

The COBie Guide:

a commentary to the NBIMS-US COBie standard

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EXECUTIVE SUMMARY

The Construction-Operations Building information exchange (COBie) format is the international standard for the exchange of information about managed facility assets. COBie does not add new requirements to contracts; it simply changes the format of existing deliverables from paper documents and proprietary formats, to an open, international standard format.

While COBie provides the format for the exchange of required asset information, it does not provide details on what information is to be provided when, and by whom. This Guide provides best-practice guidelines for these requirements. This Guide can be considered the “commentary” that accompanies the COBie format specification.

To use this guide, customizations reflecting regional practices, specialized project types, and client’s requirements should be documented in Appendix A. The correct application of the COBie Guide may then be reference directly in appropriate specifications.

As of 2012 over twenty commercial software products support COBie. These products cover the entire facility life-cycle from planning, design, construction, commissioning to operations, maintenance, and space management. Software implementers will find the information in Appendix B helpful for low-level mapping of required properties.

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DRAFT

1 INTRODUCTION

Building Information Modeling (BIM) technology has demonstrated its ability to reduce overall project cost through the identification of physical conflicts between building components prior to construction. Resolving such issues during design eliminates expensive tear-out and rework during that would have otherwise occurred during construction. The use of BIM for geometric collision detection has been the starting point to understand the potential use of building information.

The buildingSMART alliance³ has begun to unlock the non-geometric information content in BIM through the standardization of contracted information exchanges that will eventually replace the paper-based document exchanges currently specified by contracts. The goal of these standards is to provide the required information content when created, and securely share and update specified portions of that information with authorized team members as the project proceeds.

Rather than producing wasteful paper documents whose content is impractical to extract, multiple times during a facility life-cycle, standard information exchanges streamline current process to eliminate waste and increase profitability. The first of these standards, the Construction-Operations Building information exchange (COBie⁴) delivers facility asset information. These assets are simply the scheduled equipment, products, and spaces that appear on design drawings.

Readers unfamiliar with COBie should begin by watching the following two on-line presentations:

- Class 1. Overview⁵
- Class 2. How To⁶

It is assumed that readers of this document have viewed these two on-line presentations.

2 PURPOSE OF THIS COBie GUIDE

The purpose of this Guide is to identify the requirements of COBie deliverables for design and construction contracts. This document is not a software user manual.

There are two parts to this document. First are common requirements to be met regardless of client. The second part is the set of client-specific requirements that must be met in addition to the general requirements. Client-specific requirements may be found in “Appendix A – Owner’s Requirements.”

³ buildingsmartalliance.org A Council of the National Institute of Building Sciences.

⁴ wbdg.org/resources/cobie.php The COBie homepage.

⁵ youtube.com/playlist?list=PL9E7A408B074B90C9&feature=plcp COBie College. Class 1. Overview.

⁶ youtube.com/playlist?list=PL9703BB3F0E9EACA9&feature=plcp COBie College. Class 2. How To.

There are over twenty commercial off the shelf software products that support the production and/or consumption of building asset information through COBie. Instructions on using these systems to produce or consume COBie data must be obtained directly from the software company.

The results of independent software testing conducted by the National Institute of Building Sciences are documented on the COBie Means and Methods web page⁷. Given the differences in software configuration and version, those producing or consuming COBie deliverables using commercial software solutions should conduct their own test using any one of three common test models⁸.

3 THE COBie PROCESS

The process of creating COBie deliverables follows the same processes used in today's design and construction. COBie simply transforms the information provided in paper documents into information that can be re-used through the project. The figure below summarizes the COBie process.

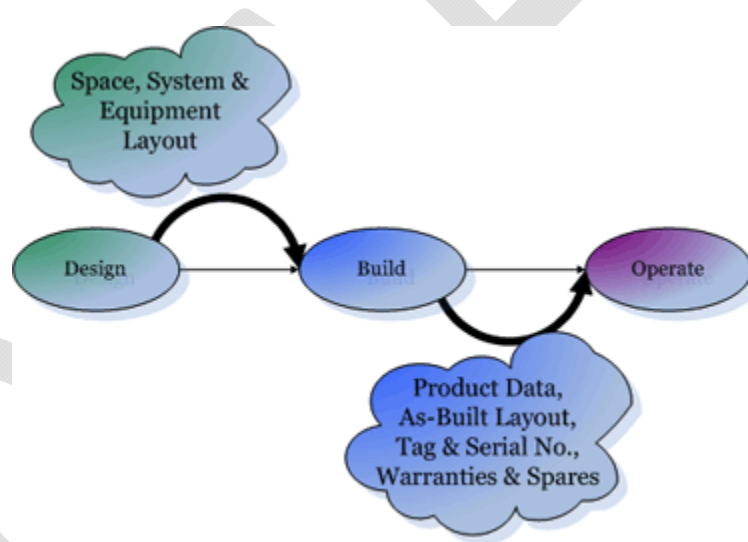


Figure 1. COBie Process

During early design, Architects develop the spaces and groups of spaces needed to support the activities required by the owner program brief. This information is delivered through the Schematic Design drawings. COBie delivers the subset of the Schematic Design information related to spaces, zoning, and “room data sheets.” Schematic Design stage COBie information is used to verify that the facility being designed meets the owner’s program brief. Since COBie is an extract from the Schematic Design deliverables, the information in COBie data files must match

⁷ buildingsmartalliance.org/index.php/projects/cobie The COBie Means and Methods page.

⁸ buildingsmartalliance.org/index.php/projects/commonbimfiles/ The Common BIM file page.

the information about spaces and architectural products and schedules found on Schematic Design submittal.

As the design nears completion, Engineers design the systems that deliver the required services, such as electricity, water, appropriate temperature, fire protection, security, etc... to allow the activities to take place. This information is delivered at the Construction Documents design stage. In addition to the updated architectural information, COBie delivers the subset of the Construction Documents information related to the product and equipment assets that will ultimately be managed by the owner. This asset information is found in the design drawing's equipment and product schedules. Since COBie is an extract from the Construction Documents Design deliverables, the information in COBie should be a perfect match for the printed on the drawings from that deliverable.

During construction, the generic asset information found in the Construction Documents stage is filled-in to provide the COBie construction deliverables. A COBie submittal prior to Beneficial Occupancy allows the facility manager to begin efficiently operating their facility upon occupancy. A COBie As-Built submittal is also provided to reflect all final changes and as-built conditions. During construction this information is linked from other sources such as documents containing approved submittals, warranty certificates, etc... As a result construction information may be gleaned directly from electronic submittal records. Other information, documenting the specific installation and testing of equipment, includes some specific information such as serial number and installation dates for every major building asset. The resulting data set is no more, or no less, than a set of Operations and Maintenance Manuals that can actually be used by operations, maintenance, and asset management personnel.

Following the delivery of facility asset, maintenance and operations information the owner will load this information directly into their COBie compatible maintenance management system and immediately begin the efficient operation of that facility. Updates to COBie data resulting from work orders should be documented directly in next-generation maintenance management systems. Results of renovations simply update that subset of existing COBie data with the changes coming from the renovation project.

4 The COBie BUSINESS CASE

The delivery of COBie is not a new requirement. COBie, from the designer's side, is simply a report from the existing design of the assets to be delivered. COBie, from the contractor's side, transforms current paper deliverables into data to operate the facility. Participants on projects requiring COBie can create the deliverables in the same way as they produce the current paper documents, or use this new format as an opportunity to eliminate wasted time and effort associated with the production of after-the-fact, error-prone paper documents. In this view, COBie is the direct application of "lean" methodologies to eliminate non-productive waste in administrative contracting procedures.

Here is one example where current process can be transformed, with the right set of technologies, to eliminate wasted effort associated with the production of paper Operations and Maintenance Manuals. This current labor intensive process to create O&M Manuals includes a physical “job crawl” to collect equipment nameplate information followed by man-months of collation of existing documents into O&M binders. The contract may also elect to capture electronic submittals and installation information as they occur and reduce their cost.

The National Institute of Building Sciences is developing a COBie Calculator that will provide a life-cycle review of the cost of such waste and the savings that may be achieved. When published in January 2013, the COBie Calculator and associated reports may be found through the Whole Building Design Guide’s COBie homepage⁹.

5 TEAM RESPONSIBILITIES

During the course of a project, different team members have primary responsibilities to create COBie deliverables. Given that many teams will use Building Information Modeling tools, particularly during the design stage, to create the required contract drawings, the identification of COBie responsibilities should be explicitly included in the team’s **BIM Execution Plan**.

One tool that can assist teams in identifying responsibilities with respect to the production of COBie deliverables is the COBie Responsibility Matrix¹⁰. This matrix allows the team to color code different parts of a COBie deliverable to define precise requirements as to what individual, from which relevant firm, will be responsible for the production of specific data within COBie.

While project teams will define specific individuals responsible within their firms, the following general responsibilities for the production of COBie data should be observed.

1. Regardless of the form of contract the Architectural firm is responsible for Design Development (35% Design) Deliverable.
2. Regardless of the form of contract, the Architectural Firm is responsible for the Coordination of all design Disciplines input to the Construction Document Design (100%) Deliverable.
3. Regardless of the form of contract, the General Contractor shall be responsible for the Beneficial Occupancy and the As-Built Construction Deliverables.
4. For projects that employ Third Party commissioning, the Commissioning Agent may assist the General Contractor to coordinate and validate the quality of the General Contractor deliverables at the Beneficial Occupancy and the As-Built Construction Deliverables.

⁹ wbdg.org/resources/cobie.php The COBie homepage.

¹⁰ projects.buildingsmartalliance.org/files/?artifact_id=4093 COBie Responsibility Matrix.

6 COBie DELIVERABLES

The requirements for the timing of COBie deliverables on typical facility acquisition projects are provided in this section. Participants in specific contracts should review individual contract requirements for any changes to these general requirements, including, but not limited to, Appendix A of this document.

One COBie file shall be provided for each facility on the project. If there are multiple facilities, then an additional COBie file identifying the assets for the Site, shall also be provided.

Information found in a COBie file shall accurately reflect the associated information on design and as-built drawings schedules at that stage of the project. All COBie files are to be submitted for client approval. A sufficient portion of the progress payment for the overall deliverable package shall be withheld for non-compliant COBie deliverables to cover the potential cost of manually creating accurate COBie deliverables.

COBie deliverables increase in content over time to reflect the increasing maturation of the design or completion of the construction project. Refer to “Deliverable Evaluation Criteria” for the content required at each deliverable. In addition, refer to “Asset Requirements” for a minimum list of assets to be included in the model and minimum required properties for such assets.

All deliverables shall comply with the Facility Management Handover Model View Definition as described in the National BIM Standard – United States. Unless otherwise specified COBie deliverables shall be provided in Industry Foundation Class (IFC) file format (STEP-Part 21) or COBie 2.4 spreadsheet format. Files referenced in the COBie.Documents worksheet shall be provided with the COBie file submission in Portable Document Format (PDF), Tag Image File Format (TIFF), or Joint Photograph Experts Group (JPEG).

Design Development Deliverable (35% Design)

Regardless of the form of contract, the Architectural firm is responsible for Design Development (35% Design) Deliverable. This phase may also be referred to as the Schematic Design phase.

The Design Development Deliverable shall be provided in a single file for each facility in the project (and site, if applicable) containing design information developed by those in the Architectural discipline. The focus of the design development deliverable is to provide an accurate representation of space and architectural facility assets. Space asset attributes shall be completed to allow the presentation of room data sheet reports corresponding to the level of detail found in the associated drawings.

Architectural product types, such as door and window schedules, shall be identified if such assets are found on the associated drawings. If plumbing and lighting assets are found in the associated drawings, then these assets shall be identified in the information deliverable as well.

The Design Development Deliverable shall also identify the expected systems required to provide heating, cooling, electricity, water, fire protection, and other services. At this stage of the design,

the system information provided shall be in name and classification only without reference to the specific components that comprise these systems. All such information is provided, in detail, during the next stage of design.

The content of the deliverable shall be evaluated based on compliance with the data format (either IFC or spreadsheet) and content. The COBie worksheets (or equivalent IFC file data) listed in the figure below shall be provided as noted in the “Asset Requirements” and “Deliverable Evaluation Criteria” sections. The purpose of these requirements is to standardize product and equipment schedules on design drawings and have the information in those schedules reflected in the associated COBie deliverable.

The content of the Design Development Deliverable shall reflect the space and scheduled products and equipment assets as presented on the corresponding deliverable drawings. The Architect is responsible to correct all deviations in content between the associated Design Development drawings and the information deliverable described in this section.

Table 1. Schematic Design COBie Deliverable

COBie Worksheet	Required Content
Contact	One row for the designer’s BIM manager shall be provided.
Facility	One facility per COBie file.
Floor	One row for each vertical level to include foundations, floors, roofs, and site.
Space	One row per functional space, per room. Mult. spaces in a room possible.
Zone	One row for each COBie.Space and COBie.Zone type.
Type	One row for each scheduled product type found on design drawings.
Component	One row for each individual scheduled product found on design drawings.
System	One row for each system to be defined in the next stage of design.
Document	One row for each associated deliverable document linked to relevant sheet.
	One row listing URL of target product COBie.Type selected.
Attribute	One row for each required COBie.Space Attribute.
	One row for each required COBie.Type Attribute.
	One row for each required COBie.Component Attribute.

Construction Documents Design Deliverable (100% Design)

Regardless of the form of contract, the Architectural Firm is responsible for the coordination of all the input from the design disciplines to the Construction Document Design (100%) Deliverable.

If COBie data at the Construction Documents Design stage is extracted from multiple BIM files each of the required BIM files shall be provided as a part of that COBie deliverable. Regardless of the native file format for BIM models, a single merged COBie file shall be provided for each facility in the project (and site, if applicable). This set of COBie files shall be the basis for client evaluation of the submittal. The party submitting the COBie file shall be responsible to verify that the submission does not contain duplicative assets or geometry. Models with duplicate assets or geometry shall be disapproved by the client.

The content of the deliverable shall be evaluated based on compliance with the data format (either IFC or spreadsheet) and content. The COBie worksheets (or equivalent IFC file data) listed in the figure below shall be provided as noted in the “Asset Requirements” and “Deliverable Evaluation Criteria” sections. The purpose of these requirements is to standardize product and equipment schedules on design drawings and have that standardization reflected in the product and equipment information delivered.

Table 2. Construction Documents COBie Deliverable

COBie Worksheet	Required Content
Contact	One row for the designer’s BIM manager shall be provided.
Facility	One facility per COBie file.
Floor	One row for each vertical level to include foundations, floors, roofs, and site.
Space	One row per functional space, per room. Mult. spaces in a room possible.
Zone	One row for each COBie.Space and COBie.Zone type.
Type	One row for each scheduled product type found on design drawings.
Component	One row for each individual scheduled product found on design drawings.
System	One row for each COBie.Component identifying the related COBie.System.
Document	One row for each associated deliverable document. Linked to relevant sheet.
	One row listing URL of target product COBie.Type selected.
Attribute	One row for each required COBie.Space Attribute.
	One row for each required COBie.Type Attribute.
	One row for each required COBie.Component Attribute.

There are two primary differences in the deliverables at the Design Development and Construction Documents stage.

First, the content of the Construction Documents Deliverable shall reflect the complete set of all spaces, scheduled products, and equipment assets as presented on the corresponding deliverable drawings. At the Construction Documents stage this list of products and equipment is expected to be complete. The attributes of the scheduled properties of these products will be updated to reflect the attributes reflecting the Basis of Design. Again, this is no different than simply lifting the information from Construction Document stage drawings and providing that information in the COBie open standard format.

The second difference in deliverables between Design Development and Construction Documents stage is that the Construction Document stage model groups products and equipment into the systems that provide specific services throughout the building.

As with design drawings at the Construction Documents stage, the Architect’s responsibility to coordinate design drawings of multiple disciplines extends to the Architect’s responsibility to ensure that the data provided from these design drawings is also coordinated.

Beneficial Occupancy Construction Deliverable

The General Contractor shall be responsible for the Beneficial Occupancy and the As-Built Construction Deliverables. For projects that employ Third Party commissioning, the Commissioning Agent may assist the General Contractor to coordinate and validate the quality of the General Contractor deliverables at the Beneficial Occupancy and the As-Built Construction Deliverables.

The following COBie worksheets (or equivalent IFC file data) shall be provided as noted in the “Deliverable Evaluation Criteria” section.

The Beneficial Occupancy Construction Deliverable will be provided as a single COBie file for each facility in the project (and site, if applicable) that reflects the as-installed and commissioned facility at the time of beneficial occupancy. This file shall update the Construction Documents model to reflect any additions, updates, or deletions to the underlying buildings and associated COBie data. The complete set of commissioning information completed at the time of beneficial occupancy shall be provided with this deliverable. The attributes of the scheduled properties of installed products will be updated to reflect any differences between installed equipment and attributes reflecting the basis of design. Information needed to operate and maintain the occupied portions of the facility shall also be included in this COBie deliverable.

Table 3. Beneficial Occupancy COBie Deliverable

COBie Worksheet	Required Content
Contact	One row for the designer’s BIM manager shall be provided.
Facility	One facility per COBie file.
Floor	One row for each vertical level to include foundations, floors, roofs, and site.
Space	One space per functional use.
Zone	One row for each COBie.Space and COBie.Zone type.
Type	One row for each scheduled product type found on design drawings.
Component	One row for each individual scheduled product found on design drawings.
System	One row for each COBie.Component identifying the related COBie.System.
Spare	Row(s) for each spare, part, or lubricant for each COBie.Type
Resource	One row for each material, labor, training, or other required resource
Job	Row(s) for each COBie.Type identifying PM Schedules
	Row(s) for COBie.Types identifying Operations Schedules
	Row(s) for COBie.Components identifying Operations Schedules
Document	Row(s) for each COBie.Type listing each approved submittal document.
	Row(s) for each COBie.Type listing all commissioning submittals.
	Row(s) for each COBie.Component listing all commissioning submittals.
	One row for a photograph of each COBie.Component equipment nameplate.
Attribute	One row for each required COBie.Space Attribute.
	One row for each required COBie.Type Attribute.
	One row for each COBie.Component equipment nameplate information

As-Built Construction Deliverable

The General Contractor shall be responsible for the Beneficial Occupancy and the As-Built Construction Deliverables. For projects that employ Third Party commissioning, the Commissioning Agent may assist the General Contractor to coordinate and validate the quality of the General Contractor deliverables at the Beneficial Occupancy and the As-Built Construction Deliverables.

The COBie worksheets (or equivalent IFC file data) required at Beneficial Occupancy shall be provided as noted in the “Deliverable Evaluation Criteria” section.

The As-Built Construction Deliverable will be provided as a single COBie file for each facility in the project (and site, if applicable) that reflects the as-built design documents delivered as fiscal completion of the project. This file shall update the Beneficial Occupancy Deliverable model to reflect any additions, updates, or deletions to the underlying buildings and associated COBie data. The complete set of commissioning information shall be provided with this deliverable. Information needed to operate and maintain the facility shall also be included in this COBie deliverable.

7 DELIVERABLE EVALUATION CRITERIA

COBie models must conform to all format and business rules found in NBIMS-US. Quality requirements must be met by a combination of the use of COBie tested software and use of that software in accordance with manufacturer’s recommendations. The quality guidelines identified in this section are issues that have arisen during software testing due to incorrect software configuration or incorrect use of that software. The project team is responsible for understanding how to use their selected software to ensure compliance.

In addition, there may be client-specific requirements found in more specific contract requirements. Participants in specific contracts should review individual contract requirements and Appendix A of this document for clarifications or changes to these general requirements.

COBie files that do not meet the requirements of NBIMS-US, including those rules specifically highlighted below, and owner-specific requirements shall be required to be manually corrected and resubmitted until approved by the client.

One Facility Per COBie File

COBie represents the set of assets managed in an individual facility. If there are multiple facilities and common site work associated with a given project, the COBie files shall be prepared for each individual facility. Site work shall be identified in a separate COBie site-file even for stand-alone facilities.

It is the responsibility of the designer, consultant, or contractor team member designated in the team's COBie implementation plan to ensure that information from multiple sources can be easily integrated to produce a single set of COBie information for each facility, at each deliverable stage, such that the information in the COBie file matches the information found on the design drawings.

If specific sets of tools are provided by your current agency to support integration efforts, these tools will also be listed in "Appendix A – Owner's Requirements".

Unique Asset Naming

Without unique names, specific assets cannot be effectively maintained. All managed spaces, products and equipment found on design schedules and drawings shall be uniquely named. These names must provide information about the asset outside the context of the design schedule. The names on the design drawings must match those found in the COBie deliverable.

During design, the Architect shall be responsible to resolve all conflicts in duplicative naming by their own staff and all consulting engineers. Software's failure either through configuration, setup, use, or underlying inability to implement unique naming algorithms shall require the Architect to manually update all effected drawings, building models, and COBie files.

During construction, the General Contractor shall be responsible to resolve all conflicts in duplicative naming of Component's in addition to those delivered during the design stages. Software's failure either through configuration, setup, use, or underlying inability to implement unique naming algorithms shall require the General Contractor to manually update all effected drawings, building models, and COBie files.

The following are the minimum quality guidelines related to COBie asset naming to be applied on the subject contract.

COBie.Space.Name Quality Guidelines

- Each value in this Column shall be unique.
- The characters in this field shall be found within the range of ASCII characters between [0-9], [a-z], [A-Z], and the two symbols dash (" - ") and underline (" _ "). Unless otherwise noted the ASCII space characters, CHR(20), in Name fields is prohibited due to the inconsistency of parsing software. Other characters, including non-printing ASCII control characters are expressly prohibited.
- One COBie.Space row shall be provided for each functional area in every physical room in every facility. For large rooms with multiple functional areas, spaces shall be defined for each of the functional areas and designated with a dash followed by a letter designation starting with "A" and working through each of the subsequent spaces.

- COBie.Space.Name's shall exactly match the space names shown the related design and construction deliverables.
- COBie.Space.Tag field shall be used for building signage.
- COBie.Space.Name requirements for unique naming of functional areas shall extend to different work areas on large roofing spaces or discrete geographic regions in site models.
- COBie.Space.Description values not published on contract drawings shall have generic space descriptions.

COBie.Type.Name Quality Guidelines

- Each value in this Column shall be unique.
- The characters in this field shall be found within the range of ASCII characters between [0-9], [a-z], [A-Z], and the two symbols dash ("-") and underline ("_"). Unless otherwise noted the ASCII space characters, CHR(20), in Name fields is prohibited due to the inconsistency of parsing software. Other characters, including non-printing ASCII control characters are expressly prohibited.
- Scheduled equipment and products found on the drawings shall be uniquely named.
- Unless otherwise specified by the client, the name of each COBie.Type of product and equipment shall begin with a signifier of the product type that would be recognizable to a facility manager outside the context of the specific design. For example, the designation "DOOR-A" uniquely distinguishes that COBie.Type from the light fixture type "LIGHT-A".
- The designer shall either utilize client supplied template objects or explicitly coordinate the names of all product types, in advance, with the owner and document all decisions.

COBie.Component.Name Quality Guidelines

- Each value in this Column shall be unique.
- The characters in this field shall be found within the range of ASCII characters between [0-9], [a-z], [A-Z], and the two symbols dash ("-") and underline ("_"). Unless otherwise noted the ASCII space characters, CHR(20), in Name fields is prohibited due to the inconsistency of parsing software. Other characters, including non-printing ASCII control characters are expressly prohibited.

- Individual instances of each type must also be unique. For large pieces of scheduled equipment such as Air Handling Units, such unique naming is commonly found on design schedules.
- Unless otherwise specified by the client, for items where design schedules describe only the asset types, such lighting or plumbing fixture schedules, the following formula for creating a unique component name shall be used.

COBie.Type.Name & "-" & COBie.Space.Name & "-" & Item Count in Space.

For example, if there were two sinks of type "Sink-A" in space "100" the unique names of each of these components following the algorithm shall be "Sink-A-100-01" and "Sink-A-100-02".

COBie.Type Product Specification

During the course of the COBie deliverables the specificity of information about COBie.Type will typically increase from a notional performance specification, to identification of the Basis of Design of specific manufacturer, to the product actually approved and installed by the Contractor. Given the differences between various software products implementing COBie and their treatment of this product life-cycle, requirements for Basis of Design documentation shall be identified as specified in this document.

Component Spatial Containment

All COBie.Component records shall be identified in the COBie.Space in which the asset is found or the COBie.Space from which the asset is operated.

Component Spatial Placement

A COBie.Attribute named "SpatialPlacement" shall be provided for each COBie.Component. This Attribute identifies information needed by the facility manager, operator or maintainer to access that component. Typical values of the SpatialPlacement Attribute shall include "UnderFloor", "AboveCeiling", "InWall", "InSpace", "OnRoof", "OnSite".

Site Spatial Containment

For each facility compound or campus with shared site work, a separate COBie Site file shall be submitted. A single COBie.Floor row will be created for this site file and identified as a COBie.Floor.FloorType of "Site." Definable areas within that site will be identified in rows in the COBie.Space worksheet. Examples of typical COBie.Space rows within COBie.Floor=Site's are parking lots, utility pads, loading docks, etc... The default list of Site spaces that shall be included for a given client are identified in Appendix A.

Facility Geo-location

To ensure coordination of COBie data with campus-management and Geographic Information Systems, the following COBie.Attributes shall rows be provided for each COBie.Facility Record based on (in the Northern Hemisphere) the “lower left-hand spatial” coordinate of each facility.

- Longitude
- Latitude
- Elevation
- Rotation

Categories

Large public clients manage different types of facilities on multiple campuses. To effectively manage these portfolios, COBie deliverables are required to receive building information in a consistent way. In COBie this is accomplished through the use of several different types of Classifications. Classifications are “category codes” of different types used in COBie. The NBIMS-US requires classification for the following COBie worksheets.

- Contact
- Facility
- Space
- Type
- System

NBIMS-US designates OmniClass¹¹ as the default classification method used if no other method is specified in contract. The default list of mandatory COBie Classifications that shall be included for a given client are identified in Appendix A.

Note that a client’s reliance on OmniClass alone may not ensure cross-project compatibility over time. The OmniClass classification tables, just like all classification systems, change over time as updates are incorporated. It is to the clients benefit to determine and publish the precise classification scheme required across all projects.

Zones

Buildings contain groups of spaces that, when connected, provide specific capabilities to the owner. The COBie.Zone worksheet is designed to identify the spaces that make up a given zone.

In general, zones shall be identified by zone type and characteristics. Zones naming in large facilities shall also be identified floor and wing appended. The names of zones and sub-zones shall be approved by the owner. The default list of zones that shall be used for a given client are identified in Appendix A.

¹¹ omniclass.org/ OMNIClass Construction Classification System.

A COBie.Space may only be listed once for a given type of zone. A COBie.Space may, however, be part of multiple types of zones.

As an example consider Space “100” in a building where “Circulation Zone” and “Fire Protection” zoning information is required by the owner. In this example Space 100 could be part of the “Circulation Zone - Public” Circulation Zone and the “Fire Protection Zone - First Floor West Wing” Fire Protection Zone. It is not, however, possible for Space 100 to be part of both the “Fire Protection Zone - First Floor West Wing” and “Fire Protection Zone - First Floor East Wing” zones.

Zones may be nested. Nesting must be accomplished through the name of the zone. For example, there may be shared spaces that support both the “Fire Protection Zone - First Floor West Wing” and “Fire Protection Zone - First Floor East Wing” zone. Such zones can be identified in the “Fire Protection Zone - First Floor” zone.

If agreed to by the project team, the nesting of zones may be accomplished through the use of COBie.Attributes that identify the ParentZone of the current zone.

Systems

Buildings contain groups of components that, when connected, provide specific required services. The COBie.System worksheet is designed to identify the components that make up a given system. In general, systems shall be identified by building service, floor and wing. The names of systems within each system type shall be approved by the owner. Subsystems, if required, shall be identified using an owner-approved naming convention. The list of systems possible for a typical project for your current agency may be found in “Appendix A - Owner’s Requirements”.

A COBie.Component may only be listed once for a given type of system. A COBie.Component may, however, be part of multiple types of systems.

As an example consider Component “Sensor – Temperature 101” in a building where “HVAC system” and “Sensor System” information is required by the owner. In this example, the sensor could be part of both the “HVAC System – Chilled Water” and the “BAS System – HVAC Sensors” system. It is not, however, possible for the sensor to be part of both the “HVAC System – Chilled Water” and “HVAC System – First Floor Heating Distribution” system.

Systems may be nested. Nesting must be accomplished through the name of the system. For example a Fire Protection System may have a set of equipment supporting “Fire Protection – Common” and equipment supporting specific areas of the building such a “Fire Protection – First Floor, West Wing” and a “Fire Protection - First Floor, East Wing”.

A question that may come up is the relationship between systems and zones. This is relevant since some systems and zones have overlapping boundaries. The link can be directly found in the COBie data specification from either the direction of components or spaces. To find the COBie.Components and COBie.Systems that support specific spaces, a query can be made to look

for all components that are found in the COBie.Spaces identified within a given COBie.Zone. The inverse query can also be made to identify the COBie.Spaces supported by a given COBie.System.

If agreed to by the project team, the nesting of systems may be accomplished through the use of COBie.Attributes that identify the ParentSystem of the current system.

Units of Measure

COBie models require a single standard set of units of measure for linear, area, and volumetric measures. This unit of measure standard is applied on all units that do not otherwise have units attached. Designers shall designate the required units of measure for their projects for owner approval prior to starting design. All other disciplines shall be required to use the same units of measure defined by the designer.

The architectural model and all other models shall be oriented to “project” north. The difference between project north and magnetic north shall be defined by the architect. The designer shall designate the elevation of the project for a single origin point. Latitude and Longitude shall be defined based on the single origin point. All other disciplines shall be required to reference the project north rotation and elevation origin point designated by the designer.

Units on attributes shall be required to be identified with each numeric value in the COBie.Attributes worksheet. This applies regardless of the type of Attribute being provided.

Given the differences in software implementation of units, it is critical that the design team evaluate their product using small testing models to ensure that this requirement can be met. It would be expected that commercial product COBie points of contact will need to be identified and contacted to reduce post-design or post-construction manual updating of COBie deliverables.

During design the Architect shall be responsible for the manual update of all COBie.Attributes not automatically provided by design software. During construction the Contractor or Commissioning Agent shall be responsible for the manual update of all COBie.Attributes not automatically provided by software used to create their required deliverables.

Use of Commercial Software

Many commercial products can produce COBie data automatically. It is critical, when using these products, that the software vendor’s set-up instructions are followed prior to the use of that software. Without the correct initial configuration, the designer, commissioning agent, or contractor may be required to rekey by hand the information required in COBie deliverables.

All COBie deliverables shall be accompanied by a report that demonstrates that the file provided meets the formatting requirements of the COBie specification.

Different checking tools have different capabilities. Some check both IFC-based and spreadsheet-based files. Others only check spreadsheet-based files. The list of available tools maybe found on the COBie Means and Methods Page¹².

If there are specific checking tool requirements for a given owner, these may be found in “Appendix A – Owner’s Requirements”.

Multiple-Model Merging

Given the variety of technology, approaches to providing COBie data, and newly emerging practical expertise in merging COBie data, special concern should be paid by those preparing COBie deliverables from multiple underlying source files. The discussion below may help to clarify these issues for those who attempt to aggregate COBie data from multiple sources.

There are two general classes of problems that may be encountered. In the first case, problems are rooted in design practice. In the second cases problems stem from incomplete adoption open standards by software firms.

Consider the workflow in the Design Development stage when an Architect will produce a reflected ceiling plan contains lighting fixtures and plumbing fixture schedule. Later during Construction Documents stage the electrical Engineer’s lighting fixture schedule and mechanical Engineer’s plumbing fixture schedule will be completed. It is sometimes the case in design practice that such information will not exactly match. The general rule to interpreting drawing inconsistencies is that the more detailed information governs over less detailed information. The practical impact of this rule is that the construction bids will almost always be made against the electrical lighting fixture schedule and not the Architect’s reflected ceiling plan.

The second type of issue that may impact on the merging of COBie data from multiple sources is that software that imports the Architects original model may not maintain unique Space, Type or Component names. In some cases when the data from this additional software is merged back into a single file multiple spaces and equipment and associated properties and geometry may be found.

It is recommended that when preparing a COBie deliverable from multiple models that a “pre-flight” check of model merging operations be conducted to determine if assets are duplicated in different models. If automated methods for supporting design quality control are not available by the design team’s commercial software product, the designers’ BIM manager will have to complete this review and/or merging manually.

If there is a question regarding the order of precedence in merging, then merging should follow standard contract interpretation rules of precedence. The standard approach is that more precise information (provided by a respective design discipline) takes precedence over the more general Architectural information. A specific set of rules should be developed by the team when merging

¹² buildingsmartalliance.org/index.php/projects/cobie The COBie Means and Methods page.

multiple files. The buildingSMART alliance¹³ has currently published a document containing an example set of merging rules at the construction document stage.

8 EQUIPMENT AND PRODUCT REQUIREMENTS

COBie delivers information about managed assets. Spatial assets shall be identified in the COBie.Space worksheet and have properties corresponding to architectural Room Data Sheets as specified by the client. Equipment and product assets described in this section appear in the COBie.Type and COBie.Component worksheets. Attributes of such assets appear in the COBie.Attribute worksheet.

It is a requirement of COBie Challenge events beginning in January 2013 that all software producing or using COBie data provide explicit end-user instructions regarding the application of regional-, national-, or client-specific property sets. An example of a regional property set project underway in the United States is the Specifiers Properties information exchange (SPie) project. In the future, it is expected that clients will specify the use of prepared template objects with mandatory properties that reflect their unique requirements.

In absence of client-specified regional-, national-, or client-specific property sets, the project team may develop equipment and product schedules according current business practices, and submit for client approval these schedules that will be reviewed against the quality standards identified in this Guide. When developing equipment and product schedules, designers and consultants shall ensure that schedule headings are normalized to eliminate duplication, resolve synonyms between disciplines, and consistently name objects to provide information upon which the facility may be efficiently maintained, operated, and managed. Units for all attributes shall also be identified and coordinated between designers and consultants.

Regardless of the source of the properties specified in client contracts, COBie.Attributes for all COBie.Type and COBie.Component records shall match the properties found on equivalent design drawing equipment and product schedules.

Section 8.1 identifies common COBie quality attributes that apply to all projects, regardless of regional-, national-, or client-specific property sets. Sub-sections beginning with section 8.2 identify properties identified by asset type. These are listed in rough order of the tempo of required maintenance and operational activities for those assets. Those asses requiring the most attention appear toward the top of the list.

8.1 General Requirements

The following requirements shall govern the delivery of all types of equipment and products found in all COBie deliverables.

¹³ buildingsmartalliance.org A Council of the National Institute of Building Sciences.

8.1.1 Project Team Responsibility

In absence of specified regional-, national-, or client-specific property sets, the project team shall pre-coordinate the identification of required equipment and product properties. Documentation of this pre-coordination shall be submitted for client approval prior to the start of design. This submittal shall include the list of scheduled equipment and product schedules and the headings expected to appear on all drawings schedules. This submittal shall be provided for client approval.

The purpose of this pre-coordination submittal is to eliminate later possible re-work by the project team that may be needed to bring COBie deliverables up to the data quality standards identified in this Guide.

The client may explicitly require that the project team conform to the properties provided in this Guide. These properties were selected from design schedules found in standard designs of several United States federal government agencies. That information was collated, normalized to eliminate duplication and resolve synonyms, and consistently organized in the tables provided in this section. Units for each Attribute have also been identified. The effort taken to resolve such issues in this Guide is expected to save the project team a significant amount of effort until such time as regional, national, or client-specific requirements are completed.

The first check of COBie data quality conducted by the client shall be a review of all scheduled equipment and products. If there are discrepancies, the client shall reject the COBie deliverable and hold retainage until such time as the COBie quality standards are met. The client's retainage of the COBie deliverable shall be based on the time required to manually document all scheduled assets.

8.1.2 Unique Component Name and Type Name

All equipment schedules that identify individual components shall begin with the attributes listed below. The asset's name "Component.name" and asset type name "Component.Type" provided in all design schedules shall be unique across all classes of asset.

- Name
- Type

A default naming scheme for schedules that identify individual components and those which only identify equipment or product types was provided previously in this Guide.

8.1.3 Non-Substantive Attributes

Attributes provided in COBie deliverables shall be restricted to those that provide information about the specification or operation of the managed asset and not information pertaining to the internal configuration of the software system or output formats provided by the implementing software systems.

8.1.4 Type versus Component Attributes

Attributes in common across a given equipment or product Type shall be associated with the COBie.Type record. Attributes unique to a specific Component may be associated with the COBie.Component record.

8.1.5 Specification Reference

At the Construction Documents deliverable and beyond all COBie.Type records shall be identified with the specification section that references their requirements. This shall be accomplished by the COBie.Type Attribute called "SpecificationSection."

8.1.6 Electrical Properties

All equipment schedules that identify individual components that use electrical power shall have the next three headings of their schedules contain the following asset information. This information shall be included in the COBie file as attributes on the asset Type.

- Current
- Voltage
- Frequency

8.1.7 Placement

All managed assets shall be identified by its placement within the facility. At the construction Documents Design stage this requirement will apply to all COBie.Component records using the COBie.Attribute "SpatialPlacement". At the Beneficial Occupancy and As-Built stages of construction, this requirement will apply to both scheduled and tagged assets. The values that can be used for the "SpatialPlacement" attribute shall include, but not be limited to, the following list.

- AboveCeiling
- InSpace
- InWall
- OnRoof
- OnSite
- UnderFloor

8.1.8 Construction Documents Deliverable - Basis of Design

These properties shall be added to the COBie.Attribute worksheet and associated with every COBie.Type record at the Construction Documents (100% Design) Deliverable. The field "BasisOfDesign-Notes" reproduces notes associated with each type of scheduled assets as found on design drawings.

- BasisOfDesign-Manufacturer
- BasisOfDesign-ModelNumber
- BasisOfDesign-Notes

8.1.9 Occupancy and As-Built Deliverables – As-Installed Common Properties

The Beneficial Occupancy and As-Built COBie deliverables shall update the following additional attributes of all designed assets based on the properties of installed products.

COBie Worksheet	COBie Field
Type	Manufacturer
Type	ModelNumber
Type	WarrantyGuarantorLabor
Type	WarrantyDurationLabor
Type	WarrantyDurationUnit
Attribute (of Type)	ApprovedDeviations
Component	SerialNumber
Component	InstallationDate
Component	TagNumber

8.1.10 Occupancy and As-Built Deliverable – As-Installed Electrical Circuit

Each scheduled/named asset that uses electricity, shall in addition to other required properties, have the following two properties that identify the electrical circuit required to de-energize that equipment. These properties will be added to the COBie.Attribute worksheet for the Beneficial Occupancy and As-Built COBie deliverables.

- ElectricalPanelName
- ElectricalPanelCircuit

8.1.11 Occupancy and As-Built Deliverables – As-Installed Systems of Components

Each scheduled/named system asset shall be identified in the COBie.System worksheet to identify the grouping of different components into systems within the facility.

8.1.12 Occupancy and As-Built Deliverables – As-Installed Assemblies of Components

Engineered-to-order products are assembled of individual products that have different preventative maintenance schedules and replacement parts requirements. To correctly include these in COBie there must be a COBie.Type and COBie.Component for both the assembly and for the individual pieces of equipment within the overall assembly. BOD and As-Built Deliverables – Required Type Properties

The Beneficial Occupancy and As-Built COBie deliverables shall update the attributes of all scheduled asset Types to match those properties of the actually selected product Types.

8.1.13 Occupancy and As-Built Deliverable – As-Installed Asset Type Properties

The Beneficial Occupancy and As-Built COBie deliverables shall update the attributes of all designed assets to match those properties of installed products.

8.2 Required HVAC System Assets

8.2.1 Chiller

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 4 Design – Minimum Chiller Schedule Headings

Heading	Typical Unit
Name	Chiller-TypeXX-Space#-01
Type	Chiller-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space.Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Capacity	kW
Water Flow	m ³ /hr
Ambient Temp	C
Pressure Drop	kPa
Entering Water Temp	C
Leaving Water Temp	C
Motor Controller	-
Unloading Steps	-
Chiller Media	-
Chiller Type	-
Refrigerant Type	-
Energy Efficiency Ratio (EER)	Btu/hr to kW
Integrated Part-Load Value (IPLV)	-
Heat Reclaim	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built In Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.2 Boiler

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 5 Design – Minimum Boiler Schedule Headings

Heading	Typical Unit
Name	Boiler-TypeXX-Space#-01
Type	Boiler-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Input Power	kW
Output Power	kW
Water Flow	m ³ /hr
Entering Water Temp	C
Leaving Water Temp	C
Vent Diameter	mm
Passes	-
Pressure Drop	kPa
Energy Source	-
Fuel Type	-
Output Media	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.3 Air Handling Units

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 6 Design – Minimum Air Handling Unit Schedule Headings

Heading	Typical Unit
Name	AHU-TypeXX-Space#-01
Type	AHU-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Fan Flow - Maximum	L/s
Fan Flow - Nominal	L/s
Fan Outside Flow	L/s
Fan Ext Pressure Drop	kPa
Fan Motor Power	kW
Fan Speed	RPM
Fan Sound Level	dB
Coil Flow	L/s
Coil Velocity	m/min
Coil Capacity	W
EnteringAirTempDB	C
EnteringAirTempWB	C
LeavingAirTempDB	C
LeavingAirTempWB	C
EnteringWater Temp	C
Leaving Water Temp	C
Chilled Water Rate	L/s
Runout Inlet Size	mm
Runout Outlet Size	mm
Coil Air Pressure Drop	Pa
Coil Water Pressure Drop	kPa
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.4 Fan coil units

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 7 Design – Minimum Fan Coil Unit Schedule Headings

Heading	Typical Unit
Name	FanCoil-TypeXX-Space#-01
Type	FanCoil-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Air Flow	L/s
Fan Speed	-
Exit Static Pressure	Pa
EnteringAirTempDB	C
EnteringAirTempWB	C
LeavingAirTempDB	C
LeavingAirTempWB	C
Total Capacity	kW
Sensible Capacity	kW
EnteringWater Temp	C
Leaving Water Temp	C
Chilled Water Flow	L/s
Cooling Coil Delta P	kPa
Cooling Rows	-
Fan Motor Power	kW
Phase	-
Cabinet Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.5 Filters

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Air Flow maximum was included in this table since it was found in a note associated with each filter. The efficiency rating identified in the table is too general and should be clarified as either NominalCountedEfficiency or NominalWeightedEfficiency.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 8 Design – Minimum Filter Schedule Headings

Heading	Typical Unit
Name	HVACFilter-TypeXX-Space#-01
Type	HVACFilter-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Length	mm
Width	mm
Height	mm
Air Flow - Maximum	L/s
Air Flow - Nominal	L/s
Nominal Pressure Drop	Pa
Efficiency Rating	%
Residence Time	Sec
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.2.6 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 9 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	HVACPump-TypeXX-Space#-01
Type	HVACPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Rated Flow	L/s
Churn Pressure	kPa
Controller Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.7 Fans

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 10 Design – Minimum Fan Schedule Headings

Heading	Typical Unit
Name	Fan-TypeXX-Space#-01
Type	Fan-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Service	-
Flow Rate	L/s
Pressure	Pa
Control Type	-
Interlock	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.8 Motors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 11 Design – Minimum Motor Schedule Headings

Heading	Typical Unit
Name	Motor-TypeXX-Space#-01
Type	Motor-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Phase	-
Efficiency	-
Drive	-
Drive Control Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.9 Compressors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 12 Design – Minimum Compressor Schedule Headings

Heading	Typical Unit
Name	Compressor-TypeXX-Space#-01
Type	Compressor-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Refrigerant Type	-
Capacity	%
Speed	RPM
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.10 Variable Air Volume boxes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 13 Design – Minimum VAV Box Schedule Headings

Heading	Typical Unit
Name	VAV-TypeXX-Space#-01
Type	VAV-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Inlet Size	mm
Air Flow – Minimum	L/s
Air Flow - Maximum	L/s
Pressure Drop	Pa
NC Level – Discharge	dB
NC Level - Radiated	dB
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.2.11 Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component’s space
- Name of COBie.Component must be uniquely created using the following rule
 - “Valve-”& COBie.SpaceName & “-” & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.2.12 Traps

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "Trap-" & COBie.SpaceName & "-" & Item Count in Specific Space
- PM Schedules for this COBie.Type shall identify the frequency of inspection/maintenance required for this type of component.

8.2.13 Strainer

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "Strainer-" & COBie.SpaceName & "-" & Item Count in Specific Space
- PM Schedules for this COBie.Type shall identify the frequency of inspection/maintenance required for this type of component.

8.3 Required Plumbing System Assets

8.3.1 Water treatment Assemblies

Water treatment systems are an Assembly of three primary Component types that shall be included in COBie deliverables. These three Types are

- Pre-treatment equipment
- Potable water treatment equipment
- Pressure vessels

If a water treatment assembly is an internal part of a given facility then there shall be one Type object for “Water Treatment”.

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 14 Design – Minimum Water Treatment Assemblies Schedule Headings

Heading	Typical Unit
Name	WaterTreatmentAssembly-TypeXX-Space#-01
Type	WaterTreatmentAssembly-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
System Types	-
Water Softener	-
Disinfection Type	-
Rejection Ratio	-
Capacity	cu.meters/day
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.3.2 Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component’s space
- Name of COBie.Component must be uniquely created using the following rule
 - “Valve-”& COBie.SpaceName & “-“ & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.3.3 Plumbing Fixtures

While there are many different types of plumbing fixtures, they commonly use the same type of schedule, since each type of fixture performs a similar function. The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 15 Design – Minimum Plumbing Fixture Schedule Headings

Heading	Typical Unit
Name	PlumbingFixture-TypeXX-Space#-01
Type	PlumbingFixture-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Waste	WSFU
Vent	WSFU
Cold Water	WSFU
Hot Water	WSFU
Sanitary Fixture Water	liter/flush
Maximum Flow Rate	L/min
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.4 Required Fire Suppression System Assets

8.4.1 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 16 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	FireSupressionPump-TypeXX-Space#-01
Type	FireSupressionPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Rated Flow	L/s
Churn Pressure	kPa
Controller Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.4.2 Valves

Schedules for this type of device are not required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "Valve-" & COBie.SpaceName & "-" & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.4.3 Sprinkler heads

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. As a result Design Deliverables for this type of device shall be comprised of the following COBie information:

- One COBie.Type record for each type of component
- One COBie.Attribute record for each Type
 - Head Type
- One COBie.Component for each individual component, identifying the component's space.

At Beneficial Occupancy and As-Built deliverables, design schedules shall be updated as noted below.

- One COBie.Type record for each type of component
- Two COBie.Attribute record for each Type
 - Head Type
 - Thread Size
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "SprinklerHead-" & COBie.SpaceName & "-" & Item Count in Specific Space

8.4.4 Fire extinguishers

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable.

Table 17 Construction – Minimum Fire Extinguisher Schedule Headings

Heading	Typical Unit
Name	FireExtinguisher-TypeXX-Space#-01
Type	FireExtinguisher-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Capacity	Kg
Rating	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.5 Required Electrical System Assets

8.5.1 Light fixtures

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component’s specific use in a system.

Table 18 Design – Minimum Light Fixture Type Schedule Headings

Heading	Typical Unit
Name	LightFixture-TypeXX-Space#-01
Type	LightFixture-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Lens Type	
Lamp Type	-
Mounting	-

Lamp Type	-
Lamp Count	Each
Lamp Power	W
Function	-
Light Path	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

At Beneficial Occupancy and As-Built deliverables, design schedules shall be updated as noted below.

- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute record for each individual component
 - ElectricalPanelName
 - ElectricalPanelCircuit
- Name of COBie.Component must be uniquely created using the following rule
 - "Outlet-" & COBie.SpaceName & "-" & Item Count in Specific Space

8.5.2 Outlets

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. As a result Design Deliverables for this type of device shall be comprised of the following COBie information:

- One COBie.Type record for each type of component
- Three COBie.Attribute record for each Type
 - Voltage
 - Current
 - Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute record for each individual component
 - ElectricalPanelName
 - ElectricalPanelCircuit

At Beneficial Occupancy and As-Built deliverables, design schedules shall be updated as noted below.

- One COBie.Type record for each type of component
- Three COBie.Attribute record for each Type
 - Voltage

- Current
- Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute record for each individual component
 - ElectricalPanelName
 - ElectricalPanelCircuit
- Name of COBie.Component must be uniquely created using the following rule
 - "Outlet-" & COBie.SpaceName & "-" & Item Count in Specific Space

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8.5.3 Switches

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. As a result Design Deliverables for this type of device shall be comprised of the following COBie information:

- One COBie.Type record for each type of component
- Three COBie.Attribute record for each Type
 - Voltage
 - Current
 - Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute record for each individual component
 - ElectricalPanelName
 - ElectricalPanelCircuit

- At Beneficial Occupancy and As-Built deliverables, design schedules shall be updated as noted below.
- One COBie.Type record for each type of component
- Two COBie.Attribute record for each Type
 - Voltage
 - Current
 - Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute record for each individual component
 - ElectricalPanelName
 - ElectricalPanelCircuit

- Name of COBie.Component must be uniquely created using the following rule
 - "Switch-" & COBie.SpaceName & "-" & Item Count in Specific Space
- One COBie.Connection record for each fixture, outlet, or equipment controlled by this component.

8.5.4 Distribution panel

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 19 Design – Minimum Distribution Panel Type Schedule Headings

Heading	Typical Unit
Name	DistributionPanel-TypeXX-Space#-01
Type	DistributionPanel-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Phase	-
Number of Wires	-
Number of Poles	-
Main Breaker Mounting	-
Main Bus Current	Amps
Neutral Bus	-
Equip Ground Bus	-
Isolated Ground Bus	-
Mounting	-
AIC Rating	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

Note that the full specification of the electrical system may be developed through use of the COBie.Connection and COBie.Assembly worksheets. Unless specified by client, use of these worksheets is not required to meet the generic COBie Guide.

8.5.5 Switchgear

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 20 Design – Minimum Switchgear Type Schedule Headings

Heading	Typical Unit
Name	Switchgear-TypeXX-Space#-01
Type	Switchgear-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Operating Weight	Kg
Type of Support	-
Horizontal Bus Current	Amps
Vertical Bus Current	Amps
Short Circuit Interrupting Rating	KAIC
Enclosure Rating	-
Minimum Bus Bracing	KAIC
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.5.6 Generator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 21 Design – Minimum Generator Type Schedule Headings

Heading	Typical Unit
Name	Generator-TypeXX-Space#-01
Type	Generator-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Operating Weight	Kg
Type of Support	-
Maximum Power Output	kW
Fuel Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.6 Required Control System Assets

8.6.1 Sensors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 22 Design – Minimum Sensors Type Schedule Headings

Heading	Typical Unit
Name	Sensor-TypeXX-Space#-01
Type	Sensor-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Mounting	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.6.2 Controllers

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables. .

Note that the expected naming of this component should reflect the type and component’s specific use in a system.

Table 23 Design – Minimum Controller Type Schedule Headings

Heading	Typical Unit
Name	Controller-TypeXX-Space#-01
Type	Controller-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Mounting	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

Controllers will also be identified with one more attribute to allow operators to determine the primary component that is controlled by this device.

- ControlledDevice

8.7 Required Elevator System Assets

8.7.1 Elevator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables. .

Note that the expected naming of this component should reflect the type and component's specific use in a system.

Table 24 Design – Minimum Elevator Type Schedule Headings

Heading	Typical Unit
Name	Elevator-TypeXX-Space#-01
Type	Elevator-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Capacity	Kg
Speed	m/s
SCR HP Rating	-
MG Motor Power	KW
Starting Amps	Amps
Accelerating Amps	Amps
Mach. RM	K Cal/hr
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8 Required Food Service System Assets

8.8.1 Sinks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 25 Design – Minimum Sinks Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceSink-TypeXX-Space#-01
Type	FoodServiceSink-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Water Inlet	-
Drain	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.8.2 Waste Disposer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 26 Design – Minimum Waste Disposer Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceWasteDisposer-TypeXX-Space#-01
Type	FoodServiceWasteDisposer-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Water Inlet	-
Drain	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attribute:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.3 Dishwasher

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 27 Design – Minimum Dishwasher Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceDishwasher-TypeXX-Space#-01
Type	FoodServiceDishwasher-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Water Inlet	-
Drain	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.4 Refrigerator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 28 Design – Minimum Refrigerator Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceRefrigerator-TypeXX-Space#-01
Type	FoodServiceRefrigerator-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Water Inlet	-
Drain	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.5 Icemaker

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 29 Design – Minimum Icemaker Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceIcemaker-TypeXX-Space#-01
Type	FoodServiceIcemaker-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Water Inlet	-
Drain	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.6 Range

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 30 Design – Minimum Range Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceRange-TypeXX-Space#-01
Type	FoodServiceRange-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Gas	Mbtu
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.7 Fryer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 31 Design – Minimum Fryer Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceFryer-TypeXX-Space#-01
Type	FoodServiceFryer-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
Gas	Mbtu
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Note that the expected naming of this component should reflect the type and component’s specific use in this system.

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.8.8 Freezer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 32 Design – Minimum Freezer Type Schedule Headings

Heading	Typical Unit
Name	FoodServiceFreezer-TypeXX-Space#-01
Type	FoodServiceFreezer-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Connection	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.9 Required Architectural Assets

8.9.1 Doors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that a comma separated list of two space names is required for interior doors. The first space listed (or if only one space is provided) shall be the space into which the door opens.

Table 33 Design – Minimum Door Type Schedule Headings

Heading	Typical Unit
Name	Door-TypeXX-Space#-01
Type	Door-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Names)
Door Width	mm
Door Height	mm
Door Thickness	mm
Door Type	-
Door Material	-
Door Finish	-
Glazing Type	-
Security Code	-
Frame Type	-
Frame Material	-
Frame Finish	-
Frame Head	-
Frame Jam	-
Frame Sill	-
Fire Label Class	-
Fire Label Rating	-
Hardware Set	-
Pressurization	-
Egress Door	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.9.2 Windows

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that a comma separated list of two space names is required for interior windows.

Table 34 Design – Minimum Window Type Schedule Headings

Heading	Typical Unit
Name	Window-TypeXX-Space#-01
Type	Window-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Names)
Window Number	-
Security Code	-
Window Rating	-
Glazing Type	-
Window Size	-
Window Size	-
Window Size	-
Window Operation	-
Frame Material	-
U-Factor	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.9.3 Finishes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 35 Design – Minimum Finish Schedule Headings

Heading	Typical Unit
Name	-
Type	-
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Floor	-
Base	-
Walls	-
Ceiling Type	-
Ceiling Finish	-
Ceiling Height	mm
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.10 Furnishing Assets

While there are many different types of furnishing assets, they commonly use the same type of schedule. The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Table 36 Design – Minimum Furnishing Assets Schedule Headings

Heading	Typical Unit
Name	FurnishingAsset-TypeXX-Space#-01
Type	FurnishingAsset-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
GFCI	-
GFGI	-
CFCI	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11 Site Assets

8.11.1 Site Water Distribution System

8.11.1.1 Site Water Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 37 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	SiteWaterPump-TypeXX-Space#-01
Type	SiteWaterPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Flow Rate Min	L/s
Flow Rate Max	L/s
Pressure Head	kPa
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.11.1.2 Site Water Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component’s space
- Name of COBie.Component must be uniquely created using the following rule
 - “Valve-”& COBie.SpaceName & “-“ & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.11.1.3 Site Water Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component’s specific use in this system.

Table 38 Design – Minimum Tanks Schedule Headings

Heading	Typical Unit
Name	SiteWaterTank-TypeXX-Space#-01
Type	SiteWaterTank-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Access Type	-
Storage Type	-
Capacity	L
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11.2 Site Fire Suppression System

8.11.2.1 Fire Suppression Hydrants

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 39 Design – Minimum Hydrant Schedule Headings

Heading	Typical Unit
Name	Hydrant-TypeXX-Space#-01
Type	Hydrant-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Flow Rate	-
Pressure Rating	-
Body Color	-
Cap Color	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11.2.2 Fire Suppression Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "Valve-" & COBie.SpaceName & "-" & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.11.2.3 Fire Suppression Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 40 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	FirePump-TypeXX-Space#-01
Type	FirePump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Flow Rate Min	L/s
Flow Rate Max	L/s
Pressure Head	kPa
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.11.3 Water Supply Wells

8.11.3.1 Water Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 41 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	WaterSupplyPump-TypeXX-Space#-01
Type	WaterSupplyPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Power	kW
Flow Rate Min	L/s
Flow Rate Max	L/s
Pressure Head	kPa
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.11.3.2 Water Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component’s space
- Name of COBie.Component must be uniquely created using the following rule
 - “Valve-”& COBie.SpaceName & “-“ & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.11.4 Site Sanitary Sewer

8.11.4.1 Sewer Manholes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component’s specific use in this system.

Table 42 Design – Minimum Manhole Schedule Headings

Heading	Typical Unit
Name	SewerManhole-TypeXX-Space#-01
Type	SewerManhole-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
North Coordinate (Y)	-
East Coordinate (X)	-
Top	-
Inv. In	-
Inv. Out	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11.4.2 Sewer Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 43 Design – Minimum Pump Schedule Headings

Heading	Typical Unit
Name	SewerPump-TypeXX-Space#-01
Type	SewerPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Rated Flow	L/s
Churn Pressure	kPa
Controller Type	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.11.4.3 Sewer Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component's space
- Name of COBie.Component must be uniquely created using the following rule
 - "Valve-" & COBie.SpaceName & "-" & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)

- OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.11.4.4 Sewer Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 44 Design – Minimum Tank Schedule Headings

Heading	Typical Unit
Name	SewerTank-TypeXX-Space#-01
Type	SewerTank-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Access Type	-
Storage Type	-
Capacity	L
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11.5 Fuel Distribution

8.11.5.1 Fuel Distribution Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component's specific use in this system.

Table 45 Design – Minimum Fuel Pump Schedule Headings

Heading	Typical Unit
Name	FuelPump-TypeXX-Space#-01
Type	FuelPump-TypeXX
SpecificationSection	(as identified in client's contract)
Location	(Space Name)
Current	Amps
Voltage	Volts
Frequency	Hz
Service	-
Flow Rate Min	L/s
Flow Rate Max	L/s
Total Head	m
Rotation Speed	RPM
Power	kW
Phase	-
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section. In addition, the Beneficial Occupancy and As-Built Deliverables shall provide the following additional attributes:

- ElectricalPanelName
- ElectricalPanelCircuit

8.11.5.2 Fuel Distribution Valves

Schedules for this type of device are **not** required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

- One COBie.Type record for each type of component
- One COBie.Component for each individual component, identifying the component’s space
- Name of COBie.Component must be uniquely created using the following rule
 - “Valve-”& COBie.SpaceName & “-“ & Item Count in Specific Space
- Two COBie.Attribute record for each component
 - OperatingPositionNormal (open/closed)
 - OperatingPositionEmergency (open/closed)
- One COBie.Connection record for each component whose flow is controlled by this device.

8.11.5.3 Fuel Distribution Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable and subsequent construction deliverables.

Note that the expected naming of this component should reflect the type and component’s specific use in this system.

Table 46 Design – Minimum Fuel Tank Schedule Headings

Heading	Typical Unit
Name	FuelTank-TypeXX-Space#-01
Type	FuelTank-TypeXX
SpecificationSection	(as identified in client’s contract)
Location	(Space Name)
Access Type	-
Service	-
Fuel Type	-
Capacity	L
Dry Weight	Kg
Wet Weight	Kg
SpatialPlacement	(from approved list of placement types)
BasisOfDesign-Manufacturer	(If found on drawing schedules)
BasisOfDesign-ModelNumber	(If found on drawing schedules)
BasisOfDesign-Notes	(If found on drawing schedules)

Construction deliverables will be updated to reflect installed equipment and other information described in the General Requirements Section.

8.11.5.4 Fuel Distribution Switches

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. As a result Design Deliverables for this type of device shall be comprised of the following COBie information:

- One COBie.Type record for each type of component
- Three COBie.Attribute record for each Type
 - Voltage
 - Current
 - Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute for each individual component
 - PanelBoard
 - Circuit

At Beneficial Occupancy and As-Built deliverables, design schedules shall be updated as noted below.

- One COBie.Type record for each type of component
- Three COBie.Attribute record for each Type
 - Voltage
 - Current
 - Frequency
- One COBie.Component for each individual component, identifying the component's space
- Two COBie.Attribute for each individual component
 - PanelBoard
 - Circuit
- Name of COBie.Component must be uniquely created using the following rule
 - "Switch-" & COBie.SpaceName & "-" & Item Count in Specific Space
- One COBie.Connection record for each fixture, outlet, or equipment controlled by this component.

9 PARTS & CONSUMABLES

The following types of parts are to be identified:

1. General consumables
2. General custodial
3. General shop equipment
4. Equipment
5. Tools
6. Equipment specific materials

9.1 Common Facility Consumables

The following minimum set of information shall be provided in the Beneficial Occupancy Construction COBie Deliverable and reflected in the As-Built Construction Deliverable.

Table 47 Minimum Attributes for Common Facility Consumables and COBie Mapping

Heading	COBie Mapping				
	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Part Number	Spare	PartNumber		IfcIdentifier	
Description	Spare	Description		IfcText	
Vendor	Spare	Suppliers		IfcText	
Unit Price	Attribute	-	UnitPrice	IfcMonetaryUnit	Spare
Unit	Attribute	-	UnitOfMeasure	IfcUnit	Spare
Quantity	Attribute	-	Quantity	IfcCountMeasure	Spare
Material Cost	Attribute	-	MaterialCost	IfcMonetaryUnit	Spare
Shipping Cost	Attribute	-	ShippingCost	IfcMonetaryUnit	Spare
Sub Cost	Attribute	-	SubCost	IfcMonetaryUnit	Spare
Logistics Category 1	Attribute	-	LogisticsCategory1	IfcText	Spare
Logistics Category 2	Attribute	-	LogisticsCategory2	IfcText	Spare
Website	Attribute	-	Website	IfcText	Spare
Criticality	Attribute	-	Criticality	IfcText	Spare

9.2 Equipment Specific Consumables

The following minimum set of information shall be provided in the Beneficial Occupancy Construction COBie Deliverable and reflected in the As-Built Construction Deliverable.

Table 48 Minimum Attributes for Equipment Specific Consumables and COBie Mapping

Heading	COBie Mapping				
	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Part Number	Spare	PartNumber		IfcIdentifier	
Description	Spare	Description		IfcText	
Vendor	Spare	Suppliers		IfcText	
Spec Number	Attribute	-	SpecificationNumber	IfcLabel	Spare
Spec Section	Attribute	-	SpecificationSection	IfcLabel	Spare
Unit Price	Attribute	-	UnitPrice	IfcMonetaryUnit	Spare
Unit	Attribute	-	UnitOfMeasure	IfcUnit	Spare
Initial Order Quantity	Attribute	-	InitialOrderQuantity	IfcCountMeasure	Spare
Re-Order Quantity	Attribute	-	Re-OrderQuantity	IfcCountMeasure	Spare
Minimum Inventory Level	Attribute	-	MinimumInventoryLevel	IfcCountMeasure	Spare
Attic	Attribute	-	Attic	IfcText	Spare
Material Cost	Attribute	-	MaterialCost	IfcMonetaryUnit	Spare
Shipping Cost	Attribute	-	ShippingCost	IfcMonetaryUnit	Spare
Sub Cost	Attribute	-	SubCost	IfcMonetaryUnit	Spare
Logistics Category 1	Attribute	-	LogisticsCategory1	IfcText	Spare
Logistics Category 2	Attribute	-	LogisticsCategory2	IfcText	Spare
Website	Attribute	-	Website	IfcText	Spare
Criticality	Attribute	-	Criticality	IfcText	Spare

APPENDIX A - OWNER'S REQUIREMENTS

NOTE: Prior to the use of this document by a specific owner. This section should be updated to reflect the individual procedures and technologies in place by that owner to facilitate the production and delivery of COBie deliverables.

This Appendix provides the requirements for your specific Agency as additions to, or clarification of, the general requirements for COBie deliverables identified in the previous sections.

1 Automated Tools

It is recommended that the Agency utilizing this guide identify the necessary automated tools to be used during the different project phases.

Design

The Agency will need tools to capture the design information required in COBie. There are several design tools available to produce a design COBie file. More information related to such tools can be found on the COBie Means and Method page¹⁴.

Construction

The Agency will need tools to capture information during construction that is required in COBie. Tools can be used to capture assets' serial numbers or to electronically produce and transmit submittals. There are several tools available to accomplish this. More information can be found on the COBie Means and Method page¹⁵.

Commissioning

The Agency will need tools to capture and update information during the commissioning phase. There are several available tools to aid in this process. More information related to such tools can be found on the COBie Means and Method page¹⁶.

2 Mandatory Classification

In lieu of the client providing a specific classification scheme, the project team shall submit, to the owner for approval, the classification scheme to be used. The identification of the COBie.Sheet.Classification column data shall be a single text string with the Classification Number, a delimiter (typically a colon), and the Classification name, e.g. "11-12 11 34 00 : New Facility". The best

¹⁴ <http://www.buildingsmartalliance.org/index.php/projects/cobie>

¹⁵ <http://www.buildingsmartalliance.org/index.php/projects/cobie>

¹⁶ <http://www.buildingsmartalliance.org/index.php/projects/cobie>

classification found shall be used. If there is not a specifically applicable sub-classification, the higher level classification shall be selected. Spaces may be added to classification records to provide readability.

COBie.Contact Classification

The required classification to be used for COBie.Contact records identifies the organization's roles. The Agency specific table for contact classification shall be inserted in this section. If no specific agency table is available for this classification, OmniClass Table 34 – Organizational Roles shall be use as default.

COBie.Facility Classification

The required classification to be used for COBie.Facility records identifies the facility's function. The Agency specific table for facility classification shall be inserted in this section. If no specific agency table is available for this classification, OmniClass Table 11 - Construction Entities by Function shall be use as default.

COBie.Space Classification

The required classification to be used for COBie.Space records identifies the space's function. The Agency specific table for space classification shall be inserted in this section. If no specific agency table is available for this classification, OmniClass Table 13-Spaces by Function shall be use as default.

COBie.Zone Classification

The following zones are recommended to be included in COBie models, if such zones are relevant in the specific facility being modeled. These are provided in alphabetical order.

- Circulation Zone
- Fire Alarm Zone
- Historical Preservation Zone
- Lighting Zone
- Occupancy Zone
- Ventilation Zone

COBie.Type Classification

The required classification to be used for COBie.Type records identifies the asset type. The Agency specific table for type classification shall be inserted in this section. If no specific agency table is available for this classification, OmniClass Table 23-Products shall be use as default.

COBie.System Classification

The required classification to be used for COBie.System records identifies the system type. The Agency specific table for type classification shall be inserted in this section. If no specific agency table is available for this classification, OmniClass Table 21-Elements shall be use as default.

APPENDIX B – MAPPING FOR EQUIPMENT / ASSET SCHEDULE REQUIREMENTS

1 Required HVAC System Assets

1.1 Chiller

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Chiller_AIRCOOLED_UStypeProduct¹⁷

Table 49 Mapping for Minimum Chiller Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Chiller-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Chiller-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	kW	Attribute	-	NominalPower	IfcPowerMeasure	Type/Component
Capacity	kW	Attribute	-	NominalCapacity	IfcPowerMeasure	Type/Component
Water Flow	m ³ /hr	Attribute	-	NominalFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Ambient Temp	C	Attribute	-	AmbientTemperature	IfcThermodynamicTemperatureMeasure	Type/Component
Pressure Drop	kPa	Attribute	-	PressureDrop	IfcPressureMeasure	Type/Component
Entering Water Temp	C	Attribute	-	WaterTempEntering	IfcThermodynamicTemperatureMeasure	Type/Component
Leaving Water	C	Attribute	-	WaterTempLeaving	IfcThermodynamicTemperatureMeasure	Type/Component

¹⁷ http://www.wbdg.org/references/spie/111201/Chiller_AIRCOOLED_US/Chiller_AIRCOOLED_UStypeProduct.html

Temp				g	icTemperatureMeasure	
Motor Controller	-	Attribute	-	MotorController	IfcIdentifier	Type/Component
Unloading Steps	-	Attribute	-	UnloadingSteps	IfcText	Type/Component
Chiller Media	-	Attribute	-	ChillerMedia	IfcText	Type/Component
Chiller Type	-	Attribute	-	ChillerType	IfcText	Type/Component
Refrigerant Type	-	Attribute	-	RefrigerantType	IfcText	Type/Component
Energy Efficiency Ratio (EER)	Btu/hr to kW	Attribute	-	Energy Efficiency Ratio	IfcRatioMeasure	Type/Component
Integrated Part-Load Value (IPLV)	-	Attribute	-	Integrated Part-Load Value	IfcText	Type/Component
Heat Reclaim	-	Attribute	-	HeatReclaim	IfcBoolean	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

1.2 Boiler

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template Boiler_Steam_US¹⁸

Table 50 Mapping for Minimum Boiler Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Boiler-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Boiler-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		IfcText	Type

¹⁸ http://www.wbdg.org/references/spie/110901/Boiler_STEAM_US/Boiler_STEAM_USTypeProduct.html

Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Input Power	kW	Attribute		PowerInput	IfcPowerMeasure	Type/Component
Output Power	kW	Attribute	-	PowerOutput	IfcPowerMeasure	Type/Component
Water Flow	m ³ /hr	Attribute	-	NominalFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Entering Water Temp	C	Attribute	-	WaterTempEntering	IfcThermodynamicTemperatureMeasure	Type/Component
Leaving Water Temp	C	Attribute	-	WaterTempLeaving	IfcThermodynamicTemperatureMeasure	Type/Component
Vent Diameter	mm	Attribute	-	VentDiameter	IfcPositiveLengthMeasure	Type/Component
Passes	-	Attribute	-	Passes	IfcText	Type/Component
Pressure Drop	kPa	Attribute	-	PressureDrop	IfcPressureMeasure	Type/Component
Energy Source	-	Attribute	-	EnergySource	IfcLabel	Type/Component
Fuel Type	-	Attribute	-	FuelType	IfcText	Type/Component
Output Media	-	Attribute	-	OutputMedia	IfcText	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

1.3 Air Handling Units

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template UnitaryEquipment_AIRHANDLER_UStypeProduct¹⁹

Table 51 Mapping for Minimum Air Handling Unit Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	AHU-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	AHU-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Fan Flow - Maximum	L/s	Attribute	-	FanFlowRateMax	IfcVolumetricFlowRateMeasure	Type/Component
Fan Flow - Nominal	L/s	Attribute	-	FanFlowRateMin	IfcVolumetricFlowRateMeasure	Type/Component
Fan Outside Flow	L/s	Attribute	-	FanFlowRateOutside	IfcVolumetricFlowRateMeasure	Type/Component
Fan Ext Pressure Drop	kPa	Attribute	-	FanPressureDrop	IfcPressureMeasure	Type/Component
Fan Motor Power	kW	Attribute	-	FanMotorPower	IfcPowerMeasure	Type/Component
Fan Speed	RPM	Attribute	-	FanSpeed	IfcRotationalFrequencyMeasure	Type/Component
Fan Sound Level	dB	Attribute	-	FanSoundLevel	IfcSoundPressureMeasure	Type/Component
Coil Flow	L/s	Attribute	-	CoilFlow	IfcVolumetricFlowRateMeasure	Type/Component
Coil Velocity	m/min	Attribute	-	CoilVelocity	IfcLinearVelocityMeasure	Type/Component
Coil Capacity	W	Attribute	-	CoilCapacity	IfcPowerMeasure	Type/Component
EnteringAirTempDB	C	Attribute	-	EnteringAirTempDB	IfcThermodynamicTemperatureMeasure	Type/Component

¹⁹ http://www.wbdg.org/references/spie/111201/UnitaryEquipment_AIRHANDLER_US/UnitaryEquipment_AIRHANDLER_UStypeProduct.html

EnteringAirTempWB	C	Attribute	-	EnteringAirTempWB	IfcThermodynamicTemperatureMeasure	Type/Component
LeavingAirTempDB	C	Attribute	-	LeavingAirTempDB	IfcThermodynamicTemperatureMeasure	Type/Component
LeavingAirTempWB	C	Attribute	-	LeavingAirTempWB	IfcThermodynamicTemperatureMeasure	Type/Component
EnteringWaterTemp	C	Attribute	-	EnteringWaterTemp	IfcThermodynamicTemperatureMeasure	Type/Component
LeavingWaterTemp	C	Attribute	-	LeavingWaterTemp	IfcThermodynamicTemperatureMeasure	Type/Component
ChilledWaterRate	L/s	Attribute	-	ChilledWaterRate	IfcVolumetricFlowRateMeasure	Type/Component
RunoutInletSize	mm	Attribute	-	RunoutInletSize	IfcPositiveLengthMeasure	Type/Component
RunoutOutletSize	mm	Attribute	-	RunoutOutletSize	IfcPositiveLengthMeasure	Type/Component
CoilAirPressureDrop	Pa	Attribute	-	PressureDropCoilAir	IfcPressureMeasure	Type/Component
CoilWaterPressureDrop	kPa	Attribute	-	PressureDropCoilWater	IfcPressureMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

1.4 Fan coil units

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Coil_NOTDEFINED_US²⁰.

Table 52 Mapping for Minimum Fan Coil Unit Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	FanCoil-TypeXX- Space#-01	Component	Name		IfcLabel	
Type	FanCoil-TypeXX	Component	TypeName		IfcText	

²⁰ http://www.wbdg.org/references/spie/110901/Coil_NOTDEFINED_US/Coil_NOTDEFINED_USTypeProduct.html

SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Air Flow	L/s	Attribute	-	NominalAirFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Fan Speed	-	Attribute	-	FanSpeed	IfcRotationalFrequencyMeasure	Type/Component
Exit Static Pressure	Pa	Attribute	-	ExitStaticPressure	IfcPressureMeasure	Type/Component
EnteringAirTempDB	C	Attribute	-	EnteringAirTempDB	IfcThermodynamicTemperatureMeasure	Type/Component
EnteringAirTempWB	C	Attribute	-	EnteringAirTempWB	IfcThermodynamicTemperatureMeasure	Type/Component
LeavingAirTempDB	C	Attribute	-	LeavingAirTempDB	IfcThermodynamicTemperatureMeasure	Type/Component
LeavingAirTempWB	C	Attribute	-	LeavingAirTempWB	IfcThermodynamicTemperatureMeasure	Type/Component
Total Capacity	KW	Attribute	-	TotalCapacity	IfcPowerMeasure	Type/Component
Sensible Capacity	KW	Attribute	-	NominalSensibleCapacity	IfcPowerMeasure	Type/Component
EnteringWaterTemp	C	Attribute	-	EnteringWaterTemp	IfcThermodynamicTemperatureMeasure	Type/Component
Leaving Water Temp	C	Attribute	-	LeavingWaterTemp	IfcThermodynamicTemperatureMeasure	Type/Component
Chilled Water Flow	L/s	Attribute	-	ChilledWaterFlow	IfcVolumetricFlowRateMeasure	Type/Component
Cooling Coil Delta P	kPa	Attribute	-	CoolingCoilDeltaP	IfcPressureMeasure	Type/Component
Cooling Rows	-	Attribute	-	CoolingRows	IfcReal	Type/Component
Fan Motor Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Phase	-	Attribute	-	PhaseReference	IfcLabel	Type/Component
Cabinet Type	-	Attribute	-	CabinetType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component

BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

1.5 Filters

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template Filter_AIRPARTICLEFILTER_US²¹. Air Flow maximum was included in this table since it was found in a note associated with each filter. The efficiency rating identified in the table is too general and should be clarified as either NominalCountedEfficiency or NominalWeightedEfficiency.

Table 53 Mapping for Minimum Filter Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Filter-TypeXX- Space#-01	Component	Name		IfcLabel	
Type	Filter-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Length	mm	Attribute	-	NominalLength	IfcPositiveLength Measure	Type/Component
Width	mm	Attribute	-	NominalWidth	IfcPositiveLength Measure	Type/Component
Height	mm	Attribute	-	NominalHeight	IfcPositiveLength Measure	Type/Component
Air Flow - Maximum	L/s	Attribute	-	MaxFlowRate	IfcVolumetricFlo wRateMeasure	Type/Component
Air Flow - Nominal	L/s	Attribute	-	NominalFlowRate	IfcVolumetricFlo wRateMeasure	Type/Component
Nominal Pressure Drop	Pa	Attribute	-	NominalPressure Drop	IfcPressureMeas ure	Type/Component
Efficiency Rating	%	Attribute	-	Efficiency	IfcReal	Type/Component
Residence Time	Sec	Attribute	-	ResidenceTime	IfcTimeMeasur e	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component

²¹ http://www.wbdg.org/references/spie/110901/Filter_AIRPARTICLEFILTER_US/Filter_AIRPARTICLEFILTER_USTypeProduct.html

BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

1.6 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_CIRCULATOR_US²².

Table 54 Mapping for Minimum Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Pump-TypeXX- Space#-01	Component	Name		IfcLabel	
Type	Pump-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	`	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Rated Flow	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Churn Pressure	kPa	Attribute	-	ChurnPressure	IfcPressureMeasure	Type/Component
Controller Type	-	Attribute	-	ControllerType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²² http://www.wbdg.org/references/spie/111201/Pump_CIRCULATOR_US/Pump_CIRCULATOR_USTypeProduct.html

1.7 Fans

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Fan_CENTRIFUGALAIRFOIL_US²³

Table 55 Mapping for Minimum Fan Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Fan-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Fan-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Service	-	Attribute	-	TypeOfService	IfcText	Type/Component
Flow Rate	L/s	Attribute	-	NominalAirFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Pressure	Pa	Attribute	-	NominalTotalPressure	IfcPowerMeasure	Type/Component
Control Type	-	Attribute	-	CapacityControlType	IfcLabel	Type/Component
Interlock	-	Attribute	-	Interlock	IfcText	Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²³ http://www.wbdg.org/references/spie/111201/Fan_CENTRIFUGALAIRFOIL_US/Fan_CENTRIFUGALAIRFOIL_UStypeProduct.html

1.8 Motors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricMotor_DC_US²⁴.

Table 56 Mapping for Minimum Motor Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Motor-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Motor-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Phase	-	Attribute	-	PhaseReference	IfcLabel	Type/Component
Efficiency	-	Attribute	-	ElectricMotorEfficiency	IfcPowerMeasure	Type/Component
Drive	-	Attribute	-	Drive	IfcLabel	Type/Component
Drive Control Type	-	Attribute	-	DriveControlType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²⁴ http://www.wbdg.org/references/spie/110901/ElectricMotor_DC_US/ElectricMotor_DC_USTypeProduct.html

1.9 Compressors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Compressor_RECIPROCATING_US²⁵.

Table 57 Mapping for Minimum Compressor Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Compressor-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Compressor-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Refrigerant Type	-	Attribute	-	RefrigerantClass	IfcMaterialDefinition	Type/Component
Capacity	%	Attribute	-	NominalCapacity	IfcPowerMeasure	Type/Component
Speed	RPM	Attribute	-	CompressorSpeed	IfcRotationalFrequencyMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²⁵http://www.wbdg.org/references/spie/110901/Compressor_RECIPROCATING_US/Compressor_RECIPROCATING_USTypeProduct.html

1.10 Variable Air Volume boxes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template AirTerminalBox_VARIABLEFLOWPRESSUREDEPENDANT_US²⁶

Table 58 Mapping for Minimum VAV Box Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	VAV-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	VAV-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Inlet Size	mm	Attribute	-	InletSize	IfcPositiveLengthMeasure	Type/Component
Air Flow – Minimum	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Air Flow - Maximum	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Pressure Drop	Pa	Attribute	-	PressureDrop	IfcPressureMeasure	Type/Component
NC Level – Discharge	dB	Attribute	-	NCLevelDischarge	IfcSoundPressureMeasure	Type/Component
NC Level - Radiated	dB	Attribute	-	NCLevelRadiated	IfcSoundPressureMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²⁶ http://www.wbdg.org/references/spie/110901/AirTerminalBox_VARIABLEFLOWPRESSUREDEPENDANT_US/AirTerminalBox_VARIABLEFLOWPRESSUREDEPENDANT_USTypeProduct.html

2 Required Plumbing System Assets

2.1 Water treatment Assemblies

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable.

Table 59 Mapping for Minimum Water Treatment Assemblies Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	WaterTreatmentAssembly-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	WaterTreatmentAssembly-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
System Types	-	Attribute	-	SystemsType	IfcText	Type/Component
Water Softener	-	Attribute	-	WaterSoftener	IfcBoolean	Type/Component
Disinfection Type	-	Attribute	-	DisinfectionType	IfcText	Type/Component
Rejection Ratio	-	Attribute	-	RejectionRatio	IfcRatioMeasure	Type/Component
Capacity	cu.meters/day	Attribute	-	Capacity	IfcVolumetricFlowRateMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

2.1 Plumbing Fixtures

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template SanitaryTerminal_WASHHANDBASIN_PlumbingFixtures_US²⁷, SanitaryTerminal_TOILETPAN_PlumbingFixtures_US²⁸, SanitaryTerminal_URINAL_PlumbingFixtures_US²⁹

Table 60 Mapping for Minimum Plumbing Fixture Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	PlumbingFixture-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	PlumbingFixture-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Waste	WSFU	Attribute	-	WasteWater	IfcVolumetricFlowRateMeasure	Type/Component
Vent	WSFU	Attribute	-	Vent	IfcVolumetricFlowRateMeasure	Type/Component
Cold Water	WSFU	Attribute	-	ColdWater	IfcVolumetricFlowRateMeasure	Type/Component
Hot Water	WSFU	Attribute	-	HotWater	IfcVolumetricFlowRateMeasure	Type/Component
Sanitary Fixture Water	liter/flush	Attribute	-	SanitaryFixtureWater	IfcReal	Type/Component
Maximum Flow Rate	L/min	Attribute	-	MaximumFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

²⁷ http://www.wbdg.org/references/spie/110901/SanitaryTerminal_WASHHANDBASIN_PlumbingFixtures_US/SanitaryTerminal_WASHHANDBASIN_PlumbingFixtures_USTypeProduct.html

²⁸ http://www.wbdg.org/references/spie/111201/SanitaryTerminal_TOILETPAN_PlumbingFixtures_US/SanitaryTerminal_TOILETPAN_PlumbingFixtures_USTypeProduct.html

²⁹ http://www.wbdg.org/references/spie/111201/SanitaryTerminal_URINAL_PlumbingFixtures_US/SanitaryTerminal_URINAL_PlumbingFixtures_USTypeProduct.html

3 Required Fire Suppression System Assets

3.1 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_CIRCULATOR_US³⁰.

Table 61 Mapping for Minimum Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Pump-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Pump-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	`	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Rated Flow	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Churn Pressure	kPa	Attribute	-	ChurnPressure	IfcPressureMeasure	Type/Component
Controller Type	-	Attribute	-	ControllerType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁰ http://www.wbdg.org/references/spie/111201/Pump_CIRCULATOR_US/Pump_CIRCULATOR_UStypeProduct.html

3.2 Fire extinguishers

Design schedules for this type of device on design drawings only identify each type of component. The location of each component is typically identified by drawing note. As a result Design Deliverables for this type of device shall be comprised of the following COBie information:

- One COBie.Type record for each type of component
- Two COBie.Attribute record for each Type
 - Capacity (Kg)
 - Rating
- One COBie.Component for each individual component, identifying the component's space

Schedules for this type of device are not required for COBie Design Deliverables, but will be required for COBie Beneficial Occupancy and As-Built Models. These schedules will consist of the following parts.

Table 62 Mapping for Minimum Fire Extinguisher Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	FireExtinguisher-TypeXX-Space#-01	Component	Name		IfcLabel	-
Type	FireExtinguisher-TypeXX	Component	TypeName		IfcText	-
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	-
Capacity	Kg	Attribute	-	Capacity	IfcMassMeasure	Component
Rating	-	Attribute	-	Rating	IfcText	Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

4 Required Electrical System Assets

4.1 Light fixtures

The following minimum set of information shall be provided Construction Document stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template LightFixture_DIRECTIONSOURCE_LightFixture_US³¹

Table 63 Mapping for Minimum Light Fixture Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	LightFixture-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	LightFixture-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Lens Type		Attribute	-	LensType	IfcLabel	Type/Component
Lamp Type	-	Attribute	-	LampType	IfcLabel	Type/Component
Mounting	-	Attribute	-	LightFixtureMountingType	IfcLabel	Type/Component
Lamp Count	Each	Attribute	-	LampCount	IfcCountMeasure	Type/Component
Lamp Power	W	Attribute	-	LampPower	IfcPowerMeasure	Type/Component
Function	-	Attribute	-	Function	IfcText	Type/Component
Light Path	-	Attribute	-	LightPath	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³¹ http://www.wbdg.org/references/spie/111201/LightFixture_DIRECTIONSOURCE_LightFixture_US/LightFixture_DIRECTIONSOURCE_LightFixture_USTypeProduct.html

4.2 Distribution panel

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template

ElectricDistributionBoard_DISTRIBUTIONBOARD_DistributionPanel_US³².

Table 64 Mapping for Minimum Distribution Panel Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	DistributionPanel-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	DistributionPanel-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Phase	-	Attribute	-	PhaseReference	IfcLabel	Type/Component
Number of Wires	-	Attribute	-	NumberOfWires	IfcCountMeasure	Type/Component
Number of Poles	-	Attribute	-	NumberOfPoles	IfcInteger	Type/Component
Main Breaker Mounting	-	Attribute	-	MainBreakerMounting	IfcText	Type/Component
Main Bus Current	Amps	Attribute	-	BusCurrent	IfcElectricCurrentMeasure	Type/Component
Neutral Bus	-	Attribute	-	NeutralBus	IfcBoolean	Type/Component
Equip Ground Bus	-	Attribute	-	EquipGroundBus	IfcBoolean	Type/Component
Isolated Ground Bus	-	Attribute	-	IsolatedGroundBus	IfcBoolean	Type/Component
Mounting	-	Attribute	-	MountingType	IfcText	Type/Component
AIC Rating	-	Attribute	-	AICRating	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type

³²http://www.wbdg.org/references/spie/111201/ElectricDistributionBoard_DISTRIBUTIONBOARD_DistributionPanel_US/ElectricDistributionBoard_DISTRIBUTIONBOARD_DistributionPanel_USTypeProduct.html

BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type
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4.3 Switchgear

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable.

Table 65 Mapping for Minimum Switchgear Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Switchgear-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Switchgear-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Operating Weight	Kg	Attribute	-	OperatingWeight	IfcMassMeasure	Type/Component
Type of Support	-	Attribute	-	SupportType	IfcText	Type/Component
Horizontal Bus Current	Amps	Attribute	-	HorizontalBusCurrent	IfcElectricCurrentMeasure	Type/Component
Vertical Bus Current	Amps	Attribute	-	VerticalBusCurrent	IfcElectricCurrentMeasure	Type/Component
Short Circuit Interrupting Rating	KAIC	Attribute	-	ShortCircuitInterruptingRating	IfcElectricCurrentMeasure	Type/Component
Enclosure Rating	-	Attribute	-	EnclosureRating	IfcText	Type/Component
Minimum Bus Bracing	KAIC	Attribute	-	MinimumBusBracing	IfcElectricCurrentMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

4.4 Generator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricGenerator_STANDALONE_US³³

Table 66 Mapping for Minimum Generator Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Generator-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Generator-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Operating Weight	Kg	Attribute	-	OperatingWeight	IfcMassMeasure	Type/Component
Type of Support	-	Attribute	-	SupportType	IfcText	Type/Component
Maximum Power Output	KW	Attribute	-	MaximumPowerOutput	IfcPowerMeasure	Type/Component
Fuel Type	-	Attribute	-	FuelType	IfcText	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³³http://www.wbdg.org/references/spie/110901/ElectricGenerator_STANDALONE_US/ElectricGenerator_STANDALONE_USTypeProduct.html

5 Required Control System Assets

5.1 Sensors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe templates Sensor_MOVEMENTSENSOR_US³⁴ and Sensor_LIGHTSENSOR_US³⁵.

Table 67 Mapping for Minimum Sensors Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Sensor-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Sensor-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Mounting	-	Attribute	-	Mounting	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁴http://www.wbdg.org/references/spie/110901/Sensor_MOVEMENTSENSOR_US/Sensor_MOVEMENTSENSOR_USTypeProduct.html

³⁵http://www.wbdg.org/references/spie/110901/Sensor_LIGHTSENSOR_US/Sensor_LIGHTSENSOR_USTypeProduct.html

5.2 Controllers

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Controller_PROGRAMMABLE_US³⁶.

Table 68 Mapping for Minimum Controller Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Controller-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Controller-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Mounting	-	Attribute	-	Mounting	IfcText	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁶http://www.wbdg.org/references/spie/110901/Controller_PROGRAMMABLE_US/Controller_PROGRAMMABLE_USTypeProduct.html

6 Required Elevator System Assets

6.1 Elevator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template TransportElement_ELEVATOR_US³⁷.

Table 69 Mapping for Minimum Elevator Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Elevator-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Elevator-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Capacity	Kg	Attribute	-	Capacity	IfcMassMeasure	Type/Component
Speed	m/s	Attribute	-	Speed	IfcLinearVelocityMeasure	Type/Component
SCR HP Rating	-	Attribute	-	SCRHPRating	IfcText	Type/Component
MG Motor Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Starting Amps	Amps	Attribute	-	StartingAmps	IfcElectricCurrentMeasure	Type/Component
Accelerating Amps	Amps	Attribute	-	AcceleratingAmps	IfcElectricCurrentMeasure	Type/Component
Mach. RM	K Cal/hr	Attribute	-	MachRM	IfcPowerMeasure	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁷ http://www.wbdg.org/references/spie/110901/TransportElement_ELEVATOR_US/TransportElement_ELEVATOR_USTypeProduct.html

7 Required Food Service System Assets

7.1 Sinks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template SanitaryTerminal_SINK_PlumbingFixtures_US³⁸.

Table 70 Mapping for Minimum Sinks Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Sink-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Sink-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Water Inlet	-	Attribute	-	WaterInlet	IfcText	Type/Component
Drain	-	Attribute	-	Drain	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁸http://www.wbdg.org/references/spie/111201/SanitaryTerminal_SINK_PlumbingFixtures_US/SanitaryTerminal_SINK_PlumbingFixtures_USTypeProduct.html

7.2 Waste Disposer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_USERDEFINED_FoodServiceEquipment_US³⁹.

Table 71 Mapping for Minimum Waste Disposer Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	WasteDisposer-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	WasteDisposer-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	kW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Water Inlet	-	Attribute	-	WaterInlet	IfcText	Type/Component
Drain	-	Attribute	-	Drain	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

³⁹http://www.wbdg.org/references/spie/110901/ElectricAppliance_USERDEFINED_FoodserviceEquipment_US/ElectricAppliance_USERDEFINED_FoodserviceEquipment_USTypeProduct.html

7.3 Dishwasher

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_DISHWASHER_US⁴⁰.

Table 72 Mapping for Minimum Dishwasher Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Dishwasher-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Dishwasher-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Water Inlet	-	Attribute	-	WaterInlet	IfcText	Type/Component
Drain	-	Attribute	-	Drain	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴⁰http://www.wbdg.org/references/spie/110901/ElectricAppliance_DISHWASHER_US/ElectricAppliance_DISHWASHER_USTypeProduct.html

7.4 Refrigerator

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_REFRIGERATOR_US⁴¹.

Table 73 Mapping for Minimum Refrigerator Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Refrigerator-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Refrigerator-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Water Inlet	-	Attribute	-	WaterInlet	IfcText	Type/Component
Drain	-	Attribute	-	Drain	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴¹http://www.wbdg.org/references/spie/110901/ElectricAppliance_REFRIGERATOR_US/ElectricAppliance_REFRIGERATOR_USTypeProduct.html

7.5 Icemaker

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_USERDEFINED_FoodServiceEquipment_US⁴².

Table 74 Mapping for Minimum Icemaker Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Icemaker-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Icemaker-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Water Inlet	-	Attribute	-	WaterInlet	IfcText	Type/Component
Drain	-	Attribute	-	Drain	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴²http://www.wbdg.org/references/spie/110901/ElectricAppliance_USERDEFINED_FoodserviceEquipment_US/ElectricAppliance_USERDEFINED_FoodserviceEquipment_USTypeProduct.html

7.6 Range

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_ELECTRICCOOKER_US⁴³.

Table 75 Mapping for Minimum Range Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Range-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Range-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	kW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Gas	Mbtu	Attribute	-	Gas	IfcEnergyMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴³http://www.wbdg.org/references/spie/110901/ElectricAppliance_ELECTRICCOOKER_US/ElectricAppliance_ELECTRICCOOKER_USTypeProduct.html

7.7 Fryer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_ELECTRICCOOKER_US⁴⁴.

Table 76 Mapping for Minimum Fryer Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Fryer-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Fryer-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	KW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
Gas	Mbtu	Attribute	-	Gas	IfcEnergyMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴⁴http://www.wbdg.org/references/spie/110901/ElectricAppliance_ELECTRICCOOKER_US/ElectricAppliance_ELECTRICCOOKER_USTypeProduct.html

7.8 Freezer

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template ElectricAppliance_FREEZER_US⁴⁵.

Table 77 Mapping for Minimum Freezer Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Freezer-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Freezer-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Power	kW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Connection	-	Attribute	-	Connection	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴⁵http://www.wbdg.org/references/spie/110901/ElectricAppliance_FREEZER_US/ElectricAppliance_FREEZER_USTypeProduct.html

8 Required Architectural Assets

8.1 Doors

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Window Door_DOOR_SecurityDoorsandFrames_US⁴⁶

Table 78 Mapping for Minimum Door Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Door-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Door-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Door Width	mm	Type	NominalLength		IfcPositiveLengthMeasure	
Door Height	mm	Type	NominalHeight		IfcPositiveLengthMeasure	
Door Thickness	mm	Type	NominalThickness		IfcPositiveLengthMeasure	
Door Type	-	Type	Name		IfcLabel	
Door Material	-	Type	Material		IfcLabel	
Door Finish	-	Type	Finish		IfcText	
Glazing Type	-	Attribute	-	Glazing	IfcText	Type
Security Code	-	Attribute	-	SecurityCode	IfcText	Type
Frame Type	-	Attribute	-	FrameType	IfcText	Type/Component
Frame Material	-	Attribute	-	FrameMaterial	IfcText	Type/Component
Frame Finish	-	Attribute	-	FrameFinish	IfcText	Type/Component
Frame Head	-	Attribute	-	Head	IfcText	Type/Component
Frame Jam	-	Attribute	-	Jam	IfcText	Type/Component
Frame Sill	-	Attribute	-	Sill	IfcText	Type/Component
Fire Label Class	-	Attribute	-	Class	IfcLabel	Type

⁴⁶http://www.wbdg.org/references/spie/110901/Door_DOOR_SecurityDoorsandFrames_US/Door_DOOR_SecurityDoorsandFrames_USTypeProduct.html

Fire Label Rating	-	Attribute	-	FireRating	IfcLabel	Type
Hardware Set	-	Attribute	-	HardwareSet	IfcText	Type/Component
Pressurization	-	Attribute	-	Pressurization	IfcBoolean	Type/Component
Egress Door	-	Attribute	-	Egress	IfcBoolean	Type/Component
Spatial Placement	(From List)	Attribute	-		IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

8.2 Windows

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Window_WINDOW_SecurityWindows_US⁴⁷

Table 79 Mapping for Minimum Window Type Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Window-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Window-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Window Number	-	Attribute	-	Name	IfcIdentifier	Type
Security Code	-	Attribute	-	SecurityCode	IfcText	Type
Window Rating	-	Attribute	-	Rating	IfcText	Type
Glazing Type	-	Attribute	-	Glazing	IfcText	Type
Window Size	-	Type	NominalLength	NominalLength	IfcPositiveLength Measure	Type
Window Size	-	Type	NominalHeight	NominalHeight	IfcPositiveLength Measure	Type
Window Size	-	Type	NominalWidth	NominalThickness	IfcPositiveLength Measure	Type

⁴⁷http://www.wbdg.org/references/spie/110901/Window_WINDOW_SecurityWindows_US/Window_WINDOW_SecurityWindows_USTypeProduct.html

Window Operation	-	Attribute	-	WindowOperation	IfcText	Type/Component
Frame Material	-	Attribute	-	FrameMaterial	IfcText	Type/Component
U-Factor	-	Attribute	-	Ufactor	IfcText	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

8.3 Finishes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable.

Table 80 Mapping for Minimum Finish Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	-					
Type	-					
Specification Section	-	Attribute	Type Name		IfcText	Type
Location	(Space Name)	Space	Name	-	IfcIdentifier	Space
Floor	-	Attribute	-	CoveringFloor	IfcLabel]	Space
Base	-	Attribute	-	CoveringBase	IfcLabel	Space
Walls	-	Attribute	-	CoveringWalls	IfcLabel	Space
Ceiling Type	-	Attribute	-	ConvergingCeilingType	IfcLabel	Space
Ceiling Finish	-	Attribute		CoveringCeilingFinish	IfcText	Space
Ceiling Height	mm	Attribute	-	CeilingHeight	IfcPositiveLengthMeasure	Space
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Space
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Space
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

9 Furnishing Assets

While there are many different types of furnishing assets, they commonly use the same type of schedule. The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie templates Furniture_SHELF_US⁴⁸ and Furniture_TABLE_US⁴⁹.

Table 81 Mapping for Minimum Furnishing Assets Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	FurnishingAsset-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	FurnishingAsset-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
GFCI	-	Attribute	-	GFCI	IfcBoolean	Type/Component
GFGI	-	Attribute	-	GFGI	IfcBoolean	Type/Component
CFCI	-	Attribute	-	CFCI	IfcBoolean	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁴⁸ http://www.wbdg.org/references/spie/110901/Furniture_SHELF_US/Furniture_SHELF_USTypeProduct.html

⁴⁹ http://www.wbdg.org/references/spie/110901/Furniture_TABLE_US/Furniture_TABLE_USTypeProduct.html

10 Site Assets

10.1 Site Water Distribution System

10.1.1 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_CIRCULATOR_US⁵⁰.

Table 82 Mapping for Minimum Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Pump-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Pump-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	`	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Rated Flow	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Churn Pressure	kPa	Attribute	-	ChurnPressure	IfcPressureMeasure	Type/Component
Controller Type	-	Attribute	-	ControllerType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁰http://www.wbdg.org/references/spie/111201/Pump_CIRCULATOR_US/Pump_CIRCULATOR_USTypeProduct.html

10.1.2 Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template Tank_STORAGE_US⁵¹.

Table 83 Mapping for Minimum Tanks Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Tank-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Tank-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Access Type	-	Attribute	-	AccessType	IfcLabel	Type/Component
Storage Type	-	Attribute	-	StorageType	IfcLabel	Type/Component
Capacity	L	Attribute	-	NominalCapacity	IfcVolumeMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵¹ http://www.wbdg.org/references/spie/110901/Tank_STORAGE_US/Tank_STORAGE_USTypeProduct.html

10.2 Site Fire Suppression System

10.2.1 Hydrants

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template FireSuppressionTerminal_FIREHYDRANT_US⁵².

Table 84 Mapping for Minimum Hydrant Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Hydrant-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Hydrant-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Flow Rate	-	Attribute	-	DischargeFlowRate	IfcVolumetricFlowRateMeasure	Type/Component
Pressure Rating	-	Attribute	-	PressureRating	IfcPressureMeasure	Type/Component
Body Color	-	Attribute	-	BodyColor	IfcText	Type/Component
Cap Color	-	Attribute	-	CapColor	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵²http://www.wbdg.org/references/spie/110901/FireSuppressionTerminal_FIREHYDRANT_US/FireSuppressionTerminal_FIREHYDRANT_USTypeProduct.html

10.3 Water Supply Wells

10.3.1 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_CIRCULATOR_US⁵³.

Table 85 Mapping for Minimum Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Pump-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Pump-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	`	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Rated Flow	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Churn Pressure	kPa	Attribute	-	ChurnPressure	IfcPressureMeasure	Type/Component
Controller Type	-	Attribute	-	ControllerType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵³http://www.wbdg.org/references/spie/111201/Pump_CIRCULATOR_US/Pump_CIRCULATOR_USTypeProduct.html

10.4 Site Sanitary Sewer

10.4.1 Manholes

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template DistributionChamberElement_MANHOLE_US⁵⁴.

Table 86 Mapping for Minimum Manhole Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Manhole-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Manhole-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
North Coordinate (Y)	-	Attribute	-	NorthCoordinate	IfcIdentifier	Type/Component
East Coordinate (X)	-	Attribute	-	EastCoordinate	IfcIdentifier	Type/Component
Top	-	Attribute	-	Top	IfcReal	Type/Component
Inv. In	-	Attribute	-	InvIn	IfcReal	Type/Component
Inv. Out	-	Attribute	-	InvOut	IfcReal	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁴http://www.wbdg.org/references/spie/110901/DistributionChamberElement_MANHOLE_US/DistributionChamberElement_MANHOLE_USTypeProduct.html

10.4.2 Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_CIRCULATOR_US⁵⁵.

Table 87 Mapping for Minimum Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Pump-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Pump-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	`	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Rated Flow	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Churn Pressure	kPa	Attribute	-	ChurnPressure	IfcPressureMeasure	Type/Component
Controller Type	-	Attribute	-	ControllerType	IfcText	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁵http://www.wbdg.org/references/spie/111201/Pump_CIRCULATOR_US/Pump_CIRCULATOR_USTypeProduct.html

10.4.3 Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template Tank_STORAGE_US⁵⁶.

Table 88 Mapping for Minimum Tank Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	Tank-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	Tank-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Access Type	-	Attribute	-	AccessType	IfcLabel	Type/Component
Storage Type	-	Attribute	-	StorageType	IfcLabel	Type/Component
Capacity	L	Attribute	-	NominalCapacity	IfcVolumeMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁶ http://www.wbdg.org/references/spie/110901/Tank_STORAGE_US/Tank_STORAGE_USTypeProduct.html

10.5 Fuel Distribution

10.5.1 Fuel Pumps

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPIe template Pump_SUBMERSIBLEPUMP_US⁵⁷.

Table 89 Mapping for Minimum Fuel Pump Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	FuelPump-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	FuelPump-TypeXX	Component	TypeName		IfcText	
Specification Section	-	Attribute	TypeName		IfcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Current	Amps	Attribute	-	Current	IfcElectricCurrentMeasure	Type/Component
Voltage	Volts	Attribute	-	Voltage	IfcElectricVoltageMeasure	Type/Component
Frequency	Hz	Attribute	-	Frequency	IfcFrequencyMeasure	Type/Component
Service	-	Attribute	-	Service	IfcText	Type/Component
Flow Rate Min	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Flow Rate Max	L/s	Attribute	-	FlowRateRange	IfcVolumetricFlowRateMeasure	Type/Component
Total Head	m	Attribute	-	TotalHead	IfcLengthMeasure	Type/Component
Rotation Speed	RPM	Attribute	-	NominalRotationSpeed	IfcRotationalFrequencyMeasure	Type/Component
Power	kW	Attribute	-	Power	IfcPowerMeasure	Type/Component
Phase	-	Attribute	-	PhaseReference	IfcLabel	Type/Component
Spatial Placement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign-Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign-ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign-Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁷ http://www.wbdg.org/references/spie/110901/Pump_SUBMERSIBLEPUMP_US/Pump_SUBMERSIBLEPUMP_US_TypeProduct.html

10.5.2 Fuel Tanks

The following minimum set of information shall be provided in Construction Documents stage design deliverable schedule and reflected in the CD Stage COBie Deliverable. COBie data mapping is based on COBie format and current SPie template Tank_STORAGE_US⁵⁸.

Table 90 Mapping for Minimum Fuel Tank Schedule Headings

Design Schedule		COBie Mapping				
Heading	Unit	Sheet	Column	Attribute Name	Data Type	Attribute Reference
Name	FuelTank-TypeXX-Space#-01	Component	Name		IfcLabel	
Type	FuelTank-TypeXX	Component	TypeName		IfcText	
SpecificationSection	-	Attribute	TypeName		ifcText	Type
Location	(Space Name)	Component	SpaceName		IfcIdentifier	
Access Type	-	Attribute	-	AccessType	IfcLabel	Type/Component
Service	-	Attribute	-	StorageType	IfcLabel	Type/Component
Fuel Type	-	Attribute	-	FuelType	IfcText	Type/Component
Capacity	L	Attribute	-	NominalCapacity	IfcVolumeMeasure	Type/Component
Dry Weight	Kg	Attribute	-	DryWeight	IfcMassMeasure	Type/Component
Wet Weight	Kg	Attribute	-	WetWeight	IfcMassMeasure	Type/Component
SpatialPlacement	(From List)	Attribute	-	Placement	IfcText	Component
BasisOfDesign- Manufacturer	(Basis of Design)	Attribute	-	BODManufacturer	IfcLabel	Type
BasisOfDesign- ModelNumber	(Basis of Design)	Attribute	-	BODModel	IfcLabel	Type
BasisOfDesign- Notes	(If Required)	Attribute	-	BODNotes	IfcText	Type

⁵⁸ http://www.wbdg.org/references/spie/110901/Tank_STORAGE_US/Tank_STORAGE_USTypeProduct.html