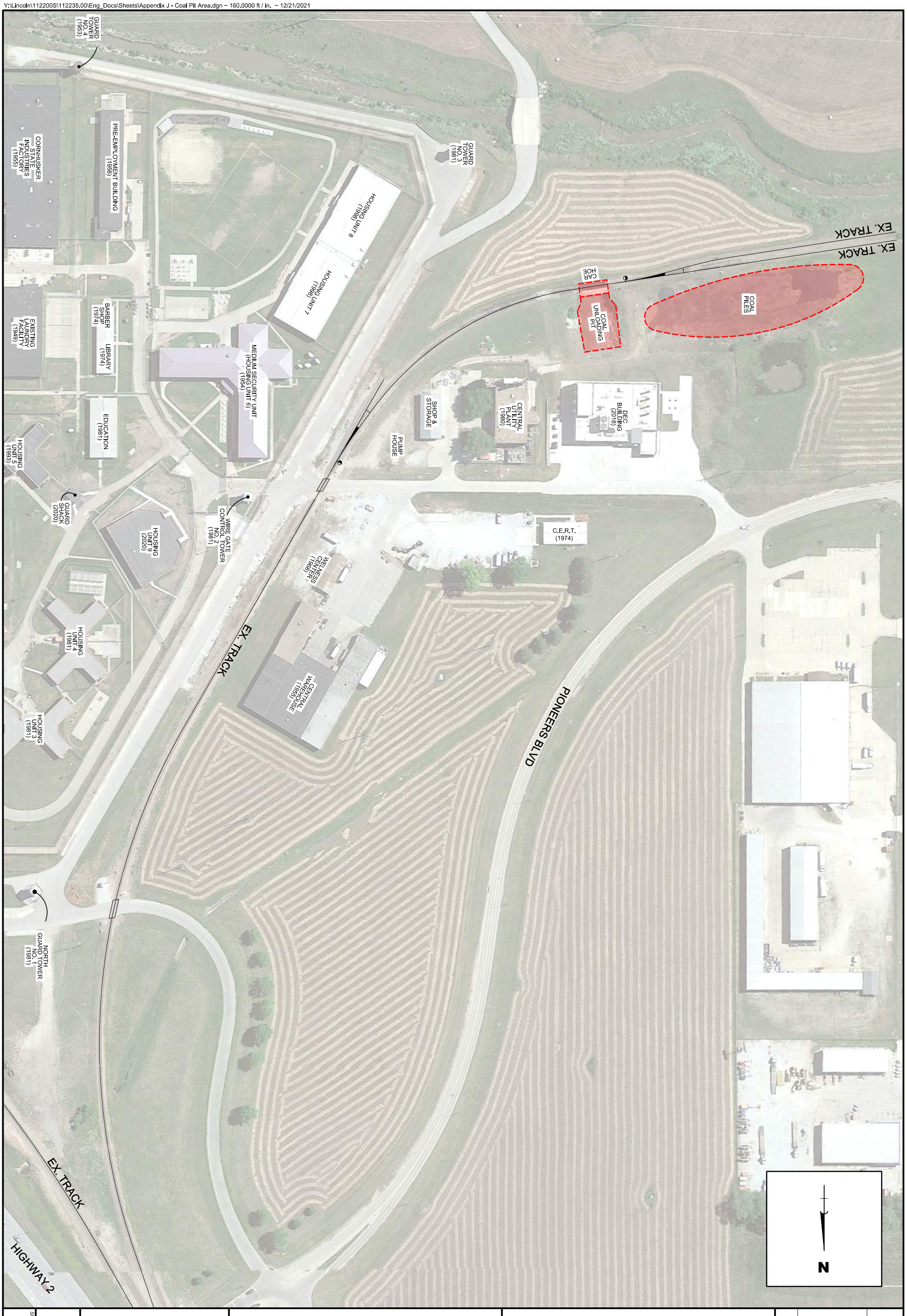
CAMPUS PLAN - SITE UTILITY TUNNELS

NO.	REVISIONS	DATE

Appendix J

Coal Unloading/Storage Area

Y:\Lincoln\112200S\112235.00\Eng_Docs\Sheets\Appendix J - Coal Pit Area.dgn ~ 160.0000 ft / in. ~ 12/21/2021



SHEET
APPENDIX J

DATE 12/21/2021

PROJECT 112235.00

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200 Job No. 112235.00

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

COAL UNLOADING / STORAGE AREA

NO.	REVISIONS	DATE

Appendix K

Site Sanitary Sewer and Storm Drainage System Investigation Report

SUBSURFACE UTILITY ENGINEERING

BY TINIUS PLUMBING INC. 4121 N 42 STREET LINCOLN 467-2822

PIPE ASSESSMENT CERTIFICATION #02-469 MASTER PLUMBING REGISTRATION #PMC80

SANITARY SEWER INSPECTION REPORT

ADDRESS	NDCS 4201 S 14TH STREET
CITY	LINCOLN, NE
DEPTH AT HOUSE	NA
DEPTH AT JUNCTION	NA
LENGTH OF PIPE	NA
TAP FROM MANHOLE	NA
SIZE OF SERVICE	8, 10, & 12
TYPE OF PIPE	CLAY TILE AND REINFORCED CONCRETE PIPE (RCP)
DATE WORK COMPLETED	12/2/2021
PREPARED FOR	BENESCH
CAMERA TYPE USED	ENVIROSIGHT
LOCATOR TYPE USED	NA
STRUCTURAL GRADE	MANHOLES #3 PIPES #4
OPERAT. & MAINT. GRADE	MANHOLES #4 PIPES #5

COMMENTS

MANHOLES HAVE NO CHANNEL OR BENCH
SOME CHANNELS HAVE BRICKS THAT HAVE BROKEN AWAY FROM THE MH WALL
MANHOLES SHOW SIGNS OF DETERIORATION FROM HYDROGEN SULFIDE (H2S) ATTACK

SOME PIPE SEGMENTS EAST OF LAUNDRY ARE MADE OF REINFORCED CONCRETE AND SHOW SIGNS OF SURFACE DAMAGE WITH AGGREGATE PROJECTING.

CAMERA GOT STUCK IN SURVEY #1 POSSIBLE NO INVERT IN PIPE

BROKEN PIECE OF CLAY PIPE INSIDE SECTION MH #M3 TO MH #M4 SURVEY #8 & #9
UNABLE TO FIND ORIGIN OF BROKEN PIECE OF PIPE

MANHOLE #M4 IS A DROP-IN STYLE THAT IS PLUGGED AND NEEDS CLEANING

ALL LINES SURVEYED NEED TO BE JET FLUSHED FOR BUILDUP AND ROCK REMOVAL
DEPOSITS CAN CAUSE FLOW TURBULENCE AND PARTIAL BLOCKAGES THAT
RESULT IN A REDUCTION OF HYDRAULIC CAPACITY

MANHOLE ON MAIN LINE WEST OF TOWER #2 IS BURIED UNDER ASPHALT ROAD AND NEEDS TO BE BROUGHT UP TO GRADE FOR QUICK ACCESS IN CASE OF A BACKUP

NO DETERMINATION OF FUTURE PERFORMANCE HAS BEEN NOR CAN BE MADE DUE TO UNKNOWN CONDITION DURING SYSTEM CONSTRUCTION, ABUSE OF THE SYSTEM, INADEQUATE MAINTENANCE, OR FUTURE WATER USAGE.

DAVID TINIUS David A Tinius *DATE* 12-6-2021

TINIUS PLUMBING INC.
PIPE CONDITION GRADING SYSTEM

NDCS – NE STATE PENITENTIARY – LINCOLN, NE

SANITARY SEWER - MANHOLES

Using the PACP Code Matrix, each defect is assigned a condition grade of from 1 to 5. Grades are assigned based on potential for further deterioration or pipe failure. Pipe failure is defined as when the pipe can no longer convey the pipe design capacity, including failure caused by root intrusion.

Structural Defect Grades:

☐	5 – Immediate Attention	Defects requiring immediate attention
☐	4 – Poor	Severe defects that will become Grade 5 defects within the foreseeable future
☒	3 – Fair	Moderate defects that will continue to deteriorate
☐	2 – Good	Defects that have not begun to deteriorate
☐	1 – Excellent	Minor defects

Operation and Maintenance Defect Grades:

☐	5 – Pipe has failed or will likely fail within the next five years
☒	4 – Pipe will probably fail in 5 to 10 years
☐	3 – Pipe may fail in 10 to 20 years
☐	2 – Pipe unlikely to fail for at least 20 years
☐	1 – Failure unlikely in the foreseeable future

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in this evaluation.

David A. Tinius DATE 12-6-2021

TINIUS PLUMBING INC.
PIPE CONDITION GRADING SYSTEM

NDCS – NE STATE PENITENTIARY – LINCOLN, NE

SANITARY SEWER - PIPES

Using the PACP Code Matrix, each defect is assigned a condition grade of from 1 to 5. Grades are assigned based on potential for further deterioration or pipe failure. Pipe failure is defined as when the pipe can no longer convey the pipe design capacity, including failure caused by root intrusion.

Structural Defect Grades:

☐	5 – Immediate Attention	Defects requiring immediate attention
☒	4 – Poor	Severe defects that will become Grade 5 defects within the foreseeable future
☐	3 – Fair	Moderate defects that will continue to deteriorate
☐	2 – Good	Defects that have not begun to deteriorate
☐	1 – Excellent	Minor defects

Operation and Maintenance Defect Grades:

☒	5 – Pipe has failed or will likely fail within the next five years
☐	4 – Pipe will probably fail in 5 to 10 years
☐	3 – Pipe may fail in 10 to 20 years
☐	2 – Pipe unlikely to fail for at least 20 years
☐	1 – Failure unlikely in the foreseeable future

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in this evaluation.

David A Tinius DATE 12-6-2021

S Survey #1
West from MH #64. 65' Non-passable, object in invert. End of survey. 12 o'clock tap 67'
RCP pipe. Surface damage. Surface damage, aggregate projecting.

S Survey #2
East from MH #64 3.0'
Unable to survey. Obstacle obstruction, Bricks, sludge in invert. 20% cross-sectional reduction
RCP pipe, Surface damage,

S Survey #3 MH
Invert of MH Full of sludge and bricks

S Survey #3 LINE
N From MH #TEK1 85.5'
Clay Tile Pipe. Heavy sludge, needs to be jet flushed

SS Survey #4
RCP Pipe
Storm line, 50-60% plugged with rocks & debris. East and West from grated inlets.

SS Survey #5
RCP Pipe. Multiple longitudinal fractures
Unable to survey, 50% full of gravel

SS Survey #6
RCP Pipe. Multiple longitudinal and circumferential fractures
Unable to survey, 50% full of gravel
Area does not drain well, according to staff present during rains.

S Survey #7
Unable to survey. High flow

S Survey #8
Clay tile pipe. South from MH #M3. Piece of broken tile in invert at 95'. End of survey, backed out.

S Survey #9
West from MH #M3 324'. Clay tile pipe 0' to MH @ 185'. PVC pipe from 185' to 324"
Smaller than normal opening in top of pipe at 185' MH.

S Survey #10
North from MH M4. Piece of clay tile in invert @ 125'. End of survey, backed out.
This is the same piece as Survey #8 from opposite direction.

S Survey #10
At 3:45 into video, reverse directions in MH #M4, travel South.
Clay tile pipe, Spiral fractures that have started to move from their original position.
Drop Tee, 6 o'clock position, plugged. Dropped system not functional.

SS Survey #11
PVC pipe. Camera under water 92-102', 112-121"
Wye downstream of MH #M13 is bushed down on inlet side.

S Survey #12
Service for Housing Unit #6 has dropped invert into MH, unable to access from MH.

SS Survey #13
Access from outfall in Beal Slough. Broken pipe at 93.2'. End survey @ 131.0', pushing concrete piece that broke off while going over 93' break. Backed out

S = Sanitary Sewer
SS = Storm Sewer

Note #1
Could not find outfall pipe in Beal Slough for Storm sewer pipe that drains street on south side of Chaple/Laundry. This area floods during heavy rains.

Note #2
Could not access pipes because of dirt blocking outlet grate. Outlet opening is 50% restricted

SANITARY SEWER UTILITY OVERVIEW

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

NO.	REVISIONS	DATE

LEGEND

- SANITARY SEWER LINE
- ABANDONED SANITARY SEWER
- 4" (1981) — SANITARY SEWER SIZE / DATE CONSTRUCTED

#12
#9
#8
#10
#7
#3
#1
#2
#64
#48
M4
M3
TEK 1
CITY OF LINCOLN LINE

PIONEERS BLVD
S. 14TH STREET
HIGHWAY 2

COAL CAR UNLOADING HOE PIT
DEC BUILDING
8" (2018)
C.E.R.T.
CENTRAL UTILITY PLANT
8" (2018)
GUARD TOWER NO. 3
SHOP & STORAGE
PUMP HOUSE
12" (UNKNOWN)
18" (UNKNOWN)
6" (1998)
HOUSING UNIT 8
HOUSING UNIT 7
CENTRAL RECEIVING WAREHOUSE
CORNHUSKER STATE WAREHOUSE
WIRE GATE CONTROL TOWER NO. 2
MEDIUM SECURITY UNIT
GUARD TOWER NO. 4
PRE-EMPLOYMENT BUILDING
BARBER SHOP
LIBRARY
EDUCATION
HOUSING UNIT 9
HOUSING UNIT 4
HOUSING UNIT 3
HOUSING UNIT 2
HOUSING UNIT 1
HOUSING UNIT 5
GUARD SHACK
NORTH GUARD TOWER NO. 1
METALS SHOP
EXISTING LAUNDRY FACILITY
CORNHUSKER STATE INDUSTRIES - FACTORY
GUARD HOUSE
UNKNOWN SIZE & DATE
HEALTH FACILITIES
CHAPEL
ACTIVITIES CENTER
GUARD TOWER NO. 5
GUARD TOWER NO. 10
HOSPITAL (SECOND FLOOR)
ANCILLARY (ADMINISTRATION)
GYMNASIUM
PRIVATE VENTURE BUILDING
CANTEEN
STORAGE
SOAP FACTORY
CONTROL UNIT
FRONT ENTRANCE
GUARD TOWER NO. 6
GUARD TOWER NO. 7
GUARD TOWER NO. 8

benesch
Allied Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-479-2200
Job No. 117235.00

PROJECT 117235.00
DATE 11/10/2016
SHEET EXHIBIT B

Y:\Lincoln\117235\117235.06\Eng_Docs\Exhibits\YDC5 Utility Overview - Sanitary - 2021.11.23.dgn ~ 220.6003 ft / in. ~ 11/23/2021

SUBSURFACE UTILITY ENGINEERING

BY TINIUS PLUMBING INC. 4121 N 42 STREET LINCOLN 467-2822

PIPE ASSESSMENT CERTIFICATION #02-469 MASTER PLUMBING REGISTRATION #PMC80

STORM SEWER INSPECTION REPORT

ADDRESS	NDCS 4201 S 14TH STREET
CITY	LINCOLN, NE
DEPTH AT HOUSE	NA
DEPTH AT JUNCTION	NA
LENGTH OF PIPE	NA
TAP FROM MANHOLE	NA
SIZE OF SERVICE	10, & 12
TYPE OF PIPE	REINFORCED CONCRETE PIPE (RCP) & PVC
DATE WORK COMPLETED	12/2/2021
PREPARED FOR	BENESCH
CAMERA TYPE USED	ENVIROSIGHT
LOCATOR TYPE USED	NA
STRUCTURAL GRADE	MANHOLES #3 PIPES #4
OPERAT. & MAINT. GRADE	MANHOLES #5 PIPES #5

COMMENTS

MANHOLES HAVE MISSING BRICKS AND SURFACE SPALLING.
CHANNELS ARE NOT VISIBLE, COVERED WITH ROCKS AND BRICKS

PIPES ARE 50% FULL OF GRAVEL & ROCKS. PIPES INSPECTED HAVE MULTIPLE LONGITUDINAL & CIRCUMFERENTIAL CRACKS THAT HAVE STARTED TO OPEN AND ARE NOW CODED AS FRACTURES. WITH REDUCED PIPE CAPACITY, HEAVY RAINS COULD CREATE EXCESSIVE BACK PRESSURE ON JOINT DESIGNED TO BE USED FOR GRAVITY SYSTEMS CLEANING METHODS NEEDED TO REMOVE SEDIMENT TO RESTORE PIPES TO THE ORIGINAL DIAMETER/CAPACITY, WOULD MOST LIKELY RESULT IN PIPE FAILURE.

THE 12" STROM MAIN LINE THAT SERVES THE LAUNDRY AND CHAPEL SOUTH STREET AREA IS SHOWN ON MAPS TO DISCHARGE INTO BEAL SLOUGH. THIS OUTFALL PIPE WAS NOT VISIBLE AND POSSIBLE BLOCKED OR COVERED OVER, RESTRICTING FLOW.

MAIN STORM DISCHARGE FOR AREA EAST OF TOWER #2 HAS SEVER BLOCKAGE AT GRATED OUTLET IN DITCH TO THE SW. THIS AREA NEEDS TO BE DUG UP WITH A BACKHOE AND REGRADED. ADDITION PLANS SHOULD BE MADE TO ALLOW CAMERA ACCESS OF PIPE TUBES SERVICING THIS SECTION

PIPE EAST OF TOWER #5 SERVICING SOAP BUILDING HAS A BREAK 93' UPSTREAM FROM BEAL SLOUGH DISCHARGE, ABOUT UNDER THE SOUTH WALL.

NO DETERMINATION OF FUTURE PERFORMANCE HAS BEEN NOR CAN BE MADE DUE TO UNKNOWN CONDITION DURING SYSTEM CONSTRUCTION, ABUSE OF THE SYSTEM, INADEQUATE MAINTENANCE, OR FUTURE WATER USAGE.

DAVID TINIUS David A Tinius *DATE* 12-6-2021

TINIUS PLUMBING INC.
PIPE CONDITION GRADING SYSTEM

NDCS – NE STATE PENITENTIARY – LINCOLN, NE

STORM SEWER - MANHOLES

Using the PACP Code Matrix, each defect is assigned a condition grade of from 1 to 5. Grades are assigned based on potential for further deterioration or pipe failure. Pipe failure is defined as when the pipe can no longer convey the pipe design capacity, including failure caused by root intrusion.

Structural Defect Grades:

☐	5 – Immediate Attention	Defects requiring immediate attention
☐	4 – Poor	Severe defects that will become Grade 5 defects within the foreseeable future
☒	3 – Fair	Moderate defects that will continue to deteriorate
☐	2 – Good	Defects that have not begun to deteriorate
☐	1 – Excellent	Minor defects

Operation and Maintenance Defect Grades:

☒ 5 – Pipe has failed or will likely fail within the next five years

☐ 4 – Pipe will probably fail in 5 to 10 years

☐ 3 – Pipe may fail in 10 to 20 years

☐ 2 – Pipe unlikely to fail for at least 20 years

☐ 1 – Failure unlikely in the foreseeable future

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in this evaluation.

David A. Tinius DATE 12-6-2021

TINIUS PLUMBING INC.
PIPE CONDITION GRADING SYSTEM

NDCS – NE STATE PENITENTIARY – LINCOLN, NE

STORM SEWER - PIPE

Using the PACP Code Matrix, each defect is assigned a condition grade of from 1 to 5. Grades are assigned based on potential for further deterioration or pipe failure. Pipe failure is defined as when the pipe can no longer convey the pipe design capacity, including failure caused by root intrusion.

Structural Defect Grades:

☐	5 – Immediate Attention	Defects requiring immediate attention
☒	4 – Poor	Severe defects that will become Grade 5 defects within the foreseeable future
☐	3 – Fair	Moderate defects that will continue to deteriorate
☐	2 – Good	Defects that have not begun to deteriorate
☐	1 – Excellent	Minor defects

Operation and Maintenance Defect Grades:

☒	5 – Pipe has failed or will likely fail within the next five years
☐	4 – Pipe will probably fail in 5 to 10 years
☐	3 – Pipe may fail in 10 to 20 years
☐	2 – Pipe unlikely to fail for at least 20 years
☐	1 – Failure unlikely in the foreseeable future

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in this evaluation.

David A. Tinius DATE 12-6-2021

S Survey #1
West from MH #64. 65' Non-passable, object in invert. End of survey. 12 o'clock tap 67'
RCP pipe. Surface damage. Surface damage, aggregate projecting.

S Survey #2
East from MH #64 3.0'
Unable to survey. Obstacle obstruction, Bricks, sludge in invert. 20% cross-sectional reduction
RCP pipe, Surface damage,

S Survey #3 MH
Invert of MH Full of sludge and bricks

S Survey #3 LINE
N From MH #TEK1 85.5'
Clay Tile Pipe. Heavy sludge, needs to be jet flushed

SS Survey #4
RCP Pipe
Storm line, 50-60% plugged with rocks & debris. East and West from grated inlets.

SS Survey #5
RCP Pipe. Multiple longitudinal fractures
Unable to survey, 50% full of gravel

SS Survey #6
RCP Pipe. Multiple longitudinal and circumferential fractures
Unable to survey, 50% full of gravel
Area does not drain well, according to staff present during rains.

S Survey #7
Unable to survey. High flow

S Survey #8
Clay tile pipe. South from MH #M3. Piece of broken tile in invert at 95'. End of survey, backed out.

S Survey #9
West from MH #M3 324'. Clay tile pipe 0' to MH @ 185'. PVC pipe from 185' to 324"
Smaller than normal opening in top of pipe at 185' MH.

S Survey #10
North from MH M4. Piece of clay tile in invert @ 125'. End of survey, backed out.
This is the same piece as Survey #8 from opposite direction.

S Survey #10
At 3:45 into video, reverse directions in MH #M4, travel South.
Clay tile pipe, Spiral fractures that have started to move from their original position.
Drop Tee, 6 o'clock position, plugged. Dropped system not functional.

SS Survey #11
PVC pipe. Camera under water 92-102', 112-121"
Wye downstream of MH #M13 is bushed down on inlet side.

S Survey #12
Service for Housing Unit #6 has dropped invert into MH, unable to access from MH.

SS Survey #13
Access from outfall in Beal Slough. Broken pipe at 93.2'. End survey @ 131.0', pushing concrete piece that broke off while going over 93' break. Backed out

S = Sanitary Sewer
SS = Storm Sewer

Note #1
Could not find outfall pipe in Beal Slough for Storm sewer pipe that drains street on south side of Chaple/Laundry. This area floods during heavy rains.

Note #2
Could not access pipes because of dirt blocking outlet grate. Outlet opening is 50% restricted

No Access UPPER

S. 14TH STREET

HIGHWAY 2

FRONT ENTRANCE

GYMNASIUM (ADMINISTRATION)

ANCILLARY

HOSPITAL (SECOND FLOOR)

GUARD TOWER NO. 10

HOUSING UNIT 1

HOUSING UNIT 2

HOUSING UNIT 3

HOUSING UNIT 4

HOUSING UNIT 5

HOUSING UNIT 9

GUARD SHACK

GUARD TOWER NO. 1 NORTH

EDUCATION

BARBER SHOP

LIBRARY

ACTIVITIES CENTER

CHAPEL

MENTAL HEALTH FACILITY

PRIVATE VISITING BUILDING

STORAGE

CANTEEN

SOAP FACTORY

CONTROL UNIT

GUARD TOWER NO. 8

GUARD TOWER NO. 7

GUARD TOWER NO. 6

GUARD TOWER NO. 5

GUARD TOWER NO. 4

GUARD TOWER NO. 3

GUARD HOUSE

CORNHUSKER STATE INDUSTRIES FACTORY

METALS SHOP

PRE-EMPLOYMENT BUILDING

EXISTING LAUNDRY FACILITY

#13

#14

#5

#6

NOTE #1

No Access

MEDIUM SECURITY UNIT

WIRE GATE CONTROL TOWER NO. 2

CORNHUSKER STATE WAREHOUSE

CENTRAL RECEIVING WAREHOUSE

HOUSING UNIT 8

HOUSING UNIT 7

#11

Blocked

NOTE #2

PUMP HOUSE

SHOP & STORAGE

CENTRAL UTILITY PLANT

C.E.R.T.

DEC BUILDING

COAL CAR UNLOADING HOE PIT

PIONEERS BLVD

LEGEND

STORM DRAINAGE LINE

N

NEBRASKA DEPARTMENT OF CORRECTIONAL SERVICES
NEBRASKA STATE PENITENTIARY
LINCOLN, NEBRASKA

STORM DRAINAGE UTILITY OVERVIEW

benesch
Alfred Benesch & Company
825 M Street, Suite 100
Lincoln, Nebraska 68508
402-475-2200
Job No. 112735.00

PROJECT 112735.00
DATE 11/22/21
SHEET EXHIBIT C

NO. | REVISIONS | DATE

Y:\Lincoln\112735\01122235.00\Eng_Docs\Exhibits\NDCS Utility Overview - Storm - 2021.11.22.dgn - 220,000 ft / in. - 11/22/2021