1. APPLICABLE CODES AND GUIDELINES

1.1 ILLINOIS ACCESSIBILITY CODE, 2018 MINIMUM STANDARD

1.2 AMERICANS WITH DISABILITY ACT, 2010 OR STANDARDS FOR ACCESSIBLE DESIGN ONLY WHERE MORE STRINGENT THAN IAC&ABAS

1.3 IBC, 2018

1.4 NFPA 70-NATIONAL ELECTRIC CODE, 2011

1.5 NFPA 99-HEALTHCARE FACILITIES CODE, 2012

1.6 NFPA 110-EMERGENCY AND STANDBY POWER, 2010

1.7 NFPA 780-STANDARD FOR THE INSTALLATION OF LIGHTING PROTECTION SYSTEMS, 2011

1.8 NFPA 101-LIFE SAFETY CODE, 2012

1.9 ILLINOIS DEPARTMENT OF PUBLIC HEALTH

1.10 ADAMS COUNTY WITH LOCAL AMENDMENTS

1.11 INTERNATIONAL MECHANICAL CODES, 2018

1.12 INTERNATIONAL ENERGY CONSERVATION CODE, 2018

1.13 ALL OTHER VETERANS HOME CODES APPLICABLE TO QUINCY VETERANS HOME AND GUIDELINES FROM CDB.

2. NARRATIVE SUMMARY

2.1 CAMPUS MEDIUM VOLTAGE (MV) DISTRIBUTION REPLACEMENT

A. As per design team recommendation and CDB approval, the medium voltage distribution system will need to be replaced to accommodate the phased plan for new buildings and renovation of existing buildings electrical distribution. The phasing plan will be submitted by Design Builder Entity (DB)E and shall take approval from owner and CDB. In lieu of reliability and future growth of campus, 300 amp loop with switches to serve buildings is recommended. A loop type configuration with sectionalizing switches provide the flexibility necessary for phasing. The future expansions and renovations shall be done with minimal interruptions tpo power and disturbance to site and campus normal operation. The existing 2400V and the new 12.47kV systems will operate together until all the existing loads on this campus are transferred to the new 12.47kV system. DBE to coordinate with Ameren for all the MV and building distribution work before commencing and while performing the work. This work will be closely coordinated with facility personnel and all other engineering trades and utilities present on site, before any building is taken off the existing system. In addition, other site utility upgrades are a part of this project, therefore this contractor shall to coordinate all work with owner, civil design and other site utility work on this project.

The drawings and design presented is not final product. The intent of these documents is not to describe or finalize design but rather to present a design approach requested by CDB to guide DBE. DBE responsibility to provide final design and construction with the approval of CDB. See S-E000, S-E101, S-E102 and S-E103 for more details.

The MV loop system is recommended to be installed as one complete system in one phase rather than breaking into several small phases in order to minimize power disruptions and site disturbance. Phasing plan will be needed to energize existing buildings new electrical distribution load from new MV system.

2.2 NEW MV SYSTEM 12.47KV:

A. New Utility Switchyard will consist of utility provided manual transfer switch between the two (2) existing utility 12.47kV feeds. Ameren will provide and install manual transfer switch. DBE to coordinate with Ameren for metering and grounding of services. The main switchgear construction shall be fused type and will be rated at 600 amp. DBE to provide lightning, surge, short circuit and ground fault protection for the main switchgear and provide grounding grid and testing holes as per Ameren and NEC 250. The main electrical switchgear shall have grounding ring around entire equipment with minimum of six ground rods ¾” x 10’ at each corner and midpoints along length. All grounding throughout the campus shall be bonded together.

Feeder from manual transfer will enter the main switchgear into the disconnect and will be metered in next switch gear bay. The load on each feeder going out shall be metered. Bay-7 shall have provision for future campus wide generator. The generator bay shall have all the interlocking and relays necessary for complete working system. DBE to coordinate with utility (Ameren Illinois-Roger Donaldson at, Office 217 221-0805, Cell-217 257-1516, email-rdonaldson@ameren.com).

All electrical equipment shall be mounted on reinforced concrete pad/footings to assure no frost heaving. DBE responsibility to provide concrete base to prevent heaving. it is highly recommended that new metal enclosed service switches are either housed in a pre-fabricated, weather proof enclosure or configured so the equipment has an enclosed operational area with safety clearances per NFPA 70/70E; all outdoor switch sections shall have heaters to avoid condensation and icing of the interiors and mechanisms; all switches shall have surge protection; all entry of equipment enclosures and operational switches shall be lockable via padlocks with broach protected key systems to meet the Using Agency (IVHQ) standards so the keys cannot be readily copied without authorization; all switches shall be capable of confirmation of switch positions.

Air or Vacuum Break Pad Mounted Sectionalizing Switches with Integral Fused Disconnects for Building Services; loop switches shall be 15kV/600A minimum and be gang operated, branch feed switches shall be 200A; DBE to finalize decision in coordination with owner for open switch in the loop. Mechanism needs to be provided in order to protect closing of open switch mistakenly. Switch bases shall be corrosion resistant stainless steel to avoid corrosion at the base; all switches shall be capable of confirmation of switch positions either visibly or by mechanical indicator; all switches shall have surge protection; .

Duct banks shouldbank system shall include a minimum of (2) 5” (for 12.47KV system(1+1 spare) and (4) 5” (for communication system)(2+2 spare), PVC schedule 40 encased in reinforced concrete and be supported and spaced using conduit support/spacers; inter duct separation shall be provided in four communication ducts. See S-E101 for more details. Duct bank system shall be installed as per NFPA 70/70E.

For long life and ease of future changes, pre-cast concrete manholes are the preferred pull boxes for cable directional changes or routing to pad mounted switches and transformers or to building unit substations; manholes MUST be sized larger than minimum provided in NFPA 70 – NEC to allow for future entries from all sides of the box; suggested minimum of 4’ x 7’x 7’D but sizing may be larger to accommodate large duct banks for distribution from the main service switchgear; manhole covers/collars for entry should be no smaller than 36” diameter; cable pulling rings should be standard; sump holes should be provided directly beneath and vertically aligned with the manhole cover to allow a portable submersible pump to be lowered for removal of water prior to entry; cable supports should be provided on all sides and coordinated for each manhole based upon duct/cable entries. DBE to provide hand holes and coordinate with IT consultant for the requirements of communication handholes. Handholes shall be sized as per IT consultant requirements and shall be installed as per NFPA 70/70E.

MV cable should be shielded EPR type, copper, MV-105 (133%) to assure long life and performance. All switches and transformers shall be provided with a ‘ground ring’ with a minimum

of two (2) corner located driven ¾"x 10' ground rods and shall be bonded to the ground conductor of the distribution system to assure a common ground potential field due to the open campus space being subjected to induced lightning voltage surges; all medium voltage circuits shall include a copper ground conductor connected to the grounding electrode system at the new main campus service switchgear.

All equipment and cabling will be tested to Inter-National Electrical Testing Association Maintenance Testing Standards (ANSI/NETA MTS) using an approved method to provide a 'baseline' for future maintenance testing; it is highly recommended to use testing other than DC High Potential so the data can be tracked over time; a suggested alternative for cable testing is Very Low Frequency AC (VLF) Insulation Resistance in conjunction with VLF – Tangent Delta (VLF-TD) to create a baseline for future maintenance testing; equipment testing should follow NETA standards for medium voltage equipment acceptance.

2.3 EXISTING BUILDING ELECTRICAL SERVICE

A. DBE to replace all the existing obsolete panels keeping safety and operation in mind and in order to make the existing buildings distribution compatible with new proposed system. The existing buildings distribution will be replaced to be compatible with 277/480 V system. See sheet S-E103 for work needed to be done in each building. DBE to provide final sizes for all the buildings switchgears. The intent of this drawing is to provide approach to upgrade the existing obsolete and hazardous electrical system. All the main switchgear of the existing buildings will need to be replaced with new in order to provide 277/480 V service, unless 120/208 V system is needed in some buildings. DBE to provide new grounding for each building transformers, switchgears and electrical panels as per NEC 250. Each building has to be connected to the new 12.4kV system. All work on this new electrical loop has to be closely coordinated with other new and existing utilities on the campus. Metering shall be provided on all switchgears. DBE to provide new lighting fixtures, lighting panel, power panel and lighting controls for open auditorium.

DBE shall be responsible for the demolition work planned for buildings and tunnels including Neilson building. Coordinate with architecture drawings for the scope of demolition work. DBE shall be responsible for electrical work require to refeed normal and emergency power to buildings and site lighting disturb due to demolition. New lighting and receptacles shall be provided in new tunnels and utility corridors.

2.4 LONG TERM CARE BUILDING:

A. Main Switch gear:
The electrical service for new building will be fed from the new medium voltage distribution system to an outdoor transformer and will be fed to new 277/480V, 3 phase main switchboard. Sizing of a new main distribution/service switchboard will be DBE responsibility. Main switch board bus shall be design accommodating the solar load. Power for 120/208V will be furnished via dry-type distribution transformers (copper winding) to step down voltage from 480 V. 120/208V power will be provided for receptacles and equipment and systems which require 120/208 V power. Mechanical equipment for heating and ventilation and lighting will typically be at 480V/ 3 phase. 480V, 3pahse will be design for anything above one (1) horsepower (HP) motor. Fractional HP equipment will be either 120/208V single or three phase.

B. Electrical Building Distribution:

All distribution systems should include arc fault labeling based upon code required analysis per NFPA 70E – National Electrical Safety Code (current). All distribution should be designed with overcurrent device selective coordination and where required by NFPA 70, ground fault protection. If the ground fault protection is required by NFPA 70 based upon size and voltage of the service then an additional level of ground fault protection shall be provided as noted in NFPA 70-517. DBE to provide adjustable trip type breakers for all feeder breakers.
All feeders shall be made of copper. All motor controls should be NEMA type. All wiring devices should be heavy duty commercial grade. ESS sourced receptacles shall be identified by red devices and cover plates. Resident room bed headwall should have a minimum of four (4) duplex receptacles of which two (2) shall be sourced from the ESS. DBE to separate emergency and normal power as per NEC 700 and 517. DBE to coordinate with IT/security/system drawings for their requirement for power, conduit, conductors and boxes. DBE to coordinate with IT drawings for Floor boxes requirement, shall provide receptables, boxes, conductor and conduits in those location. DBE to coordinate with laundry, kitchen drawings for their requirements of power. Advance metering shall be provided as per LEED **v4 – 4.1 BD+C NC E&A Advanced Energy Metering** requirements and goals. Electric Car charging in parking shall be provided as per **LEED v4 – 4.1 BD+C NC Location and Transportation: LTc8**: **Electric Vehicles** requirements and goals. DBE to provide fire pump disconnect/controls installation as per NEC 695. Complete Lightning protection System will be provided on roof which shall include dedicated grounding system and shall be installed as per NFPA 780 and UL 96&96A.

C. Essential Electrical System:

Provide a new Essential Electrical System (ESS) which complies with NFPA 70- National Electrical Code (2011), NFPA 110- Standard for Emergency and Standby Power Systems (2012) and NFPA 101 – Life Safety Code (2012). The ESS will meet the NFPA 110 and NFPA 99 requirements for Level 1, Type 10, Class X system (two branch – life safety and equipment. See Single Line Diagram for more details. 96 hour fuel supply will be needed for generator operation as per code and IDPH. DBE to provide final sizing for generator. DBE to provide remote shunt trip and all fuel management controls as per NFPA 70/110. LTC will be category 2 and type 2nd EES as per NFPA 99 and NFPA 70. DBE to provide time delay in seconds for heavy loads such as chillers, AHU and pumps. Time delay sequencing shall be done by providing signal from ATS to breaker of the equipment and by tying up to building automation. Sequence shall be done with the coordination of owner and mechanical engineer. Generator shall be approved for hospital applications and shall have features for fuel efficiency, air cleaner, advanced short circuit capability, EPA, CSA, IBC, NFPA and UL certified etc. DBE to coordinate with all trades for emergency power requirements for equipment. Walk in cooler, freezer, exhaust fans, make up unit, and fire suppression system need to be on emergency power. Coordinate with kitchen consultant for emergency power requirements.

LIFE SAFETY BRANCH		AMPS	KVA	NOTES
EGRESS, EXIT SIGN LIGHTING		48.1	40	
FIRE ALARM, MEDICAL GAS ALARM ETC		3.6	3	
LIGHTING DINING, CHAPEL		6.0	5	
COMMUNICATION SYSTEM		1.2	1	
GENERATOR LOAD		0.6	0.5	
ELEVATOR LIGHTING, CONTROL, SYSTEM		1.2	1	
TOTAL		60.8	50.5	
EQUIPMENT BRANCH				
PATIENT ROOM LIGHTING		18.1	15	
PATIENT ROOM RECEPTACLE		60.2	50	
NURSE STATION RECEPTACLE		7.2	6	
SMOKE CONTROL AND STAIR PRESURRIZATION		0.0	0	
KITCHEN HOOD AND EXHAUST SYSTEM		72.2	60	
SUMP/EJECTOR PUMP		18.1	15	
TOTAL		175.7	146	
HEATING EQUIPMENT LOAD/HVAC	SHALL BE INCLUDED IN EQ BRANCH			
CHILLERS	TOTAL 3, 2 WORK AT A TIME, 200 TON	558	463.698	
PRIMARY PUMP	TOTAL 3, 2 WORK AT A TIME, 20HP	52	43.212	
FIRE PUMP	50HP	65	54.015	
SECONDARY PUMP	TOTAL 3, 2 WORK AT A TIME, 40 HP	104	86.424	
AHU EF, CD	TOTAL TWO, 438 AMPS EACH	876	727.956	
ACC	TOTAL 6, 4 WORK AT A TIME, 24.8 AMPS	99.2	82.4352	
BOILER	TOTAL 3, 2 WORK AT A TIME, 5 HP	5.2	4.3212	
PRIMARY HEATING PUMP	TOTAL 3, 2 WORK AT A TIME, 20 HP	52	43.212	
SECONDARY HEATING WATER	TOTAL 3, 2 WORK AT A TIME, 40 HP	104	86.424	
FANCOIL	TOTAL 210 ROOM, 1/2 HP EACH	124	103.044	
VACCUM PUMP	SINGLE, 10 HP	14	11.634	
MEDICAL GAS COMPRESSOR	SINGLE, 15 HP	21	17.451	
MEDICAL GAS SYSTEM	SINGLE	3	2.493	
ELEVATOR LOAD	2 ELEVATORS, 50HP	130	108.03	
IT COOLING GYCOL WATER PUMP	10HP	14	11.634	
IT COOLING CONDENSER FAN	12HP	18	14.958	
IT COOLING UNIT	76.5KW UNIT	115	95.565	
IT load		100	83.1	
Nurse call system		3	2.493	
Total		2457.4	2042.1	
TOTAL (ALL branch)		2693.9	2238.6	KVA
			1790.88	KW
	80% LOADING		2238.6	KW
			2250	KW

D. Lighting:

DBE to provide LED based networked lighting systems throughout the building. Corelated Color Temperature (CCT) tunable fixtures (color tuning-technique to adjust the color of the light fixture) shall be provided and shall be limited to a range of 2700°K to 6500°K for indoor lighting in patient rooms. Patient room fixture CCT shall be maintained as per schedule. Capability to control or override the patient room fixture CCT shall be provided at each nurse station. Overall color rendering quality should be limited to 80+ CRI (Color Rendering Index) or greater for all lighting. Lighting levels should be established per the Illuminating Engineer Society (IES) standards for senior living environment to assure adequate levels. Controls/dimming shall be provided in each patient room and all other areas as per Energy Codes and LEED requirements, See lighting sheets. General lighting for other than resident areas such as offices, toilets, storage and mechanical/electrical rooms should use fixed CCT of 3500°K with 80+ CRI to mimic a 'neutral' environment. Controls should include occupancy/vacancy sensing and dimming capability for all transient areas such as toilets, offices and corridors (per Energy Codes and LEED requirements). Daylighting harvesting with dimming and dimming controls will be needed in some windowed areas to meet the energy code requirements and LEED points. DBE to provide fixtures designed for particular areas. For example kitchen shall have sealable lens fixture to avoid fungus fertilization and for easy cleaning. All lighting shall fulfill requirements of LEED.

DBE responsibility to provide task lighting/egress illumination and emergency lighting necessary for recreational areas and dinning. DBE to provide pathway lighting to nearest parking and shall provide these lights on emergency power.

LEED- All lighting shall fulfill requirements of LEED v4 – v4.1 IAQ-Interior Lighting: Option 1: Lighting Control and Option 2: Lighting Quality. All lighting in the entire project shall be LED based. DBE responsibility to achieve two credits in LEED v4 – v4.1 Interior Lighting category.

E. Solar/PV:

Solar array will be provided to generate renewable energy to support building LEEDs goal. Renewable energy production shall be provided as per LEED **v4 – 4.1 BD+C NC E&A Renewable Energy Production** requirements and goals. Preliminary analysis is being shown, See sheet L-E701 for Solar Analysis for more details. Further analysis needs to be done by DBE to calculate exact generation and size. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than 97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

2.5 DOMICILIARY BUILDING –

A. Main Switch gear:

The electrical service for new building will be fed from the new medium voltage distribution system to an outdoor transformer and will be fed to new 277/480V, 3 phase main switchboard. Sizing of a new main distribution/service switchboard will be DBE responsibility. Main switch board bus shall be design accommodating the solar load. Power for 120/208V will be furnished via dry-type distribution transformers (copper winding) to step down voltage from 480 V. 120/208V power will be provided for receptacles and equipment and systems which require 120/208 V power. Mechanical equipment for heating and ventilation and lighting will typically be at 480V/ 3 phase. 480V, 3pahse will be design for anything above one (1) horsepower (HP) motor. Fractional HP equipment will be either 120/208V single or three phase.

B. Electrical Building Distribution:

All distribution systems should include arc fault labeling based upon code required analysis per NFPA 70E – National Electrical Safety Code (current). All distribution should be designed with overcurrent device selective coordination and where required by NFPA 70, ground fault protection. DBE to provide adjustable trip type breakers for all feeder breakers.

All feeders shall be made of copper. All motor controls should be NEMA type. All wiring devices should be heavy duty commercial grade. ESS sourced receptacles shall be identified by red devices and cover plates. Resident room bed headwall should have a minimum of four (4) duplex receptacles of which two (2) shall be sourced from the ESS. DBE to separate emergency and normal power as per NEC 700 and 517. DBE to coordinate with IT/security/system drawings for their requirement for power, conduit, conductors and boxes. DBE to coordinate with IT drawings for Floor boxes requirement, shall provide receptables, boxes, conductor and conduits in those location. Advance metering shall be provided as per LEED **v4 – 4.1 BD+C NC E&A Advanced Energy Metering** requirements and goals. Electric Car charging in parking shall be provided as per **LEED v4 – 4.1 BD+C NC Location and Transportation: LTc8**: **Electric Vehicles** requirements and goals. DBE to provide fire pump disconnect/controls installation as per NEC 695. Complete Lightning protection System will be provided on roof which shall include dedicated grounding system and shall be installed as per NFPA 780 and UL 96&96A.

C. Essential Electrical System:

Provide a new Essential Electrical System (EES) which complies with NFPA 70- National Electrical Code (current), NFPA 110- Standard for Emergency and Standby Power Systems (2012) and NFPA 101 – Life Safety Code (2012). See Single Line Diagram for more details. DBE to finalize the size of generator. DBE to provide remote shunt trip and all fuel management controls as per NFPA 70/110. Generator shall be approved for commercial applications and shall have features for fuel efficiency, air cleaner, advanced short circuit capability, EPA, CSA, IBC, NFPA and UL certified etc. DBE to coordinate with local authorities to make sure if we can have life safety load and other loads on same ATS since DOM is not healthcare building as per NFPA 99 and NFPA 70. Life safety wiring shall be separate from the other emergency loads. Branches shall be provided as per 701, 702 and legally required branch for life safety.

LOAD	DETAILS	AMPS	NOTE
ELEVATOR	ONE ELEVATOR ON EMERGENCY	65	ALL SIZES NEED TO BE FINALIZE BY DBE
FCU	80 units, 1/2 hp	52	
FIRE PUMP	50 HP	65	
LIFE SAFETY	LIGHTING AND RECEPTACLE	25	
IT LOAD		50	
GENERATOR LOAD		3	
	TOTAL AMPS	260	
	TOTAL KVA	216.06	
	TOTAL KW	172.848	
GEN SIZE (80% LOADING)		216.06	
FINAL GEN SIZE KW		225	

D. Lighting:

DBE to provide LED based networked lighting systems throughout the building. Overall color rendering quality should be limited to 80+ CRI (Color Rendering Index) or greater for all lighting. Lighting levels should be established per the Illuminating Engineer Society (IES) standards for senior living environment to assure adequate levels. Controls/dimming shall be provided in each patient room and all other areas as per Energy Codes and LEED requirements, See lighting sheets. General lighting for other than resident areas such as offices, toilets, storage and mechanical/electrical rooms should use fixed CCT of 3500°K with 80+ CRI to mimic a 'neutral' environment. Controls should include occupancy/vacancy sensing and dimming capability for all transient areas such as toilets, offices and corridors (per Energy Codes and LEED requirements). Daylighting harvesting with dimming and dimming controls will be needed in some windowed areas to meet the energy code requirements and LEED points. DBE to provide fixtures designed for particular areas. For example kitchen shall have sealable lens fixture to avoid fungus fertilization and for easy cleaning. All lighting shall fulfill requirements of LEED.

DBE responsibility to provide task lighting/egress illumination and emergency lighting necessary for recreational areas and dinning. DBE to provide pathway lighting to nearest parking and shall provide these lights on emergency power.

LEED- All lighting shall fulfill requirements of LEED v4 – v4.1 IAQ-Interior Lighting: Option 1: Lighting Control and Option 2: Lighting Quality. All lighting in the entire project shall be LED based. DBE responsibility to achieve two credits in LEED v4 – v4.1 Interior Lighting category.

E. Solar/PV:

Solar array will be provided to generate renewable energy to support building LEEDs and NET Zero Energy goals. Renewable energy production shall be provided as per LEED **v4 – 4.1 BD+C NC E&A Renewable Energy Production** requirements and goals. Preliminary analysis is being shown on sheet D-E701 for Solar Analysis for more details. Further analysis needs to be done by DBE to calculate exact generation and size. DBE responsibility to find and coordinate with agencies which

can help in funding the project. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than 97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

2.6 NEILSON BUILDING-

A. The electrical service for building will be fed from the new medium voltage distribution system to an outdoor transformer and connect to new 277/480V, 3 phase panel board. Sizing of a new main distribution/service switchboard or panelboard will be determined during the design. Power for 120/208V will be furnished via dry-type distribution transformers to reduce voltage from 480V/ 3 Phase. Renovation of kitchen and mechanical space is being anticipated at this stage. Electrical panels related to this renovation will be replaced together with all wiring and power requirements for equipment. Emergency power will be provided from the existing generator sources for freezer and coolers. LED Lighting and controls will be provided in renovated areas, including egress lighting. Fire alarm devices will be provided where required and will be tied to existing fire alarm panel. See architect sheets for the scope of work.

2.7 SITE LIGHTING -

A. New LED lighting fixtures will be provided. Lights will be fed from distribution panelboards in nearby building throughout the site as needed. New poles will be provided in new areas. Site lighting shall be provided as per **LEED v4 – 4.1 BD+C NC SS Light Pollution Reduction** requirements and goals. DBE to refer to site lighting narrative of landscape consultant for the scope of site lighting. DBE to provide all the material and services needed for complete pole lighting system. New lighting panel will be required in auditorium.

2.8 FIRE ALARM SYSTEMS:

A. Long Term Care Building:

DBE to provide a new simplex 4100ES addressable fire alarm system per NFPA 72 – National Fire Alarm & Signaling Code and as required by 38CFR – Ch. 1, 59.130 (DVA), 42 CFR 483.90 (CMS) plus state and local regulation. Smoke/CO detection, indication and notification with addressable devices will be provided as per codes and LEED goals. Connect the new fire alarm to existing fire alarm HUB and network. DBE to provide door closers and LED indicator in above each patient room, and, annunciator panel at each nurse station. DBE to provide door closers in some recreational areas. DBE responsibility to provide door holders as per the requirements, coordinate with mechanical and Life safety drawings.

B. Domiciliary Building:

DBE to provide a new simplex 4100ES addressable fire alarm system per NFPA 72 – National Fire Alarm & Signaling Code and as required by 38CFR – Ch. 1, 59.130 (DVA), 42 CFR 483.90 (CMS) plus state and local regulation. Smoke/CO detection, indication and notification with addressable

devices will be provided as per codes. Connect the new fire alarm to existing fire alarm HUB and network. DBE to provide necessary ADA requirements in each resident room as per IDPH and Illinois accessible code 2018. (see fire alarm general note)

C. Incentives & Rebates:

DBE to coordinate with Ameren and other agencies for the incentives in lighting, power and solar power. DBE responsibility to fulfill the design and other requirements in order to get maximum incentives as per program for lighting, power and solar. Incentive programs and their requirements change every year. Incentive program available as of now are for lighting (Ameren), HVAC (Ameren) and energy efficient smart appliances (Ameren) and solar (Solar for Illinois). DBE responsibility to find such programs and apply through respective agencies.

3. BETTERMENT PLANS:

3.1 WHOLE CAMPUS FIRE ALARM UPGRADE:

A. DBE to upgrade existing addressable fire alarm system (14) 4010 panels to 4010ES panel. Upgrade existing addressable fire alarm system (6) 4100 panels to 4010ES panel, (10) 4100U panel to 4100ES panel. Upgrade existing addressable fire alarm system (1) 2001 panel to 4007ES panel. 4100U panels can be upgraded to 4100ES by upgrading new motherboard. All the other upgrades will need panel replacement. Upgrade all the fire alarm system to have fiber optic compatibility. New card in each panel will be required to provide optic fiber communication. New computer and new communication card in HUB equipment system will be required for HUB upgradation. Upgrade Fire Alarm systems to comply latest NFPA 72 – National Fire Alarm & Signaling Code and as required by state and local codes and regulations. Note: Some existing buildings may have an addressable fire alarm which should be vetted to confirm the viability of upgrading/expanding system. DBE to make Long term care building as a new HUB by providing new fire alarm system in long term care and domiciliary building and other required equipment. Utilizing existing hub equipment if they are up to date. Connect all the new fire alarm panels to existing fire alarm HUB and network.

3.2 ON-SITE SOLAR PV ARRAY:

A. DBE to provide solar array to support and exceed net zero goal of DOM. Location for solar PV shall be roofs of Neilson and Lippincott. DBE to provide modifications to roof if needed in order to maximize area for the solar panels. Another location shall be parking lots. DBE to provide proper structure over the parking areas to support solar panels. Ground mounted dual axis solar tracking type panels shall be provided on remote ground. DBE to coordinate with owner for finalizing the locations. DBE responsibility to find and coordinate with agencies which can help in funding the project. As an example preliminary analysis shows approx. 307 sqm area can be covered on Lippincott roof with PV panels. These panels will be able to generate 63,989 KWH/yr or 218,330,468 BTU/yr and will be tied to DOM solar array system. DBE to provide final analysis for size and placement. See architect sheet for location. Solar panel efficiency shall be greater than 21%. DBE to use most efficient panels available at the time of construction. Warranty shall include material and performance for at least 20 yrs. Electrical equipment shall be rated for solar use and UL listed. All equipment warranty shall be at least for 10 yrs and shall have efficiency of more than

97%. All cables/wiring (PV wire) shall be approved by UL for solar application. DBE responsibility to find and coordinate with agencies which can help in funding the project.

SOLAR (LIPPINCOTT)			
TYPE	TOTAL NUMBER	PANEL	AREA SQM
A (4 PANEL FAMILY)	48	4	307.2
B (2 PANEL FAMILY)			0
C (1 PANEL FAMILY)			0
		TOTAL AREA	307.2
		TOTAL KWH/YR	63989
		SYSTEM SIZE KW	48.6
		BTU/YR	218330468
		$2 COST	97200
		$3 COST	145800

3.3 WHOLE CAMPUS-WIDE GENERATOR:

A. DBE to provide and size campus wide generator. Provision to connect generator is being provided in MV switchgear. Manual Switch to be provided in order to connect the generator power to MV switchgear. DBE to size campus wide generator by developing scheme utilizing existing Fifer 125KW generator, new DOM and LTC generator. DBE to pick-up all the loads left by existing and new ATS in these three building and the site loads. Campus wide generator goal can also be achieved by providing larger generator (larger than the size mentioned in dwgs) to pick all the loads in DOM and LTC and then sizing the campus generator excluding the DOM, LTC and Fifer loads. In general, DBE to provide options to owner to cover the entire campus by utilizing DOM, LTC and Fifer generator. A complex scheme of controls will be required to implement the desire design. It would be economical to utilize existing and new generator (DOM and LTC) instead of providing a whole new 4000kw4000KW generator. DBE to provide and size generator manufacturer recommended load bank in order to test the generator as per standards. DBE to coordinate with owner for location and size.