**CU Denver | Anschutz Medical Campus “LESSONS LEARNED” 10.4.19**

**Intent:** Pre-emptive discussion of lessons learned from other building projects. Need to discuss and document design decisions and construction approach for new buildings on the items listed below.

**General Building Information:**

1. Review outside air intake and air mixing and preheat to avoid nuisance trips of freeze stats. Confirm building is truly designed to -10F (-20F for 100% outside air systems) (see Campus Standard, **Appendix A**). Need to make sure design is ok and need to make sure the submittal process doesn’t undo design intent. Discuss QC during construction.

2. Engineering criteria: Confirm capacities in HVAC, electrical systems etc. duct static, exhaust and supply capabilities. (has altitude been considered on all equipment, confirm that all duct supply and leakage and testing will occur during construction. Discuss excess capacities in systems.

3 Capacities Section: Review what commissioning agent has checked in design process i.e. HVAC capacities (heating, cooling) electrical etc. Review scope of commissioning during construction.

4. Has Siemens control sequences been developed and finalized? Do we have it on UPS for Siemens panels?

5. Review how potential freezing and uncomfortable conditions near dock are being addressed. Review insulation (min R19) and temperature control at dock doors.

6. Have exhaust air entrainment issues been addressed?

7. Fire alarm sequences ok? Make sure buildings on the Anschutz medical Campus are tied to Building 407 Police Dispatch. Make sure the police can general announce to all of the buildings on campus. Verify the requirements for buildings on the Downtown Campus.

Use a “.wav”(sound Bite file with a female voice) supplied by CU Denver Fire Alarm tech with the following wording for the entire \_\_\_\_\_\_ building.:(Applies to high rise buildings only)

*"A fire alarm has been detected on the \_\_\_ floor. Remain alert and evacuate if there are indications of fire. If no danger is noted, you may await further instructions. Elevators have been recalled to level 1 until fire alarm is over."*

8. Review automatic lighting controls sequence also talk about how public and entry space lighting is controlled (see CU Denver Standard 26 09 43 – Network Lighting Controls, **Appendix B**)

9. Supply/Exhaust duct static – are we ok?

10. Automatic transfer switches and functions of switch to emergency power. Do we have a simple straight forward process?

11. Exterior lighting is it adequate for entrances and for entire site and from adjacent library site?

12. Water quality: fixtures, (low lead), domestic water testing during construction, define tests and certifications.

13. Special systems requiring ongoing 3rd party vendors. How are they designed? Coordinate the system (i.e. central CO2 system)

14. Review Elevator control system and maintenance tool (see standard excerpt below, **Appendix C**)

15. Do we have demand control ventilation per ASHRAE 62 (i.e. monitoring CO2)? Explain how it works on this project.

16. Have we looked at life cycle cost of VE items that we had already taken that might have a high life cycle cost.

17. Open Gratings at the duct shafts, at a minimum of every other floor. Also need safety systems.

18. Need to have an occupancy turnover procedure, the occupancy TCO permit is not the same.

19. Need to have the IT rooms ready early so that security can be installing prior the drywall.

20. Do not put electrical transformer and switches in planted areas as the we have experienced outages when plant material grows into the equipment.

21. Curtain Wall covers that are not mechanically fastened are likely to come loose. Mullion covers that are not flush and deep sections need extra clips and screws to keep them from coming loose over time. Look at the fixes for Research 1 and Research 2.

22. Make Flooring choices that are very durable, easy to clean, and do not discolor. Avoid light colors and porous stone on stairs and hallways. Do not pick light color solid carpet colors and specify darker colors with a significant pattern

**Laboratory/research Building Information:**

1. Avoiding Fume Hood Alarm Failure**:** identify brand and durability and function of fume hood alarm.

1. Confirm 20 AMP dedicated single outlets on emergency circuits in linear equipment corridor. Confirm that outlets are red and labeled as emergency. Confirmed housekeeping outlets are clearly marked and on opposite side of hallway. Confirm remote monitoring system is in place for the linear equipment corridor and for temperature sensitive equipment.

3. Confirm that all drainage pipes in basement and in walls leaving lab spaces is acid waste type pipe to avoid damage from an accidental acid spill.

4. How has preventing food in labs been addressed?

5. Need to have a testing sequence for eyewash and showers to make sure the flow rate is appropriate (sometimes shoot to the ceilings). Also verify that the showers are monitored by the Siemens system.

**Appendix A**

Item 1 – General Building Information

Excerpt from Campus Standards (23 00 00)

1.2 System Design Requirements

I. Air Handling Devices

5. Use the following design temperatures for heating and air conditioning systems:

* + - * 1. Winter:

Outside air temperature: -10 degree F. outside air temperature. For 100 percent outside air systems use -20 degree F.

Inside air temperature: 72 degree F.

Wind velocity: 15 mph.

* + - * 1. Summer:

Outside air temperature: 100 degree F dry bulb, 59 Degree F wet bulb for systems with OSA economizers or 100% OSA Systems, otherwise 95/63.

Inside air temperature: 72 degree F dry bulb, 63 degree F wet bulb.

Air cooled condensers and dry coolers: 105 degree F.

Wind velocity: 8 mph.

* + - * 1. Discuss special room requirements with UCD Project Manager

**Appendix B**

Item 8 – General Building Information

Excerpt from Campus Standards - Network Lighting Controls (26 09 43)

2.2 SYSTEM REQUIREMENTS

A. Provide windows graphic user interface for programming and status of lighting control system.

B. Reports: Energy performance reports shall be printable in a printer friendly format and downloadable for use in spreadsheet applications, etc.

C. Interoperability: Control module shall be configured to connect to a BACnet-compliant network, resulting in extending control to any network-compliant devices such as occupancy switches.

D. Load Shed Mode: An automatic load shedding mode shall be available where, when activated through the System, the control unit will reduce its output to a programmable maximum electrical demand load. The System shall not shed more load than required and load shedding priority shall be centrally configurable by light fixture. The individual user shall retain the ability to override System light levels.

E. Emergency Mode: There shall be a mode, when activated through the System, that will immediately adjust lights to full light output and retain that level until the mode is deactivated. This setting shall override all other inputs. The System shall interface with the building emergency monitoring system at a convenient point and not require multiple connections.

F. Addressing: I/O Modules shall be centrally addressable, on a per fixture basis, through the software. To simplify installation and maintenance, the System shall not require manual recording of addresses for commissioning or reconfiguration.

G. LAN Operations: System shall operate independently of building’s existing network infrastructure and shall not rely on tenant supplied PCs for operation. Network infrastructure shall only be utilized for software. Manufacturer must provide software to facilitate communications. Manufacturer shall provide connection from the PC running energy management and lighting control software to the System communication bus.

H. Firewall Security: System firewall technology shall maintain network security.

I Re-configurability: The assignment of individual fixtures to zones shall be centrally configurable by software such that physical rewiring will not be necessary when workspace reconfiguration is performed. Removal of covers, faceplates, ceiling tiles, etc. shall not be required.

**Appendix C**

Item 14 – General Building Information

Excerpt from Campus Standards - Elevators (14 20 00)

2.1 MATERIALS, GENERAL

A. Control System

1. Maintainable control with common features such as Independent Service, Fire Fighters Service, and Emergency Power Operation.

2. Provide a microprocessor-based controller installation that is able to be maintained by any licensed elevator maintenance company without the need to purchase or lease diagnostic devices or special tools or software from the original equipment manufacturer.

a. Controller shall include diagnostic capability to monitor, store and recall elevator malfunctions. Controller or provided diagnostic tool shall have the ability to complete all code mandated tests. Controller shall have on-board, or provided diagnostic tool, shall enable field programmable features such as adjustable door times and other industry standard and appropriate features and adjustments. Controller or provided diagnostic tool shall retain system errors and trouble codes for use in diagnosing trouble calls.

b. Manufacturers of elevator control systems may provide their own controllers as long as they include full diagnostic tools over the lifetime of the building without restrictions, recalibrations, or lease agreements.

3. Provide security interface with building security system. Access shall be dictated by building security access; elevator contractor shall provide necessary interfaces for access and tracking of floor(s) selected. Interface shall be provided via serial interface link.