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Diocese of Cleveland Facilities Services Corporation

Basis of Design & Design Intent Documents

This past July in the Asset Management column of *Focus on Facilities* we discussed **3rd party commissioning of building systems.** Our topic for September herein is to extend that discussion to the creation of a building program's "Basis of Design" (BOD) document, which is an integral first step in the design phase commissioning process. We will also address another commissioning requirement titled the "Design Intent Document" (DID) document along with the "Owner's Project Requirements" (OPR) document. Together these three documents chart the course for a successful building program beginning in the design phase proceeding to the construction phase and finishing up in the building project's warranty phase.

When a building owner, institution, or state or local community decide on a building need, whether it be new construction or renovation, a building program will be drafted. This building program will explain, justify, and/or specify the OPR. With a design team selected to work with the owner, owner representative, or building committee this OPR will be fine-tuned. Quite often the team will add a 3rd party commissioning agent who may also participate in the fine-tuning of this OPR. This must be completed prior to the project design beginning and ideally after the commissioning agent has joined the project because commissioning should begin in sync with the OPR document and before the design phase.

The OPR shall include the project intent, document requirements, goals, budget, timeline, and many other tasks necessary to facilitate a successful project. Additionally, in this phase the initial commissioning plan, training requirements, and systems operation and maintenance (O&M) manuals will be outlined. The commissioning agent will often lead the OPR development and will continue this responsibly assisting the design phase and construction phase and often into the warranty phase. Following the OPR documentation, the design team will develop the BOD documents again probably being led by the commissioning agent.

This BOD document will be a well-defined criteria that consists of statements that will be confirmed via inspection, testing, and verification outlined in the plans to design the project according to the OPR. After owner approval of the BOD during the design process, the commissioning agent assists with input on testing procedures, acceptance criteria, and other commissioning requirements for the design package that will become the contract documents used to solicit contractor bids and to build the project. This second document basically records the thought process and assumptions behind the design decisions being made to meet the OPR. It also provides specific criteria to confirm OPR success. These two documents will be updated as necessary as the project progresses through design and into construction.

The BOD will be written to focus on the general design objective such as energy efficiency, occupant comfort, indoor air quality, sustainability, etc. at a higher level of description abstract to the DID that will be written in

more detail such as HVAC sequences of operation, O&M requirements e.g., O&M manuals, emergency planning, etc. and energy budget to mention five DID specifics.

The BOD records the general building expectations, performance criteria and special requirements as they relate to space, site, and technical design elements. It may be a series of narratives and lists of individual items that will support the DID by documenting the providing system descriptions and how each description will function. It leaves the more detailed project information and calculations for the design, construction, commissioning, and operation of the building to the DID and the contract bid document design criteria that provide specific data to purchase the equipment and materials and to build the project. These last details that make up the contract specification and the construction drawings will all be developed by the design team later in the Design Phase. The BOD criteria is also not intended to be a substitute for the owner's regulatory or code requirements, standards and guidelines, or detailed project goals.

The details of the BOD will be fluid and dynamic and increase in detail as the design progresses. In the beginning, the documentation required will be primarily a narrative of the building system descriptions, the purpose of the systems, how the systems will meet those requirements, and why this system, or that method, was chosen above others. As the design progresses, this document will begin to bond with the DID documentation that will include specific description of the system(s) and components, its function, how it relates to other systems, sequences of operation, and operating control parameters.

The DID document will identify more specific goals and expectations such as:

- Aesthetics and architecture
- Building information modeling (BIM)
- Design methodology
- Energy analysis
- Etc.

These goals, as well as many more depending on the project are examples that contribute to a DID draft that will be detailed narratives of how the aesthetics of the surrounding landscape will blend with the building itself. BIM computer generated contract drawings will be layered so O&M management can use these drawings as part of their building management role. Design methodology could require acoustic levels within classrooms to be 35 NC sound level and energy analysis may set the maximum cooling system performance at a certain Tons per Square Foot to be no more than 500 SF/ Ton. The DID will also highlight other more detailed parameters associated with the building program, the OPR, and the BOD. It is important to note that just like the BOD, the DID is not to be so detailed that it would overlap or duplicate, the actual "design criteria" documented in the contract bid specifications and drawings e.g., chiller selection at 0.61 kW per ton, 45F chilled water supply, 58F chilled water return, etc.

For more information on BOD and DID an asset manager, owner representative, etc. are directed to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers ASHRAE Guideline 0-2019, The Commissioning Process. This presents best practices for applying whole-building commissioning to facilities and can be applied to all phases of new construction and renovation processes to provide a uniform, integrated and consistent approach to commissioning.

ASHRAE Standard 202-2018 Commissioning Process for Buildings and Systems is a second document to also assist in providing direction and assistance when drafting the BOD and DID documents. Setting out on a successful building program requires research or refresher in useful guidelines and standards to assist the building program team to establish the OPR, BOD, and DID that will become the roadmap to reference as the project moves through the design phase to the construction phase and its closeout process, and then into the warranty phase. This process will ensure that the building being built or renovated will achieve the goals set at the start of the job.

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