UC San Diego

University of California San Diego

BIM GUIDELINES

Version 1.4: May 16, 2019

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Contents

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1. Building Information Modeling ("BIM") Program Overview

1.1 Intent

The BIM Guideline is part of an initiative for the University of California San Diego ("UCSD" or "University") to develop data standards that will address the project life cycle for facility design, construction, and operations activities. This document is meant to provide insight into the goals of the University for integrating quality data from BIM with the University's life cycle management systems ("LCM"), e.g. Computerized Maintenance Management System ("CMMS"), space management, Geographic Information System ("GIS"), and the University's proprietary Facility Information System ("FIS"). This document aims to define the baseline for BIM protocols and ensure data and modeling consistency for components critical to the life cycle management process based on industry best practices and the current capabilities of available BIM software. The University expects consultants, contractors, and the entire project team to be committed to the use of BIM as the primary design, documentation, coordination, collaboration, and visualization platform.

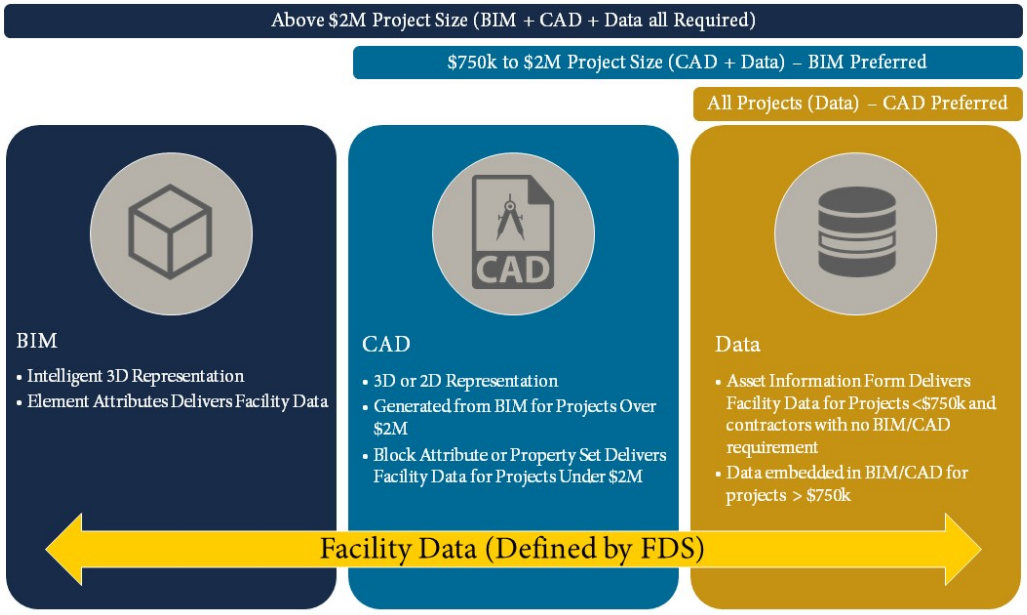
For purposes of this BIM Guideline, "digital data" is defined as information, including communications, drawings, specifications, and designs, created or stored for a project in digital form, including those developed by the project team, and the University and its consultants, for use in preparation of two-dimensional (2D) printed hard-copy construction documents using Computer Aided Design (CAD) and Building Information Modeling (BIM) software, three-dimensional (3D) model deliverables, and facility data deliverables as specified by the UCSD Facility Data Specification (FDS). Digital data will be used for planning, design, construction, commissioning, turnover, and operations and maintenance purposes.

1.2 BIM Guidelines Applicability

The Building Information Modeling process will be required on all new construction projects and major additions and renovations contracted by the University with budgets over $2,000,000. CAD and facility data deliverables are also required for projects over $2,000,000. Use of BIM is highly encouraged for all other projects under $2,000,000.

All projects between $750,000 and $2,000,000 will require a minimum of CAD design, record, and as-built deliverables, with use of BIM preferred, along with facility data deliverables. Review the Attachment 6 – CAD Standards for more information on CAD layer standards and Revit-to-CAD layer mapping guidance.

For projects under $750,000, UCSD prefers but does not require CAD deliverables for design, record, and as-built deliverables, but will still require facility data deliverables, as defined by the FDS. Any questions as to the applicability of this Guideline to a project or the comprehensiveness of the Guideline should be directed to UCSD Capital Program Management.



1.3 Organization

To ensure the successful implementation of BIM practices at the project level, the University understands there are organizational roles both on the University side to specify, oversee, and validate appropriate BIM usage and on the project consultant and contractor side to execute on project BIM requirements.

The University will appoint a representative or a team of representatives, who will support the University Project Manager in facilitating the implementation of the BIM Guidelines at the project level. The term "University BIM Lead" will be used to refer to this representative throughout this document. This University representative will be identified at the project outset by the University Project Manager. The University BIM Lead will oversee and guide BIM usage, review the project BIM Execution Plan, recommend model element Level of Development ("LOD") and facility data requirements as it relates to the project, and guide the scheduling and validation of model and data deliverables at project milestones.

The term "project team" shall mean the aggregate of the various entities involved in the planning, design, construction, commissioning, and turnover of the Project inclusive of the following: the Architect, General Contractor, and all University consultants providing input to deliver a project, including contract and third-party consultants preparing information intended to become part of the Contract Documents. The University may be referred to as "UCSD" or "University".

Project team members contracted directly with the University should appoint and name a

representative of their firm ("BIM Manager") who will be the primary point of contact for all BIM-related activities within their scope of services. The expanded project team (subconsultants, subcontractors, vendors) with model authoring requirements, as determined by the project team in the project BIM Execution Plan, may also need to identify BIM-capable personnel as part of fulfillment of their contractual requirements.

Project team members with no BIM requirement but having facility data authoring responsibility should identify a representative of their firm ("Facility Data Manager") who will be the primary point of contact for collecting and submitting facility data as required by the FDS. At the discretion of each project team member, both the BIM Manager and Facility Data Manager functions are roles that may be filled by a project team member with another primary function within the project team and need not be on their own a full-time, dedicated position.

1.4 University BIM Goals

a. Create and maintain world-class facilities

In alignment with UCSD's vision to grow leaders to drive innovation, the University is committed to creating and maintaining world-class facilities for their students, faculty, and the community at-large. UCSD acknowledges that managing world-class facilities starts with an information strategy to plan, design, specify, construct, commission, operate and maintain its' assets and related asset data in a standardized and structured manner. Incorporating BIM practices and the efficient transition of digital design and construction data to facilities LCM systems are critical elements to achieve this goal. The University aims to aggregate and maintain as-managed models for new construction and renovations/additions as well as an associated facility data set for managed assets across these facilities.

As-managed models typically start as record and/or as-built models delivered at project completion by the design team and trade contractors. As-managed models are maintained and kept up to date as a virtual facility by the University facility owner or manager as maintenance, work orders, renovations, and other projects are carried out in the physical facility such that the two are continuously aligned.

b. Use BIM processes to inform and direct team collaboration and development during a project.

The project team shall use BIM processes and virtual design and construction methodologies to engage University stakeholders to visualize, coordinate, schedule, document, and analyze design intent and constructability throughout a project, including closeout. The project team will identify and implement uses of BIM as described in this Guidelines document to be communicated through the project BIM Execution Plan.

c. Create and manage models that reflect as-built conditions.

In addition to the As-Managed model, which may be developed from a combination of record and as-built models, the University also aims to store a full set of detailed as-built models with features that are dimensionally accurate for construction and robust enough to serve as a reference post-occupancy. The University wants to have confidence the As-Built models will exist as a highly detailed digital

representation for locating all building and system elements with enough all discipline scope (supports, hangers, etc.) to determine remaining clearances and space constraints within the As-Built facility. The As-Built models will supplement the as-managed models as the authoritative source of truth for dimensional accuracy of the as-built condition at project closeout.

d. Achieve day one operational readiness by implementing a facilities information strategy to support the overall goal for efficient turnover of digital data to facilities operations systems.

The University aims to specify and incrementally collect and validate data to meet their goals for operational readiness on Day 1 of occupancy. Prior to project closeout, the validated As-Managed model and facility data set will be transferred into the relevant LCM systems to support operations and maintenance functions. To meet this objective, it is important that the guidelines presented in this document be followed. Housing Dining Hospitality (HDH), Facilities Management, and UCSD Health will be the primary users of the project digital data (Maximo and TMA). Digital data will also be used to update the University's GIS dataset and space management system (Tririga). Additional departments may express interest in working with project digital data on specific University projects and may provide additional model or data requirements to the project that are not contained in the Guideline.

Transfer of information between project digital data deliverables and LCM software will be tested by the University at milestone intervals determined by the University to validate the deliverables (section 2.5 of this Guide). Incremental data collection and transfer of project digital data to LCM systems will be one of several ways the University will assess and validate acceptability of deliverables from the Project Team over the project lifecycle.

The University aims to develop processes to manage changes to existing facilities data and As-Managed models as work orders and renovations are performed over time.

1.5 BIM Execution Planning

A BIM Execution Plan (BEP) is a living document that provides a framework to determine project-specific BIM goals, processes, information exchanges, and technology infrastructure needs to fully execute the various aspects of BIM. A project BEP helps document and communicate content, process, organizational, and technological requirements for the project team to ensure a comprehensive and consistent set of models with enough detail and development are delivered to the University. BIM Execution Planning is required as documentation from the project team that all considerations have been taken into account when implementing BIM on a project. The University BIM Lead will be an active participant in guiding and overseeing adequate BIM execution planning by the project team.

The University requires the use the UCSD BIM Execution Plan Template as a starting point for development of project BIM Execution Plans. See

1.6 Ownership

The University has ownership and all rights to all digital data including all models and facility data created or developed by consultants, subconsultants, contractors, subcontractors, and vendors in relation to a project under which this Guideline or portion of this Guideline applies to. The University may make use of this data following any deliverable.

In contributing content to a model or models, the model element author (MEA) and facility data manager (FDM) does not convey any ownership right in the content provided or in the software used to generate the content. Unless otherwise granted in a separate license, any subsequent MEA's/FDM's and model user's right to use, modify, or further transmit the model(s) or data is specifically limited to the design, construction, and turnover of the Project, and nothing contained in this Guideline conveys any other right to use the model(s) or data for another purpose.

2. Building Information Modeling Guidelines for Project Execution

The next section discusses what is expected of an individual project team through the BIM Execution planning activities and provides guidance on BIM uses that are important to the University.

2.1 BIM Execution Planning

The Project Team is responsible for developing a BIM Execution Plan (BEP) for every project where BIM usage or facility data is required. Responsibility for development of the BEP typically starts with the architect during the design phases and transitions to the construction manager/general contractor as the project enters construction. The architect and/or construction manager/general contractor is responsible for authoring, storing all versions of, and updating the project BEP. The project team, with the approval of the University Project Manager, should determine who will update and maintain the BEP for a specific project based on project delivery method and other factors. The timing, responsibility, and storage location should be made known to the University and all project consultants, subconsultants, and contractors who will be a party to any of the requirements prescribed in the BIM Guide and agreed upon in the BIM Execution Plan.

The project BEP should be maintained and revised as project team members are brought on-board and should be incorporated into all subconsultant and subcontractor contracts who have BIM authoring or facility data authoring responsibility. The latest version and versions from major project milestones should be saved in a location that is always accessible by the University and all Project Team members. The BIM Manager representing a firm contracted directly with the University should identify and give adequate reasoning for any deviations from the BIM Guideline for themselves and their subconsultants and receive express written approval from the University BIM Lead for these deviations with ample notice prior to the commencement or anticipated commencement of work related to the specific digital data deliverable.

The University uses the industry standard LOD definitions as defined by the AIA document G202-2013 and BIMForum LOD Specification 2017 (see Appendix B for summary LOD definitions). A project BIM Level of Development (LOD) Matrix that specifies University minimum element LOD required by system will be provided as a starting point to the Project Team prior to start of model authoring. Identification of model element author (MEA) at each major phase of design and construction in the BIM LOD Matrix is a critical component of completing each version of the BEP. Any deviation from the University's minimum LOD requirement for each system should be reviewed and approved by the University BIM Lead prior to model authoring (or expectation of the start of model authoring).

The Project team should make a coordinated effort to cross-reference requirements for model element LOD and geometry with the facility data requirements (FDS), as they will need to be maintained consistently and aligned across both deliverables. The FDS spreadsheet tool allows the project team to track at a product type (asset class) level if a particular product type will also have a model requirement or not.

The FDS provided in this Guide ("base FDS") is a general starting point for the project-team to customize it according to the specific project design and scopes. In some cases, the base FDS may include systems and components not used at the project level. In those cases, the facility data requirements can be excluded. In other cases, the base FDS may not include systems and components found in the project that the University will need the project team to collect facility data on. Consultants and contractors should modify the FDS to include project-specific facility data requirements based on a review of the contract documents against the base FDS. The end-product of this modification to the base FDS will be a project-specific FDS. The project team should obtain approval from the University Project Manager on the project-specific FDS prior to the start of construction.

A project BEP template is provided through Appendix A of this Guideline. The template serves as a basis for the minimum criteria needed in a project BEP. The BEP will be developed with input from the University during the initial design phase to provide groundwork for continued coordination throughout the BIM process. It will detail how BIM will be used at the start of the design process, producing a coordinated set of drawings for agency approval and bidding and through the entire construction process of the project into turnover and closeout. The University BIM Lead will also guide the project in the facility data specification requirements as they relate to the project.

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2.2 BIM Uses Matrix

UCSD recognizes the industry standard Uses of BIM to align the purpose for implementing BIM on projects to specific BIM deliverables. The University expects project teams to prioritize BIM uses as listed in the table below.

- Priority 1 BIM uses are those that the University sees as essential and required for all projects implementing BIM.
- Priority 2 BIM uses are those which the University aims to implement in the near future and project teams should prioritize these uses after the priority 1 uses.
- Priority 3 BIM uses are those which may be implemented at the discretion of the project team based on specific project goals and the capability and experience of the individual project team members. The BEP must outline how the required and chosen model uses will be incorporated into the BIM process.

Project Phase	Model Use	Priority
Planning	Programming	3
	Site Analysis	3
	Existing Conditions Modeling	2
	Cost Estimation	3
Design	Design Authoring	1
	Design Reviews / Visualization / Rendering	1
	3D Coordination	1
	Structural Analysis	3
	Mechanical / Energy Analysis	3
	Other Engineering Analysis	3
	Lighting Analysis	3
	Sustainability (LEED) Evaluation	3
	Phase Planning (4D Modeling)	3
	Cost Estimation	3
	Code Validation	3
	Existing Conditions Modeling	2
Construction	Construction Modeling & 3D Coordination	1
	Digital Fabrication	3
	Site Utilization Planning (Logistics)	3
	Construction System Design	3
	3D Control and Planning	2
	Record Modeling	1
	4D Modeling	3
	Cost Estimation	3
	Safety	3
	Commissioning Data	2
	As-Built Modeling	1
Operations	Building Maintenance Scheduling	1
	Building System Analysis	3

	Asset Management	1
	Space Management	1
	Disaster Planning	2
	Phase Planning	3
	Cost Estimation	3
	Existing Conditions Modeling	2
	Change Management Modeling	2
	As-Managed Modeling	1

Table 1: Acknowledged uses of BIM with UCSD priority levels indicated.

2.3 Technology Infrastructure Requirements

All Project Team model element authors are required to have the following software to participate in the University BIM design and construction process. BIM software should be a version agreed upon by the project team with approval from the University Project Manager and documented in the project BEP. Upgrades to newer versions of software should be planned for and agreed upon by all affected project team members prior to implementation in the project. As a general rule, UCSD expects all project team members to work in authoring applications no older than two versions prior to the latest commercially available version.

BIM Use	Discipline/Role	Software
Design Authoring	Architecture	Revit* or other
Design Authoring	MEP	Revit* or other
Design Authoring	Structure	Revit* or other
Design Authoring	Civil	Civil 3D or other
Design Authoring	Landscape	Revit* or other
3D Coordination	CM, All Trades	Navisworks Manage or other
Construction Modeling, Digital Fabrication	All Trade Disciplines	Revit*, 3D CAD, or other
Record Modeling	All	Revit* and Navisworks Manage or other
As-Built Modeling	All	Revit* and Navisworks Manage or other
Asset Management	UCSD Facilities Mgmt.	Maximo and/or TMA**
Space Management	UCSD Space Mgmt.	Tririga**

* University preferred authoring tool. 3D AutoCAD-based modeling packages or other BIM authoring tools must be reviewed and approved on a project basis by the University BIM Lead.

** Shown for reference. Digital data conveyed in model deliverables or tabularly will be transferred to these systems by the University.

2.4 Minimum Model Requirements

This section outlines some of the minimum modeling requirements and best practices that have been deemed important by the University.

a. Project teams should determine a strategy for setting up models adequately if project is to be delivered in phases. Phased projects should develop a phased digital data milestone deliverables schedule that aligns with University needs for using project data as determined by the University BIM Lead.

b. The project team must determine the progression of the model from a design-intent model to a digital fabrication model and ultimately the record and as-built models. The hand-off of models and data between team members and storage location for the model at each phase of the project should be documented in the BEP.

c. Project teams agree to use the University's preferred classification system, Omniclass Table 23, for model elements that require facility data as specified in the FDS. Project documentation may use different classification systems, however, all facility data deliverables must be aligned with Omniclass Table 23.

d. Model element authors should make appropriate use of model element categories for their modeled scope according to industry best practices. University may provide and require Revit shared parameter files or equivalent to be used by project teams to facilitate collection of facility data per the FDS.

e. Model element authors should include all system components as specified by the project BIM LOD matrix including all connections to utilities. University may request a project team member to insert and/or maintain owner-furnished assets in a team members model for space planning and locating assets within the planned facility.

f. Project team should ensure that clearance zones, "no-fly" zones, access zones for serviceability requirements, and additional layers for each component (e.g. insulation) is modeled to communicate necessary space needs for all systems. For above-ceiling assets, clearance and access zones shall extend from the asset it belongs all the way to the floor.

g. Model setup for managing large models is at the discretion of the project team. Due to large file sizes of design authoring and construction models, model structure should be created in a logical manner determined by project scope. A reasonable effort must be taken to keep model sizes to a minimum file size. See additional tips on model quality in the BIM Execution Plan Template.

h. Project team should follow the file naming convention as defined in Attachment 1: File Naming

Convention. Project team should request written approval from the University BIM Lead for any proposed deviations from the file naming convention.

i. Model authors must regularly audit their models as defined by industry standard best practices for the software of choice (e.g. in Revit, review and resolve excessive warnings, purge unused, compact the model file on a regular basis, etc).

j. Annotation tags in the models must be setup in a way that equipment lists can be extracted from the Revit or CAD models at any time during the project. For models to be useful for data collection, it is important that annotation tags pull data from model element parameters. It is also critical that the tag naming convention established in the design documentation is carried through in other project documentation and deliverables including, but not limited to, submittals, construction models, and data deliverables.

k. All models should be created using the University standard coordinate system. For horizontal and vertical control, use benchmark description corresponding to California Coordinate System–North American Datum (NAD) 1983 and vertical description based on National Vertical Geodetic Datum (NGVD) 1929. Project coordinate system for 2D sheets and drawings should orient the major gridlines or project features orthogonal to primary floor plan sheet views. Imperial measurement system will be used for all modeling.

2.5 Facility Data Requirements

The University's goal to achieve day one operational readiness of its' facilities post-construction provides the motivation to develop practices to efficiently transfer project digital data from design and construction to the University's LCM systems. During design and construction, project teams collect a wealth of asset information that is incredibly valuable to the University's facility operations and maintenance processes.

The University aims to collect facility data in a structured format as documented in the facility data specification (FDS). The University defines an in-scope managed asset that falls within the governance of the FDS, referred to as "managed asset", as any installed item that physically resides within the project and any of the following:

a. Requires routine maintenance or has a preventive maintenance schedule
b. Has attributes a facility manager would need to reference in performing a work order
c. Is not consumable or otherwise replaced on a predetermined schedule
d. Has been identified by UCSD Facilities team as requiring asset data according to the FDS

Any assets not specified in the FDS but falling within the above criteria should be brought to the attention of the University BIM Lead and project-specific data requirements written for the assets.

Each unique managed asset will be categorized into a general functional grouping, referred to as "asset class". Every unique asset will require one or more sets of attributes, referred to as "facility data", related to their asset class grouping. It is the responsibility of the project team to extract a list of asset classes from the project contract documents and use the FDS to determine the attribute sets required by the responsible facility data manager for both the design and/or installation of those assets. Facility data must be provided at the various milestone deliverables described generically in the table below. The table below is a general guideline for a typical project. The University Project Manager, with input from the University BIM Lead and Project Team, will determine the exact timing of these milestones, the applicability of each to the project, and the responsibility for delivery of each sub-set of attributes for each asset class. The intent of the milestones is to ensure that the project team is aligned and working towards the goals of the University. The milestones also serve as a way of maintaining cadence of meetings and open communication channels between the project team, University Project Manager, and University BIM Lead.

Milestone	Information Required	Deliverable and Specification/Exhibit Reference(s)	Responsibility
1 – Design (no later than 100%DD)	Incorporate required UCSD facility data attribute fields (no values) into model elements, Spatial Elements defined (Floor, Area, Space, Room, etc.)	Design documents and design-intent models. Design team member according to BEP and LOD Matrix provides.	Design Team
2 – Design (no later than 50% CD – varies by discipline)	Models with scope aligned to FDS (Asset Class defined), full scope of managed assets listed. Asset ID should exist at this stage.	Design documents and design-intent models. Design team member according to BEP and LOD Matrix provides.	Design Team
3 – Design (no later than 100% CD)	Full scope of managed assets modeled with Asset Class, Omniclass Name and Number, Space Name and Number, Level, Building, Unit Tag, and all other design team specified data.	Design documents and design-intent models	Design Team
4x* - Procurement	Procurement Facility Data (Common and Extended Attributes). Update to any facility data from milestone 1-3 if they require updates.	Vendor and/or installing subcontractor provides facility data through procurement facility data submittals. Incremental and cumulative as procurement progresses.	Installing Contractor or Vendor through CM/GC

5x* - Installation	As-Installed Facility Data (ex. Serial number, Warranty Start Date, Installation Date)	Installing subcontractors provides facility data and as-installed facility data submittal. Incremental and cumulative as construction progresses.	Installing Contractor or Vendor through CM/GC
6 - Close Out	As-Built Verification of Procurement and As-Installed Facility Data. Record model deliverable with connected facility data.	Final sign-off and completion or revision of any outlier requests prior to close-out (if required)	Installing Contractor or Vendor through CM/GC

Table 2.5.1 – The table is a sample facility data deliverables schedule based on general facility data that may be required throughout a project. Project teams should base their deliverables schedule off their project-specific FDS and attributes required and approved of by the University. Facility data deliverables schedule should be provided to the University Project Manager for review and approval. *The "x" in the table above denotes deliverables that may be broken down into smaller, incremental, and cumulative deliverables over the course of the project.

The University BIM Lead will collect and validate all milestones deliverables from the Project Team throughout the project and will notify Project Team if deliverables are satisfactory or need to be revised and resubmitted.

The Project Team must establish meetings and other supporting communication strategies to sufficiently collect and deliver the facility data deliverables as required by this Guideline and the FDS.

Facility data may be required for managed assets with no BIM requirement. The University will provide alternate means of collecting facility data for projects or parts of projects not requiring BIM deliverables. See Attachment 4 for more information on the delivery of facility data when BIM is not a required deliverable but an FDS requirement exists for the particular scope of work.

All managed assets with a BIM representation in the as-managed (record or as-built) model must have a unique identifier (asset ID) in a BIM attribute that allows a user to cross-correlate and match non-model data records associated with the asset to the as-managed BIM element. Specific requirements for this unique identifier are spelled out in the FDS.

2.6 Project Collaboration and Meetings

The BIM modeling and management processes will be executed by the BIM Managers to be designated by each project team firm and outlined in the BIM Execution Plan (BEP). Their responsibilities will include, but are not limited to, the managing of BIM model development from initial design through the as-managed and as-built model turnover. The BIM Managers will work closely with the University BIM Lead and University Project Management team, inclusive of key Facilities Management

personnel, to identify and implement successful integration of the record model into life cycle management systems and ensure the models accuracy according to the processes outlined in this document and project BIM Execution Plan.

A minimum meeting schedule is provided below. The BEP should elaborate and expand on these requirements.

MEETING TYPE	PROJECT STAGE	FREQUENCY
BIM Requirements Design Kick-off	Programming	Once
BIM Execution Plan Review	Programming	As-needed
FDS Planning – Design	SD	Once
Design Coordination/QC	SD/DD/Bidding	Once per Stage
Design Coordination/QC	CD	Monthly
BIM Requirements CM Kick-off	CM Award	Once
BIM Execution Plan Review	Post-Award	As-needed
FDS Planning – Construction	Post-Award CM	Once
Constructability Coordination/QC	Construction	Monthly
FDS and Model Deliverable Checks	Design/Construction	Each Data Milestone
Final Punch list	Construction	Once
Lifecycle BIM Planning	Construction	As-needed

2.7 University Naming Standards

See **Attachment 1** for University file naming requirements for BIM-related deliverables. See University CAD Standard document for standards required for 2D CAD deliverables and **Attachment 5** for sheet view and drawing sheet naming requirements. See **Attachment 2** for Space Naming standards. See **Attachment 3** for facility data, asset naming, and asset attribute naming requirements.

2.8 Digital Data Deliverables Schedule

Project teams must follow the guideline for digital data deliverables as described in the table below. Any project specific BIM uses and associated deliverable dates should be discussed with and approved by the University BIM Lead. The project team must develop a deliverable schedule and include critical BIM milestones in the project schedule.

The University will be responsible for using any non-Revit model deliverables provided by the members of the project team. UCSD will make the necessary provisions for working with these models including procuring necessary software and services to work with these models for the purposes of preparing them for use post-construction by user groups in the University.

See the Attachment 6 – CAD Standards documents for specific CAD related requirements as it relates to project deliverables.

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BIM Submittal Item	File Sender	Transmitted or	Stage	Frequency	Software	File type	Notes
Complete BEP Development Schedule	DT	Transmitted	Design & Performance Criteria	Once	Word/Adobe	docx/PDF	Design Team will meet with Project Management team to review BEP development plan and review BIM Guidelines
BEP Review	DT	Transmitted	Design & Performance Criteria	Once	Word/Adobe	docx/PDF	Review BEP plan with Project Management team
Schematic Design Model for Review	DT	Transmitted	SD	Once	Revit or design authoring platform format	RVT or native format	The current Revit Model .rvt will be uploaded to the University document management system at the conclusion of the SD phase.
Facility Data Deliverables Schedule	DT and CM	Transmitted	Pre-DD (DT) and Post-Award (CM)	Once by DT and once by CM	Excel/Word	Xlsx/docx	Provide project-specific facility data deliverables schedule to University PM
Design Development Model for Review	DT	Transmitted	DD	Once	Revit or design authoring platform format	RVT or native format	The current Revit Model .rvt will be uploaded to the University document management system at the conclusion of the DD phase.

MEP Coordination	MEP Consultant	Available	CD	Monthly	Revit or design authoring platform	RVT or native format	
Structure Coordination	Structure Consultant	Available	CD	Monthly	Revit or design authoring platform	RVT or native format	
Construction Document Model for Review	DT	Transmitted	CD	Once	Revit or design authoring platform format	RVT or native format	
Space Management Floorplans	DT	Transmitted	CD	Once	Revit or design authoring platform format	DWG	See UCSD CAD Standard
Construction Documents Drawing Sets	DT	Transmitted	CD	Once	Revit or design authoring platform	PDF	See UCSD CAD Standard
CD Coordination	DT	Available	CD	Monthly	Navisworks, Glue	NWD	95% CD
Construction Documents Model for Bidding	DT	Transmitted	CD	BID	Revit or design authoring platform format	RVT or native format	2D PDF files will be issued for bidding. All 2D documents must use University defined file naming format.
Project-Specific FDS	DT/CM	Transmitted	CD	Once (Iterative)	Excel	XLSX	After design and spec is finalized, review project docs and create project-specific FDS, to be submitted and approved by University PM
BEP Review	DT/CM	Transmitted	Construction	Once	Word/Adobe	docx/PDF	Review BEP plan with Project Management team
Coordination Models	CM	Available	Construction	Weekly	Navisworks or coordination platform format	NWC/NWD	Navisworks Manage will be used to coordinate all disciplines to perform coordination and

							clash detection.
Record Model	DT/CM	Transmitted	Construction	Milestones	Revit or design authoring platform format	RVT or native format	The record model will become the University as-managed model.
Submittal and Shop Drawings	CM	Transmitted	Construction	As Req.	Revit/3D CAD, or other detailing/fabrication platform	RVT, DWG, or native format	All submittals will be coordinated, reviewed, and uploaded in PDF format to the University Collaboration Site.
Facility Data Deliverables	DT/CM	Transmitted	Design/ Construction/ Commissioning	Milestones	Revit, Excel, Other*	RVT, XLSX, or native format	Enter equipment asset data referenced by the University Maximo/TMA identification number into the defined Revit Model
Change Orders	DT	Transmitted	Construction	As Req.	Revit or design authoring platform format	RVT or native format	Approved change orders to be kept up-to-date in design intent models and conformed into record
Facilities Management	DT/CM	Transmitted	Closeout	Once	Revit, Excel, Other*	RVT, XLSX, or native format	Final record model(s) to include facility data in Model Parameters or as determined by University BIM Lead

Commissioning Documentation	CX	Transmitted	Commissioning	Once	Revit, Excel, Other*	RVT, XLSX, or native format	
Space Management Floorplans	DT	Transmitted	Closeout	Once	Revit or design authoring platform format	DWG	See UCSD CAD Standard
Record Documents Drawing Sets	DT	Transmitted	Closeout	Once	Revit or design authoring platform format	PDF and DWG	See UCSD CAD Standard
As-Built Model	CM	Transmitted	Closeout	Once	Revit/3D CAD, or other detailing/ fabrication platform	RVT, DWG, or native format	

*Other applications may be proposed for data collection and delivery of project facility data. Data must meet the University requirement of efficient transfer to University LCM systems.

2.9 Quality

The BIM process is suited to improve coordination of the design and construction process, as well as deliver improved information for facilities management. Building information models are expected to be reviewed with coordination analysis tools such as Navisworks Manage, BIM 360 Glue, or Solibri Model Checker, to identify clashes between elements, clashes of required clearances and other tolerances. Design team, construction manager, subcontractors, and vendors are required to coordinate models between disciplines to verify clearance, analyze conflicts/clashes and deliver quality documentation to reduce RFI and change order submissions. Models should include all appropriate dimensioning as needed for design intent, analysis, and construction.

At each facility data deliverable milestone according to the FDS schedule, the University will conduct facility data quality checks. The University will maintain model and facility data quality checking procedures, both manual and automated, and may require the project team to make use of tools or add-in's to conduct periodic checking of data to be delivered to the University over the course of the project. The University will provide feedback to the project team if revisions and resubmissions to the facility data deliverables are needed based on the outcome of data quality checks.

On some occasions, the University may request laser scanning be used to verify existing conditions or as-built conditions against the design and/or signed-off coordination models for accuracy if deemed necessary.

The project team will provide the University with copies of model files for archive after each phase of

design and construction, per the deliverables schedule and models must be of the same model version for when the formal issuances of drawing sets were published such that they are both consistent with one another. Project drawings and schedules required for agency review, bidding, and construction will be extracted from this model. The University will assemble the final as-managed model from record and as-built project models and is what will be integrated to the University LCM systems.

For additional model quality guidelines, see the BEP Template section on model quality.

3. Definitions

A

As-Built Documents

As-Built Documents are the collection of paper drawings or electronic drawings that typically reside in the contractor's onsite trailer that contain mark-ups, annotations, and comments about changes that have been made to the contract documents during the construction phase.

As-Built Model

Construction models that have been updated throughout the construction process to reflect as-built conditions. These changes and updates have been communicated from the Contractor to the Design Team through the comments, annotations, and mark-ups from the As-Built Documents. These typically, but not always, are discipline specific models.

As-Managed Model

The set of models that represent an accurate depiction of a facility post-construction and allows the facility manager to make regular updates to reflect the current state of the facility. The as-managed models are updated as a result of any major or minor work performed on a facility that adds, removes, or otherwise changes managed facility data and functional aspects of spaces and assets within the facility. As-managed models typically originate from a project's record models and/or as-built models and are provided in a format that can easily be updated and maintained as a digital asset by the facility owner or manager. Record and as-built model detail may be simplified to focus the as-managed models on assets that will be regularly maintained and accessed by the facility manager. **The creation of the as-managed model set from project models at UC San Diego is the responsibility of the University.**

B

BIM Execution Plan (BEP)

The BEP helps to define roles and responsibilities within a project team as it relates to BIM and BIM uses.

BIM LOD Matrix

A matrix that communicates the required level of development of model elements by building system, the planned model element LOD and the model element author at each stage of the project.

D

Design Team

The Design Team is considered to be the Architect and all of the consultants that provide design services for a project. These design services can be rendered at any time during the project.

DWG

DWG is the native AutoCAD file format. It is a widely used file format for exchanging drawing information and 3D information to different programs. While not a database file type, it still has many uses for exchanging information.

F

Facility Data Manager

Project team member responsible for collecting and submitting facility data for their firms scope as required by the University Facility Data Specification.

Facility Data Specification (FDS)

Document describing the University information requirements for managed assets. Lists the attributes required to be submitted according to asset class by the project team on capital projects.

I

Industry Foundation Classes (IFC)

A neutral and open model specification that is not controlled by a single vendor or group of vendors. It is an object-based file format.

L

Lifecycle management systems (LCM)

Suite of software applications and tools that make up the University's management suite for facilities maintenance and operations including CMMS (Computerized Maintenance and Management System), space management, GIS, among others.

Level of development (LOD)

Used to define the increasing level of reliability of model element definition and location through the design and construction process. Allows model authors to define what their models can be relied on for and allows downstream users to clearly understand the usability and the limitations of models they are receiving.

N

Navisworks

Navisworks is an application that allows viewing and aggregation of multiple model formats. This ability to view these files allows Navisworks to simulate the interaction between model files from different design disciplines or trade contractors. That includes collision detection, 4D construction

sequencing, and coordination.

No-fly Zones
No-fly Zones are areas identified in the BIM with semi-transparent massing rectangles that represent zones necessary for maintenance and repair of equipment, access to valves, access above and below ceiling/wall access panels, access in front of electrical panels, etc.

.NWC
An .NWC file is a Navisworks Cache File that is used by Navisworks to quickly read many other file types. NWC stores both geometry from the native authoring application and parameter data in a highly compressed file size. All linked files in Navisworks have an .NWC file created automatically. In addition, many common BIM and CAD tools will export directly to .NWC for quick access by Navisworks.

.NWD
A much larger file than the .NWC, the .NWD file allows a snapshot in time of a Navisworks file. No link to the original file exist, but all geometry, parameter data, saved views, clash tests, and other Navisworks application data is packaged into the NWD.

.NWF
The .NWF file is a native Navisworks file which references all linked files and stores data on clashes, markups, animations, schedules, etc. An .NWF is lightweight and typically transmitted with all linked design and construction model files which contain the overall models geometry and element attribute data.

R
Record Drawing
The production of Record Drawings is the capturing of the As-Built Document's annotation, comments, and mark-ups in a drawing format only. This does not typically include the updating of any models.

Record Model
The Record Model is a final model incorporating all changes throughout the construction process. Record Models consist of Record design intent models (by the design team) and incorporates facility data into object parameters.

RVT
An RVT file is a Revit native file type. It is also the deliverable file format for all projects for design model authoring.

S

Shop Drawing(s)

Shop Drawings are produced from the coordinated models of each trade and include all dimension and labeling. Submitted for approval by the Project team. These drawings are then used in the field for fabrication and erection.

Signoff Model

A signoff model is a coordination model that has been completed and signed off for construction.

UC San Diego

Appendix A – BIM Execution Plan Requirements

The attached BIM Execution Plan Template should be used to complete the project BIM Execution Plan.

The Part 1 (Restricted) word document must be filled in like a form and is protected from editing outside of the form fields. The Part 2 (Unrestricted) word document is more flexible and can be edited and extended as the project team sees fit to support BIM implementation on the project.

UCSD also requires an Excel worksheet to document the following:

1) **Information Exchanges** — Captures all planned exchanges of information derivative of each project team members' models to all other project team members. The information exchanges table provides transparency to the exchange of model information. Some project team members may find information already being exchanged valuable for their own workflows.
2) **Deliverables Matrix** — Documents all model and data deliverables from each team member so the University can ensure adequate project information from BIM is available to inform project actions and decisions.
3) **FDS Schedule** — Whereas the deliverables matrix mainly captures model-related deliverables, the FDS schedule delineates the facility data deliverable description, responsible parties, and the required data at each deliverable.

The Plan should be reviewed with the UCSD PM and BIM Lead at least twice during the project; once at the beginning of design and once after the CM/GC has been brought on-board and updated the initial design phase BEP.

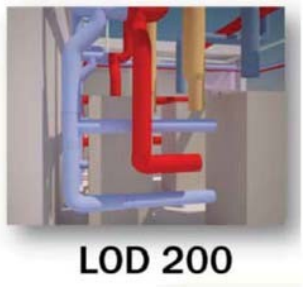
Additional processes, tools, and sections of your BEP are welcomed. You are encouraged to push innovation at UCSD to enhance the process and product.

UC San Diego

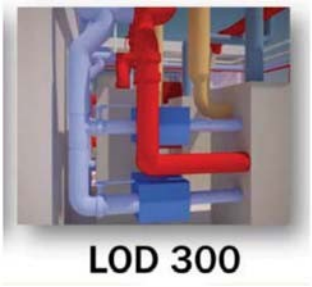
Appendix B – BIM LOD Definitions

The following outlines University's definition of Level of Development (LOD) for BIM deliverables. The University follows LOD definitions as defined by the AIA document G202-2013 and BIMForum LOD Specification 2017.

LOD 100- The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200.



LOD 200- The Model Element is graphically represented within the model as a generic system object, or assembly with approximate quantities, size, shape, location, and orientation. Non- Graphic information may also be attached to the Model Elements.

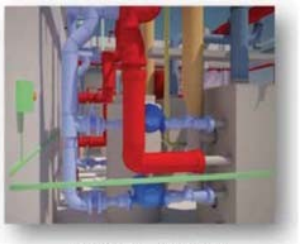


LOD 300- The model element is graphically represented within the model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the model element.

LOD 350- The model element is graphically represented within the model as a specific system, object or assembly in terms of quantity, size, shape, orientation and interfaces with other building systems. Non-graphic information (e.g. facility data) may also be attached to or associated with the model elements.

LOD 400

LOD 400- The model element is graphically represented within the model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information (e.g. facility data) may also be attached to or associated with the model elements.



LOD 500

LOD 500 - The model element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information (e.g. facility data) may also be attached to or associated with the model elements.

Examples of information required for certain components are highlighted in **Attachment #3- University Facility Data Specification. Appendix C – BIM LOD Matrix** details model components and their required minimum LOD for record and as-built model deliverables.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1																		
2	**Classifications**		**Client**	**Design**								**Construct**		**Operate**				
3	**Systems**	**FDS Product Class** (Data Requirement)		**Schematic Design**		**Design Development**		**Construction Documents**		**Design Intent**		**Trade Coordination**		**Record Modeling**		**As-Built Modeling**		
4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
5	**A Substructure**																	
6	**A10 Foundation**																	
7	A1010 – Standard Foundations																	
8	A1010.10 – Wall Foundations		All							300				300				
9	A1010.30 – Column Foundations		All							300				300				
10	A1010.90 – Standard Foundation Supplementary Components		All															
11	A1020 – Special Foundations																	
12	A1020.10 – Driven Piles		All							300				300				
13	A1020.15 – Bored Piles		All							300				300				
14	A1020.20 – Caissons		All							300				300				
15	A1020.30 – Special Foundation Walls		All							300				300				
16	A1020.40 – Foundation Anchors		All															
17	A1020.50 – Underpinning		All															
18	A1020.60 – Raft Foundations		All															
19	A1020.70 – Pile Caps		All							300				300				
20	A1020.80 – Grade Beams		All							300				300				
21	**A20 Subgrade Enclosure**																	
22	A2010 – Walls for Subgrade Enclosures																	
23	A2010.10 – Subgrade Enclosure Wall Construction		All							300				300				
24	A2010.20 – Subgrade Enclosure Wall Interior Skin Plaster and Gypsum Board		All							300				300				
25	A2010.90 – Subgrade Enclosure Wall Supplementary Components		All															5
26	**A40 Slabs-on-Grade**																	
27	A4010 – Standard Slabs-on-Grade		All							300				300				
28	A4020 – Structure Slabs-on-Grade		All							300				300				
29	A4030 – Slab Trenches		All							300				300				
30	A4040 – Pits and Basses		All							300				300				
31	A4090 – Slab-On-Grade Supplementary Components																	
32	A4090.10 – Perimeter Insulation		All															5
33	A4090.20 – Vapor Retarder		All															5
34	A4090.30 – Waterproofing		All															5
35	A4090.50 – Mud Slab		All															5
36	A4090.60 – Subbase Layer		All															5
37	**A60 Water and Gas Mitigation**																	
38	A6010 – Building Subdrainage																	
39	A6010.10 – Foundation Drainage		All							300				300				
40	A6010.20 – Underslab Drainage		All							300				300				
41	A6020 – Off-Gassing Mitigation																	
42	A6020.10 – Radon Mitigation		All															
43	A6020.50 – Methane Mitigation		All															
44	**A90 Substructure Related Activities**																	
45	A9010 – Substructure Excavation																	
46	A9010.10 – Backfill and Compaction		All															
47	A9020 – Construction Dewatering		All															
48	A9030 – Excavation Support																	
49	A9030.10 – Anchor Tiebacks		All															
50	A9030.20 – Cofferdams		All															
51	A9030.40 – Cribbing and Walers		All															
52	A9030.60 – Ground Freezing		All															
53	A9030.70 – Slurry Walls		All															
54	A9040 – Soil Treatment		All															
55	**B: Shell**																	

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Classifications		Client	Design								Construct		Operate				
3	Systems	FDS Product Class (Data Requirement)		Schematic Design		Design Development		Construction Documents		Design Intent		Trade Coordination		Record Modeling		As-Built Modeling		
4	CSI UniFormat 2010	OmniClass Table 23, Level 2	UCSD Client	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD Notes
56	**B10 Superstructure**																	
57	B1010 – Floor Construction																	
58	B1010.10 – Floor Structural Frame		All							300				300				
59	B1010.20 – Floor Decks, Slabs, and Toppings		All							300				300				
60	B1010.30 – Balcony Floor Construction		All							300				300				
61	B1010.40 – Mezzanine Floor Construction		All							300				300				
62	B1010.50 – Ramps		All							300				300				
63	B1010.90 – Floor Construction Supplementary Components		All															5
64	B1020 – Roof Construction																	
65	B1020.10 – Roof Structural Frame		All							300				300				
66	B1020.20 – Roof Decks, Slabs, and Sheathing		All							300				300				
67	B1020.30 – Canopy Construction		All							300				300				
68	B1020.90 – Roof Construction Supplementary Components		All															5
69	B1080 – Stairs																	
70	B1080.10 – Stair Construction		All							300				300				
71	B1080.30 – Stair Soffits		All							300				300				
72	B1080.50 – Stair Railings		All							300				300				
73	B1080.60 – Fire Escapes		All							300				300				
74	B1080.70 – Metal Walkways		All							300				300				
75	B1080.80 – Ladders		All							300				300				15
76	**B20 Exterior Vertical Enclosures**																	
77	B2010 – Exterior Walls																	
78	B2010.10 – Exterior Wall Veneer		All							300				300				16
79	B2010.20 – Exterior Wall Construction		All							300				300				16
80	B2010.30 – Exterior Wall Interior Skin		All							300				300				16
81	B2010.40 – Fabricated Exterior Wall Assemblies		All							300				300				16
82	B2010.50 – Parapets		All							300				300				16
83	B2010.60 – Equipment Screens		All							200				200				
84	B2010.80 – Exterior Wall Supplementary Components		All															5
85	B2010.90 – Exterior Wall Opening Supplementary Components		All															5
86	B2020 – Exterior Windows																	
87	B2020.10 – Exterior Operating Windows		All							300				300				
88	B2020.20 – Exterior Fixed Windows		All							300				300				
89	B2020.30 – Exterior Window Wall		All							300				300				
90	B2020.50 – Exterior Special Function Windows		All							200				200				
91	B2050 – Exterior Doors and Grilles																	
92	B2050.10 – Exterior Entrance Doors	23-17 11 00: Doors	All							300				350				
93	B2050.20 – Exterior Utility Doors	23-17 11 00: Doors	All							300				350				
94	B2050.30 – Exterior Oversize Doors	23-17 11 00: Doors	All							300				350				
95	B2050.40 – Exterior Special Function Doors	23-17 11 00: Doors	All							300				350				
96	B2050.60 – Exterior Grilles		All							200				200				
97	B2050.70 – Exterior Gates		All							200				200				
98	B2050.90 – Exterior Door Supplementary Components		All															5, 8
99	B2070 – Exterior Louvers and Vents																	
100	B2070.10 – Exterior Louvers		All							300				300				
101	B2070.50 – Exterior Vents		All							300				300				
102	B2080 – Exterior Wall Appurtenances																	
103	B2080.10 – Exterior Fixed Grilles and Screens		All							200				200				
104	B2080.30 – Exterior Opening Protection Devices		All							200				200				
105	B2080.50 – Exterior Balcony Walls and Railings		All							300				300				
106	B2080.70 – Exterior Fabrications		All							200				200				

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Classifications		Client	Design								Construct		Operate				
3	Systems	FDS Product Class (Data Requirement)		Schematic Design		Design Development		Construction Documents		Design Intent		Trade Coordination		Record Modeling		As-Built Modeling		
4	CSI UniFormat 2010	OmniClass Table 23, Level 2	UCSD Client	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD Notes
107	B2080.80 – Bird Control Devices		All															
108	B2090 – Exterior Wall Specialties		All							200				200				
109	**B30 Exterior Horizontal Enclosures**																	
110	B3010 – Roofing																	
111	B3010.10 – Steep Slope Roofing		All							300				300				
112	B3010.50 – Low-Slope Roofing		All							300				300				
113	B3010.70 – Canopy Roofing		All							300				300				
114	B3010.90 – Roofing Supplementary Components	23-13 39 00: Roof Coverings, Claddings, Linings	All							300				350				5, 8
115	B3020 – Roof Appurtenances																	
116	B3020.10 – Roof Accessories		All							300				300				
117	B3020.30 – Roof Specialties	23-13 39 00: Roof Coverings, Claddings, Linings	All							300				350				
118	B3020.70 – Rainwater Management		All							200				200				
119	B3040 – Traffic Bearing Horizontal Enclosures																	
120	B3040.10 – Traffic Bearing Coatings		All															
121	B3040.30 – Horizontal Waterproofing Membrane		All															5, 8
122	B3040.50 – Wear Surfaces		All							200				200				
123	B3040.90 – Horizontal Enclosures Supplementary Components		All															5, 8
124	B3060 – Horizontal Openings																	
125	B3060.10 – Roof Windows and Skylights		All							200				200				
126	B3060.50 – Vents and Hatches		All							200				200				
127	B3060.90 – Horizontal Opening Supplementary Components		All															5, 8
128	B3080 – Overhead Exterior Enclosures																	
129	B3080.10 – Exterior Ceilings		All							300				300				16
130	B3080.20 – Exterior Soffits		All							300				300				16
131	B3080.30 – Exterior Bulkheads		All							300				300				16
132	**C: Interiors**																	
133	**C10 Interior Construction**																	
134	C1010 – Interior Partitions	23-17 21 00: Protection of Openings																
135	C1010.10 – Interior Fixed Partitions		All							300				300				1, 16
136	C1010.20 – Interior Glazed Partitions		All							300				300				
137	C1010.40 – Interior Demountable Partitions		All							200				200				16
138	C1010.50 – Interior Operable Partitions		All							200				200				16
139	C1010.70 – Interior Screens		All							200				200				
140	C1010.90 – Interior Partition Supplementary Components		All															5
141	C1020 – Interior Windows																	
142	C1020.10 – Interior Operating Windows		All							300				300				
143	C1020.20 – Interior Fixed Windows		All							300				300				
144	C1020.50 – Interior Special Function Windows		All							300				300				
145	C1020.90 – Interior Window Supplementary Components		All															5, 8
146	C1030 – Interior Doors	23-17 11 00: Doors																
147	C1030.10 – Interior Swinging Doors	23-17 11 00: Doors	All							300				350				
148	C1030.20 – Interior Entrance Doors	23-17 11 00: Doors	All							300				350				
149	C1030.25 – Interior Sliding Doors	23-17 11 00: Doors	All							300				350				
150	C1030.30 – Interior Folding Doors	23-17 11 00: Doors	All							300				350				
151	C1030.40 – Interior Coiling Doors	23-17 11 00: Doors	All							300				350				
152	C1030.50 – Interior Panel Doors	23-17 11 00: Doors	All							300				350				
153	C1030.70 – Interior Special Function Doors	23-17 11 00: Doors	All							300				350				
154	C1030.80 – Interior Access Doors and Panels	23-17 11 00: Doors	All							300				350				
155	C1030.90 – Interior Door Supplementary Components	23-17 19 11 31: Automatic Door Controls and Operators	All							300				350				5
156	C1040 – Interior Grilles and Gates																	
157	C1040.10 – Interior Grilles		All							200				200				

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	**Classifications**		**Client**	**Design**								**Construct**		**Operate**				
3	**Systems**	**FDS Product Class (Data Requirement)**		**Schematic Design**		**Design Development**		**Construction Documents**		**Design Intent**		**Trade Coordination**		**Record Modeling**		**As-Built Modeling**		
4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
158	C1040.50 – Interior Gates		All							200				200				
159	C1060 – Raised Floor Construction																	
160	C1060.10 – Access Flooring		All							300				300				
161	C1060.30 – Platform/Stage Floor		All							300				300				
162	C1070 – Suspended Ceiling Construction																	
163	C1070.10 – Acoustical Suspended Ceilings		All							300				300				16
164	C1070.20 – Suspended Plaster and Gypsum Board Ceilings		All							300				300				16
165	C1070.50 – Specialty Suspended Ceilings		All							300				300				16
166	C1070.70 – Special Function Suspended Ceiling		All							300				300				16
167	C1070.90 – Ceiling Suspension Components		All															5, 8
168	C1090 – Interior Specialties	23-19 00 00: Specialty Products																
169	C1090.10 – Interior Railings and Handrails		All							300				300				
170	C1090.15 – Interior Louvers		All							300				300				
171	C1090.20 – Information Specialties		All							200				200				
172	C1090.25 – Compartments and Cubicles		All							200				200				
173	C1090.30 – Service Walls		All							300				300				
174	C1090.35 – Wall and Door Protection		All							300				300				
175	C1090.40 – Toilet, Bath, and Laundry Accessories		All							300				300				
176	C1090.45 – Interior Gas Lighting		All															
177	C1090.50 – Fireplaces and Stoves		All							200				200				
178	C1090.60 – Safety Specialties		All							200				200				
179	C1090.70 – Storage Specialties		All							300				300				
180	C1090.90 – Other Interior Specialties		All							200				200				
181	**C20 Interior Finishes**																	
182	C2010 – Wall Finishes																	
183	C2010.10 – Tile Wall Finish		All															2
184	C2010.20 – Wall Paneling		All															2
185	C2010.30 – Wall Coverings		All															2
186	C2010.35 – Wall Carpeting		All															2
187	C2010.50 – Stone Facing		All															2
188	C2010.60 – Special Wall Surfacing		All															2
189	C2010.70 – Wall Painting and Coating		All															2
190	C2010.80 – Acoustical Wall Treatment		All															2
191	C2010.90 – Wall Finish Supplementary Components		All															3, 8
192	C2020 – Interior Fabrications		All							200				200				
193	C2030 – Flooring																	
194	C2030.10 – Flooring Treatment		All															2
195	C2030.20 – Tile Flooring		All															2
196	C2030.30 – Specialty Flooring		All															2
197	C2030.40 – Masonry Flooring		All															2
198	C2030.45 – Wood Flooring		All															2
199	C2030.50 – Resilient Flooring		All															2
200	C2030.60 – Terrazzo Flooring		All															2
201	C2030.70 – Fluid-Applied Flooring		All															2
202	C2030.75 – Carpeting		All															2
203	C2030.80 – Athletic Flooring		HDH, FM															2
204	C2030.85 – Entrance Flooring		All															2
205	C2030.90 – Flooring Supplementary Components		All															3, 8
206	C2040 – Stair Finishes																	
207	C2040.20 – Tile Stair Finish		All															2
208	C2040.40 – Masonry Stair Finish		All															2
209	C2040.45 – Wood Stair Finish		All															2
210	C2040.50 – Resilient Stair Finish		All															2
211	C2040.60 – Terrazzo Stair Finish		All															2

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4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
212	C2040.75 – Carpeted Stair Finish		All															2
213	C2050 – Ceiling Finishes																	
214	C2050.10 – Plaster and Gypsum Board Finish		All															2
215	C2050.20 – Ceiling Paneling		All															2
216	C2050.70 – Ceiling Painting and Coating		All															2
217	C2050.80 – Acoustical Ceiling Treatment		All															2
218	C2050.90 – Ceiling finish Supplementary Components		All															3, 8
219	C2090 – Interior Finish Schedules		All															2
220	**D: Services**																	
221	**D10 Conveying**																	
222	D1010 – Vertical Conveying Systems																	
223	D1010.10 – Elevators	23-23 11 11: Elevators 23-23 11 11 21: Elevator Equipment and Controls	All							300				350				
224	D1010.20 – Lifts	23-23 13 11: Lifts	All							300				350				
225	D1010.30 – Escalators		All							300				300				
226	D1010.50 – Dumbwaiters	23-23 17 11: Dumbwaiters	All							300				350				
227	D1010.60 – Moving Ramps		All							200				200				
228	D1030 – Horizontal Conveying																	
229	D1030.30 – Turntables		All							200				200				
230	D1050 – Material Handling																	
231	D1050.10 – Cranes		All							200				200				
232	D1050.20 – Hoists		All							200				200				
233	D1050.30 – Derricks		All							200				200				
234	D1050.40 – Conveyors		All							200				200				
235	D1050.60 – Chutes		All							300				300				
236	D1050.70 – Pneumatic Tube Systems		Med Center, FM							300				300				
237	D1080 – Operable Access Systems																	
238	D1080.10 – Suspended Scaffolding		All															
239	D1080.20 – Rope Climbers		All							200				200				
240	D1080.30 – Elevating Platforms		All							300				300				
241	D1080.40 – Powered Scaffolding		All															
242	D1080.50 – Building Envelope Access		All							200				200				
243	**D20 Plumbing**																	
244	D2010 – Domestic Water Distribution																	
245	D2010.10 – Facility Potable-Water Storage Tanks	23-27 29 00: Tanks and Storage Structures	All							300				350		400		18
246	D2010.20 – Domestic Water Equipment	23-27 29 00: Tanks and Storage Structures	All							300				350		400		18
247	D2010.40 – Domestic Water Piping	23-27 39 00: Piping	All							300				350		400		18
248	D2010.60 – Plumbing Fixtures	23-31 00 00: Plumbing Specific Products and Equipment	All							300				350		400		18
249	D2010.90 – Domestic Water Distribution Supplementary Components	23-27 17 00: Pumps 23-27 31 00: Valves	All							300				350		400		11
250	D2020 – Sanitary Drainage																	
251	D2020.10 – Sanitary Sewerage Equipment		All							300				300		400		18
252	D2020.30 – Sanitary Sewerage Piping	23-27 39 00: Piping	All							300				350		400		18
253	D2020.90 – Sanitary Drainage Supplementary Components	23-27 17 00: Pumps 23-27 31 00: Valves	All							300				350		400		11
254	D2030 – Building Support Plumbing Systems																	
255	D2030.10 – Stormwater Drainage Equipment	23-27 17 00: Pumps	All							300				350		400		18
256	D2030.20 – Stormwater Drainage Piping	23-27 39 00: Piping	All							300				350		400		18
257	D2030.30 – Facility Stormwater Drains		All							300				350		400		18
258	D2030.60 – Gray Water Systems	23-39 29 00: Waste Water Collection and Removal	All							300				350		400		18
259	D2030.90 – Building Support Plumbing System Supplementary Components	23-27 55 00: Liquid Treatment Components 23-27 37 00: Liquid Traps	All							300				350		400		11
260	D2050 – General Service Compressed-Air	23-27 21 00: Compressors	Med Center, FM							300				350		400		
261	D2060 – Process Support Plumbing Systems																	

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4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
262	D2060.10 – Compressed-Air Systems	23-27 39 00: Piping	Med Center, FM							300				350		400		18
263	D2060.20 – Vacuum Systems	23-27 39 00: Piping	Med Center, FM							300				350		400		18
264	D2060.30 – Gas Systems	23-27 39 00: Piping	Med Center, FM							300				350		400		18
265	D2060.40 – Chemical-Waste Systems	23-27 39 00: Piping	Med Center, FM							300				350		400		18
266	D2060.50 – Processed Water Systems	23-27 39 00: Piping	Med Center, FM							300				350		400		18
267	D2060.90 – Process Support Plumbing System Supplementary Components	23-29 37 00: Occupational Safety and Health Equipment	Med Center, FM							300				350		400		11
268	**D30 HVAC**																	
269	D3010 – Facility Fuel Systems																	
270	D3010.10 – Fuel Piping		All							300				350		400		18
271	D3010.30 – Fuel Pumps		All							300				350		400		18
272	D3010.50 – Fuel Storage Tanks		All							300				350		400		18
273	D3020 – Heating Systems																	
274	D3020.10 – Heat Generation	23-33 11 00: Commercial Boilers 23-37 23 00: Heat Exchangers	All							300				350		400		17, 18
275	D3020.30 – Thermal Heat Storage		All							300				350		400		17, 18
276	D3020.70 – Decentralized Heating Equipment	23-33 15 00: HVAC Heating Units 23-33 33 00: HVAC Fan Coil Units	All							300				350		400		17, 18
277	D3020.90 – Heating System Supplementary Components		All															
278	D3030 – Cooling Systems																	
279	D3030.10 – Central Cooling	23-33 21 00: Chillers 23-33 43 00: HVAC Condenser Units 23-27 21 00: Compressors 23-33 23 00: Cooling Towers	All							300				350		400		17, 18
280	D3030.30 – Evaporative Air-Cooling		All							300				350		400		17, 18
281	D3030.50 – Thermal Cooling Storage		All							300				350		400		17, 18
282	D3030.70 – Decentralized Cooling	23-33 33 00: HVAC Fan Coil Units 23-33 39 00: Air Conditioning Equipment	All							300				350		400		17, 18
283	D3030.90 – Cooling System Supplementary Components	23-33 27 00: Air Humidity Control Equipment	All							300				350		400		
284	D3050 – Facility HVAC Distribution Systems																	
285	D3050.10 – Facility Hydronic Distribution		All							300				350		400		17, 18
286	D3050.30 – Facility Steam Distribution		All							300				350		400		17, 18
287	D3050.50 – HVAC Air Distribution	23-33 25 00: Air-Handling Units 23-33 31 00: Air Circulators 23-33 41 17: Terminal Air Units	All							300				350		400		17, 18
288	D3050.90 – Facility Distribution Systems Supplementary Components	23-27 57 27: Air Filters 23-33 29 00: HVAC Dampers	All							300				350		400		
289	D3060 – Ventilation																	
290	D3060.10 – Supply Air	23-33 31 00: Air Circulators 23-33 49 00: HVAC Ductwork	All							300				350		400		17
291	D3060.20 – Return Air	23-33 31 00: Air Circulators 23-33 49 00: HVAC Ductwork	All							300				350		400		17
292	D3060.30 – Exhaust Air	23-33 31 00: Air Circulators	All							300				350		400		17
293	D3060.40 – Outside Air	23-33 31 00: Air Circulators 23-33 49 00: HVAC Ductwork	All							300				350		400		17
294	D3060.60 – Air-to-Air Energy Recovery		All							300				350		400		17
295	D3060.70 – HVAC Air Cleaning		All							300				350		400		17
296	D3060.90 – Ventilation Supplementary Components	23-33 29 00: HVAC Dampers 23-33 43 00: HVAC Condenser Units	All							300				350		400		
297	D3070 – Special Purpose HVAC System																	
298	**D40 Fire Protection**																	
299	D4010 – Fire Suppression																	
300	D4010.10 – Water-Based Fire-Suppression	23-29 33 00: Fire Suppression System Components	All							300				350		400		4, 18
301	D4010.50 – Fire-Extinguishing		All							300				350		400		4, 18
302	D4010.90 – Fire Suppression Supplementary Components	23-27 17 00: Pumps 23-29 31 00: Fire Notification Appliances	All							300				350		400		4
303	D4030 – Fire Protection Specialties																	
304	D4030.10 – Fire Protection Cabinets		All							200				300				
305	D4030.30 – Fire Extinguishers	23-29 25 00: Fire Fighting Equipment	All							300				300				

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4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
306	D4030.50 – Breathing Air Replenishment Systems		All							200				300				
307	D4030.70 – Fire Extinguisher Accessories	23-29 29 00: Fire Detection Devices	All							300				300				
308	**D50 Electrical**																	
309	D5010 – Facility Power Generator																	
310	D5010.10 – Packaged Generator Assemblies	23-35 11 00: Electrical Generators	All							300				350				
311	D5010.20 – Battery Equipment	23-35 19 00: Batteries	All							300				350				
312	D5010.30 – Photovoltaic Collectors		All							200				300				
313	D5010.40 – Fuel Cells		All							200				300				
314	D5010.60 – Power Filtering and Conditioning		All							200				300				
315	D5010.70 – Transfer Switches		All							200				300				
316	D5010.90 – Facility Power Generation Supplementary Components	23-35 13 00: Transformers 23-35 17 00: Variable Speed Drives	All							300				350				5
317	D5020 – Electrical Service and Distribution																	
318	D5020.10 – Electrical Service		All							300				300				
319	D5020.30 – Power Distribution	23-35 23 00: Power Conditioning Equipment 23-35 31 00: Electrical Power Distribution Devices	All							300				350				14
320	D5020.70 – Facility Grounding		All															5
321	D5020.90 – Electrical Service and Distribution Supplementary Components	23-35 25 00: Electrical Instrumentation and Controls	All							300				350				5
322	D5030 – General Purpose Electrical Power																	
323	D5030.10 – Branch Wiring System	23-35 33 00: Electrical Ducting Wireways Components	All							300				350				6, 14
324	D5030.50 – Wiring Devices		All							200				200				
325	D5030.90 – General Purpose Electrical Power Supplementary Components	23-35 29 00: Circuit Breakers	All							300				350				5, 14
326	D5040 – Lighting																	
327	D5040.10 – Lighting Control	23-35 31 00: Electrical Power Distribution Devices	All							300				350				
328	D5040.20 – Branch Wiring for Lighting		All							200				200				6, 14
329	D5040.50 – Lighting Fixtures	23-35 47 15: Exit Illuminated Signs 23-35 47 13: Emergency Lighting 23-35 47 11: Lighting Fixtures	All							300				350				
330	D5040.90 – Lighting Supplementary Components	23-35 27 00: Electrical Terminals	All							300				350				5
331	D5080 – Miscellaneous Electrical Systems																	
332	D5080.10 – Lightning Protection		All															7
333	D5080.40 – Cathodic Protection		All															5
334	D5080.70 – Transient Voltage Suppression		All															5
335	D5080.90 – Miscellaneous Electrical Systems Supplementary Components		All															5
336	**D60 Communications**																	
337	D6010 – Data Communications																	
338	D6010.10 – Data communications Network Equipment		All							300				350				19
339	D6010.20 – Data Communications Hardware		All							300				350				19
340	D6010.30 – Data communications Peripheral Data Equipment		All							300				350				19
341	D6010.60 – Data Communication Program and Integration Services		All															
342	D6020 – Voice Communications																	
343	D6020.10 – Voice Communications Switching and Routing Equipment		All							300				350				19
344	D6020.20 – Voice Communications Terminal Equipment		All															19
345	D6020.30 – Voice Communications Messaging																	19
346	D6020.40 – Call Accounting																	19
347	D6020.50 – Call Management									200				200				19
348	D6030 – Audio-Video Communications																	
349	D6030.10 – Audio-Video Systems		All							300				350				19
350	D6030.50 – Electronic Digital Systems		All							300				350				19
351	D6060 – Distributed Communications and Monitoring																	

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352	D6060.10 – Distributed Audio-Video Communications Systems		All							200				200				19
353	D6060.30 – Healthcare Communications and Monitoring		Med Center, FM							200				200				19
354	D6060.50 – Distributed Systems		All							200				200				
355	D6090 – Communications Supplementary Components																	
356	D6090.10 – Supplementary Components		All							200				200				13
357	**D70 Electronic Safety and Security**																	
358	D7010 – Access Control and Intrusion Detection																	
359	D7010.10 – Access Control		All							200				200				20
360	D7010.50 – Intrusion Detection		All							200				200				20
361	D7030 – Electronic Surveillance																	
362	D7030.10 – Video Surveillance		All							300				300				20
363	D7030.50 – Electronic Personal Protection		All							200				200				20
364	D7050 – Detection and Alarm																	
365	D7050.10 – Fire Detection and Alarm	23-29 29 00: Fire Detection Devices	All							300				350				20
366	D7050.20 – Radiation Detection and Alarm		Med Center, FM							300				300				20
367	D7050.30 – Fuel-Gas Detection and Alarm		All							300				300				20
368	D7050.40 – Fuel-Oil Detection and Alarm		All							300				300				20
369	D7050.50 – Refrigeration Detection and Alarm		All							300				300				20
370	D7050.60 – Water Intrusion Detection and Alarm		All							300				300				20
371	D7070 – Electronic Monitoring and Control																	
372	D7070.10 – Electronic Detention Monitoring and Control		All							200				200				20
373	D7090 – Electronic Safety and Security Supplementary Components																	
374	D7090.10 – Supplementary Components		All							200				200				13
375	**D80 Integrated Automation**																	
376	D8010 – Integrated Automation Facility Controls	23-27 15 00: Building Automation and Control																
377	D8010.10 – Integrated Automation Control of Equipment		All															
378	D8010.20 – Integrated Automation Control of Conveying Equipment		All															
379	D8010.30 – Integrated Automation Control of Fire-Suppression Systems	23-29 29 00: Fire Detection Devices	All							300				350				
380	D8010.40 – Integrated Automation Control of Plumbing Systems		All															
381	D8010.50 – Integrated Automation Control of HVAC Systems		All															
382	D8010.60 – Integrated Automation Control of Electrical Systems		All															
383	D8010.70 – Integrated Automation Control of Communication Systems		All															
384	D8010.80 – Integrated Automation Control of Electronic Safety and Security Systems		All															
385	D8010.90 – Integrated Automation Supplementary Components		All															13
386	**E: Equipment & Furnishings**																	
387	**E10 Equipment**																	
388	E1010 – Vehicle and Pedestrian Equipment																	
389	E1010.10 – Vehicle Servicing Equipment		Med Center, FM							200				200				
390	E1010.30 – Interior Parking Control Equipment		Med Center, FM							200				200				
391	E1010.50 – Loading Dock Equipment		All							200				200				
392	E1010.70 – Interior Pedestrian Control Equipment		All							200				200				
393	E1030 – Commercial Equipment																	
394	E1030.10 – Mercantile and Service Equipment		All							200				200				
395	E1030.20 – Vault Equipment		All							200				200				
396	E1030.25 – Teller and Service Equipment		All							200				200				

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397	E1030.30 – Refrigerated Display Equipment		All							200				200				
398	E1030.35 – Commercial Laundry and Dry Cleaning Equipment		All							200				200				
399	E1030.40 – Maintenance Equipment	23-27 71 00: Building Maintenance Equipment	All							300				350				
400	E1030.50 – Hospitality Equipment		All							200				200				
401	E1030.55 – Unit Kitchens		All							200				200				
402	E1030.60 – Photographic Processing Equipment		Med Center, FM							200				200				
403	E1030.70 – Postal, Packaging, and Shipping Equipment		All															
404	E1030.75 – Office Equipment		All							200				200				
405	E1030.80 – Foodservice Equipment	23-21 21 00: Food Service Equipment and Furnishings	All							300				350				
406	E1040 – Institutional Equipment																	
407	E1040.10 – Educational and Scientific Equipment		All							200				200				
408	E1040.20 – Healthcare Equipment	23-25 00 00: Medical and Laboratory Equipment 23-25 33 00: Medical Gas Products 23-37 27 00: Emergency Communications	Med Center, FM							300				350				
409	E1040.40 – Religious Equipment		All							200				200				
410	E1040.60 – Security Equipment		All							200				200				
411	E1060 – Residential Equipment																	
412	E1060.10 – Residential Appliances		All							200				200				
413	E1060.50 – Retractable Stairs		All							200				200				
414	E1060.70 – Residential Ceiling Fans		HDH, FM							200				200				
415	E1070 – Entertainment and Recreational Equipment																	
416	E1070.10 – Theater and Stage Equipment		All							200				200				
417	E1070.20 – Musical Equipment		HDH, FM							200				200				
418	E1070.50 – Athletic Equipment		All							200				200				
419	E1070.60 – Recreational Equipment		All							200				200				
420	E1090 – Other Equipment																	
421	E1090.10 – Solid Waste Handling Equipment		All							200				200				
422	E1090.30 – Agricultural Equipment		FM							200				200				
423	E1090.40 – Horticultural Equipment		FM							200				200				
424	E1090.60 – Decontamination Equipment		All							200				200				
425	**E20 Furnishings**																	
426	E2010 – Fixed Furnishings																	
427	E2010.10 – Fixed Art		All							200				200				
428	E2010.20 – Window Treatments		All							200				200				
429	E2010.30 – Casework		All							300				300				
430	E2010.70 – Fixed Multiple Seating		All							200				200				
431	E2010.90 – Other Fixed Furnishings		All							200				200				
432	E2050 – Movable Furnishings																	
433	E2050.10 – Movable Art		All							200				200				
434	E2050.30 - Furniture		All							200				200				
435	E2050.40 – Accessories		All							200				200				
436	E2050.60 – Movable Multiple Seating		All							200				200				
437	E2050.90 – Other Movable Furnishings		All							200				200				
438	**F: Special Construction & Demolition**																	
439	**F10 Special Construction**																	
440	F1010 – Integrated Construction																	
441	F1010.10 – Building Modules		All							300				300				
442	F1010.50 – Manufactured/Fabricated Rooms		All							300				300				
443	F1010.70 – Modular Mezzanines		All							300				300				
444	F1020 – Special Structures																	
445	F1020.10 – Fabric Structures		All															
446	F1020.20 – Space Frames		All															
447	F1020.30 – Geodesic Structures		All															

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448	F1020.40 – Manufacturer-engineered Structures		All															
449	F1020.60 – Manufactured Canopies		All															
450	F1020.65 – Rammed Earth Construction		All															
451	F1020.70 – Towers		All															
452	F1030 – Special Function Construction																	
453	F1030.10 – Sound and Vibration Control		All															
454	F1030.30 – Seismic Control		All															
455	F1030.50 – Radiation Protection		All															
456	F1050 – Special Facility Components																	
457	F1050.10 – Pools		All							300				300				
458	F1050.20 – Interior Fountains		All							200				200				
459	F1050.30 – Interior Water Features		All							200				200				
460	F1050.40 – Aquariums		All							200				200				
461	F1050.60 – Ice Rinks		FM							200				200				
462	F1050.70 – Animal Containment		Med Center, FM							200				200				
463	F1060 – Athletic and Recreational Special Construction																	
464	F1060.10 – Indoor Soccer Boards		FM							200				200				
465	F1060.20 – Safety Netting		All							200				200				
466	F1060.30 – Arena Football Boards		FM							200				200				
467	F1060.40 – Floor Sockets		All							200				200				
468	F1060.50 – Athletic and Recreational Court Walls		All							200				200				
469	F1060.60 – Demountable Athletic Surfaces		All							200				200				
470	F1080 – Special Instrumentation																	
471	F1080.10 – Stress Instrumentation		All															
472	F1080.20 – Seismic Instrumentation		All															
473	F1080.40 – Meteorological Instrumentation		All															
474	F1080.60 – Earth Movement Monitoring		All															
475	**F20 Facility Remediation**																	
476	F2010 – Hazardous Materials Remediation																	
477	F2010.10 – Transportation and Disposal of Hazardous Materials		Med Center, FM															
478	F2010.20 – Asbestos Remediation		Med Center, FM															
479	F2010.30 – Lead Remediation		Med Center, FM															
480	F2010.40 – Polychlorinate Biphenyl Remediation		Med Center, FM															
481	F2010.50 – Mold Remediation		Med Center, FM															
482	**F30 Demolition**																	
483	F3010 – Structure Demolition																	
484	F3010.10 – Building Demolition		All							200								
485	F3010.30 – Tower Demolition		All															
486	F3010.50 – Bridge Demolition		All															
487	F3010.70 – Dam Demolition		All															
488	F3030 – Selective Demolition																	
489	F3030.10 – Selective Building Demolition		All							200								
490	F3030.30 – Selective Interior Demolition		All							200								
491	F3030.50 – Selective Bridge Demolition		All															
492	F3030.70 – Selective Historic Demolition		All															
493	F3050 – Structure Moving																	
494	F3050.10 – Structure Relocation		All							300				300				
495	F3050.30 – Structure Raising		All							300				300				
496	**G: Building Sitework**																	
497	**G10 Site Preparation**																	
498	G1010 – Site Clearing																	
499	G1010.10 – Clearing and Grubbing		All															

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	**Classifications**		**Client**	**Design**								**Construct**		**Operate**				
3	**Systems**	**FDS Product Class (Data Requirement)**		**Schematic Design**		**Design Development**		**Construction Documents**		**Design Intent**		**Trade Coordination**		**Record Modeling**		**As-Built Modeling**		
4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
500	G1010.30 – Tree and Shrub Removal and Trimming		All															
501	G1010.50 – Earth Stripping and Stockpiling		All															
502	G1020 – Site Elements Demolition									300				350				
503	G1020.10 – Utility Demolition		All															9
504	G1020.30 – Infrastructure Demolition		All															9
505	G1020.50 – Selective Site Demolition		All															9
506	G1030 – Site Element Relocation									300				350				
507	G1030.10 – Utility Relocation		All															9
508	G1050 – Site Remediation									-								
509	G1050.10 – Physical Decontamination		All															
510	G1050.15 – Chemical Decontamination		All															
511	G1050.20 – Thermal Decontamination		All															
512	G1050.25 – Biological Decontamination		All															
513	G1050.30 – Remediation Soil Stabilization		All															
514	G1050.40 – Site Containment		All															
515	G1050.45 – Sinkhole Remediation		All															
516	G1050.50 – Hazardous Waste Drum Handling		All															
517	G1050.80 – Water Remediation		All															
518	G1070 – Site Earthwork									300				300				
519	G1070.10 – Grading		All															9
520	G1070.20 – Excavation and Fill		All															9
521	G1070.30 – Embankments		All															9
522	G1070.35 – Erosion and Sedimentation Controls		All															9
523	G1070.40 – Soil Stabilization		All															9
524	G1070.45 – Rock Stabilization		All															9
525	G1070.50 – Soil Reinforcement		All															9
526	G1070.55 – Slope Protection		All															9
527	G1070.60 – Gabions		All															9
528	G1070.65 – Riprap		All															9
529	G1070.70 – Wetlands		All															9
530	G1070.80 – Earth Dams		All															9
531	G1070.90 – Site Soil Treatment		All															9
532	**G20 Site Improvements**																	
533	G2010 – Roadways									300				300				
534	G2010.10 – Roadway Pavement		All															9
535	G2010.20 – Roadway Curbs and Gutters		All															9
536	G2010.40 – Roadway Appurtenances		All															9
537	G2010.70 – Roadway Lighting		All															9
538	G2010.80 – Vehicle Fare Collection		All															9
539	G2020 – Parking Lots									300				300				
540	G2020.10 – Parking Lot Pavement		All															9
541	G2020.20 – Parking Lot Curbs and Gutters		All															9
542	G2020.40 – Parking Lot Appurtenances		All															9
543	G2020.70 – Parking Lot Lighting		All															9
544	G2020.80 – Exterior Parking Control Equipment		All															9
545	G2030 – Pedestrian Plazas and Walkways									300				300				
546	G2030.10 – Pedestrian Pavement		All															9
547	G2030.20 – Pedestrian Pavement Curbs and Gutters		All															9
548	G2030.30 – Exterior Steps and Ramps		All															9
549	G2030.40 – Pedestrian Pavement Appurtenances		All															9
550	G2030.70 – Plaza and Walkway Lighting		All															9
551	G2030.80 – Exterior Pedestrian Control Equipment		All															9
552	G2040 – Airfields									-								

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Classifications		Client	Design								Construct		Operate				
3	Systems	FDS Product Class (Data Requirement)		Schematic Design		Design Development		Construction Documents		Design Intent		Trade Coordination		Record Modeling		As-Built Modeling		
4	CSI UniFormat 2010	OmniClass Table 23, Level 2	UCSD Client	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD Notes
553	G2050 – Athletic, Recreational, and Playfield Areas									300				300				
554	G2050.10 – Athletic Areas		All															9
555	G2050.30 – Recreational Areas		All															9
556	G2050.50 – Playfield Areas		All															9
557	G2060 – Site Development									300				300				
558	G2060.10 – Exterior Fountains		All															9
559	G2060.20 – Fences and Gates		All															9
560	G2060.25 – Site Furnishings		All															9
561	G2060.30 – Exterior Signage		All															9
562	G2060.35 – Flagpoles		All															9
563	G2060.40 – Covers and Shelters		All															9
564	G2060.45 – Exterior Gas Lighting		All															9
565	G2060.50 – Site Equipment		All															9
566	G2060.60 – Retaining Walls		All															9
567	G2060.70 – Site Bridges		All															9
568	G2060.80 – Site Screening Devices		All															9
569	G2060.85 – Site Specialties		All															9
570	G2080 – Landscaping									300				300				
571	G2080.10 – Planting Irrigation		All															9
572	G2080.20 – Turf and Grasses		All															9
573	G2080.30 – Plants		All															9
574	G2080.50 – Planting Accessories		All															9
575	G2080.70 – Landscape Lighting		All															9
576	G2080.80 – Landscape Activities		All															9
577	**G30 Liquid and Gas Site Utilities**																	
578	G3010 – Water Utilities									300				350				
579	G3010.10 – Site Domestic Water Distribution		All															12
580	G3010.30 – Site Fire Protection Water Distribution		All															12
581	G3010.50 – Site Irrigation Water Distribution		All															12
582	G3020 – Sanitary Sewerage Utilities									300				350				
583	G3020.10 – Sanitary Sewerage Utility Connection		All															12
584	G3020.20 – Sanitary Sewerage Piping		All															12
585	G3020.40 – Utility Septic Tanks		All															12
586	G3020.50 – Sanitary Sewerage Structures		All															12
587	G3020.60 – Sanitary Sewerage Lagoons		All															12
588	G3030 – Storm Drainage Utilities									300				350				
589	G3030.10 – Storm Drainage Utility Connection		All															12
590	G3030.20 – Storm Drainage Piping		All															12
591	G3030.30 – Culverts		All															12
592	G3030.40 – Site Storm Water Drains		All															12
593	G3030.50 – Storm Drainage Pumps		All															12
594	G3030.60 – Site Subdrainage		All															12
595	G3030.70 – Storm Drainage Ponds and Reservoirs		All															12
596	G3050 – Site Energy Distribution									300				350				
597	G3050.10 – Site Hydronic Heating Distribution		All															12
598	G3050.20 – Site Steam Energy Distribution		All															12
599	G3050.40 – Site Hydronic Cooling Distribution		All															12
600	G3060 – Site Fuel Distribution									300				350				
601	G3060.10 – Site Gas Distribution		All															12
602	G3060.20 – Site Fuel-Oil Distribution		All															12
603	G3060.30 – Site Gasoline Distribution		All															12
604	G3060.40 – Site Diesel Fuel Distribution		All															12
605	G3090 – Liquid and Gas Site Utilities Supplementary Components		All															12

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	**Classifications**		**Client**	**Design**								**Construct**		**Operate**				
3	**Systems**	**FDS Product Class (Data Requirement)**		**Schematic Design**		**Design Development**		**Construction Documents**		**Design Intent**		**Trade Coordination**		**Record Modeling**		**As-Built Modeling**		
4	**CSI UniFormat 2010**	**OmniClass Table 23, Level 2**	**UCSD Client**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD Notes**
606	G3090.10 – Supplementary Components		All															12
607	**G40 Electrical Site Improvements**																	
608	G4010 – Site Electric Distribution Systems									300				350				
609	G4010.10 – Electrical Utility Services		All															10
610	G4010.20 – Electric Transmission and Distribution		All															10
611	G4010.30 – Electrical Substations		All															10
612	G4010.40 – Electrical Transformers		All															10
613	G4010.50 – Electrical Switchgear and Protection Devices		All															10
614	G4010.70 – Site Grounding		All															
615	G4010.90 – Electrical Distribution System Instrumentation		All															
616	G4050 – Site Lighting									300				350				
617	G4050.10 – Area Lighting		All															
618	G4050.20 – Flood Lighting		All															
619	G4050.50 – Building Illumination		All															
620	G4050.90 – Exterior Lighting Supplementary Components		All															
621	**G50 Site Communications**																	
622	G5010 – Site Communications Systems									300				350				
623	G5010.10 – Site Communications Structures		All															
624	G5010.30 – Site Communications Distribution		All															
625	G5010.50 – Wireless Communications Distribution		All															
626	**G90 Miscellaneous Site Construction**																	
627	G9010 - Tunnels																	
628	G9010.10 – Vehicular Tunnels		All							300				300				
629	G9010.20 – Pedestrian Tunnels		All							300				300				
630	G9010.40 – Service Tunnels		All							300				300				
631	G9010.90 – Tunnel Construction Related Activities		All															

Appendix C: BIM LOD Matrix

LOD Notes

Note	Description
1	Although standard wall and ceiling individual framing members are not modeled through LOD 300, any atypical framing features required for tiered ceilings, soffits, curved walls, arched ceilings, etc. should be modeled at a minimum for LOD 350 to ensure there is enough available space for the additional framing/bracing for these components.
2	At LOD 100 Wall, Floor and Ceiling Finishes will be represented with text via a Room object.
3	Wall, ceiling and/or floor furring along with other required sheathing/underlayments to be included with wall, ceiling and/or floor finish elements above as appropriate.
4	The Plumbing Engineer will be responsible for defining the performance of the Fire Suppressions System as well as modeling; the location of fire service to the building, major equipment, standpipes and major piping runs and sprinkler hear locations in accordance with the defined LOD. Ancillary and secondary piping from the major piping runs to the sprinkler head locations to be design and modeled by the Fire Protection Contractor in accordance with the defined LOD.
5	These categories will be represented by typical details and notes that have been developed with text and/or 2D supplementation in addition to or in lieu of model geometry for items called defined at LOD 100.
6	The Electrical Engineer will exclude branch wiring from this category. During Trade Coordination the Electrical Contractor will be expected to model all conduits larger than ¾", and large groups of conduit ¾" (or less) in a particular location shall be modeled to reflect the overall space requirements.
7	Performance specification (with supporting 2D Supplementation) to be developed at LOD 100 by the Electrical Engineer.
8	These components are typically modeled as part of other assemblies listed in the tables above and will assume those LOD and MEA designations.
9	Section G: Building Sitework items are typically designed and documented in two dimensional applications and are typically owned by CE but may be modeled for reference by LA or A. Any deviation from this reference model will be documented in the project specific BIM Execution Plan.
10	This category is typically owned by the utility company and will be modeled for reference and coordinated accordingly by the EE.
11	In addition to the defined Level of Development for this category the PE will also provide typical details and notes that have been developed with text and/or 2D supplementation.
12	The Mechanical, Plumbing and Electrical Engineers will be responsible for modeling their respective engineering systems up to 5' outside the building, from that point on ownership of the Model Elements will transition to the Civil Engineer.
13	In addition to the defined Level of Development for this category the Technology Engineer will provide typical details and notes that have been developed with text and/or 2D supplementation. This will be inclusive of this category with the exception of cable trays and bundled conduits which will be modeled.
14	Branch wiring to be excluded as Model Elements by the Design Team.
15	If systems are pre-egineered they can be modeled at LOD 200.
16	Although standard wall and ceiling individual framing members are not modeled, any atypical framing features required for tiered ceilings, soffits, curved walls, arched ceilings, etc. should be modeled to ensure there is enough available space for the additional framing/bracing for these components.
17	All ducts and air handling equipment shall be modeled to the outside face dimension.
18	All piping shall be modeled to the outside diameter of the pipe adding insulation as its own entity where applicable or the pipe insulation, whichever is greater.
19	For telecommunication systems, at a minimum, all cable tray, wire managements hooks, conduit larger than ¾", and communication racks and cabinets shall be modeled. Large groups of conduit ¾" (or less) in a particular location shall be modeled to reflect the overall space requirements.
20	All components of the fire alarm system shall be modeled including all panels and devices with access zones and conduit larger than ¾". Large groups of conduit ¾" (or less) in a particular location will be modeled to reflect the overall space requirements.

UC San Diego

Attachment 1 – File Naming Convention

Format of File: A A A - BBBB-CC-D-EE-F-####-G.ext

SIGNIFIER AREA	SIGNIFIER DESCRIPTION	VALUE	VALUE DESCRIPTION
AAA-____-__-_-__-_-####-_.ext	Facility Identifier		*Sample values shown below. Not intended as actual/final values.
		OTH	Otterson Hall
		MCH	Medical Center - Hillcrest
		JMC	Jacobs Medical Center
		MCC	Moores Cancer Center
		SCC	Sulpizio Cardiovascular Center
		SPS	Skaggs Pharmaceutical Sciences Bldg
___-BBBB-__-_-__-_-####-_.ext	Project Number		
		6789	Goya Hall Renovation
___-____-CC-_-__-_-####-_.ext	Discipline		
		A	Architecture
		C	Civil/Site Work
		DW	Drywall Studs
		DWI	Drywall No Fly Zones
		DWW	Drywall Walls
		EC	Electrical Construction
		E	Electrical Design
		EQ	Electrical Equipment
		EL	Electrical Lighting
		EP	Electrical Power and Supply
		ET	Electrical Telecom
		FP	Fire Protection
		G	General
		HSP	Horizontal Standpipe
		I	Interior

		K	Kitchen
		L	Landscape
		MC	Mechanical Construction
		M	Mechanical Design
		MP	Mechanical Pipe
		MH / MD	Mechanical Duct
		N	Infrastructure
		PC	Plumbing Construction
		P	Plumbing Design
		PG	Plumbing Gravity
		PP	Plumbing Pressure
		PT	Pneumatic Tube
		Q	Equipment
		SEL	Seismic - Electrical
		SFP	Seismic - Fire Protection
		SMD	Seismic - Mechanical Duct
		SMP	Seismic - Mechanical Piping
		SPL	Seismic - Plumbing
		SC	Structural Construction
		S	Structural Design
		SVY	Survey/Point Cloud
		T	Tele/Data
		U	Urban Design
		SY	Security
		PW	Precast Wall
		Y	Site Survey
____-__-__-D-__-_-	Style of File		
		B	Border Sheet / Title Block Drawing File
		D	Detail Base Graphic File
		E	Exterior / Framing Elevation
		G	Diagrams

		H	Schedule/Table
		I	Interior Elevations
		M	3d Model
		N	Composite annotation and plotting
		P	2d Plan
		R	Reflected Ceiling Plan
		S	Sections
		T	Composite coordination
		Y	Site Plan
____-__-__-_-EE-_-####-_.ext	Scope Designation		
		CS	Core and Shell
		ES	Exterior skin
		IN	Interior
		ST	Site
		TB	Total Building
____-__-__-_-__-F-####-_.ext	Scope Modifier		
		X	Glazing
		0	Unused/NA
____-__-__-_-__-_-	Floor(s)		
		00UG	Underground
		0000	All Floors
		0001	First Floor
		0002	Second Floor
		0003	Third Floor
		0004	Fourth Floor
		0005	Fifth Floor
		0006	Sixth Floor
		00R1	Roof Level 1
		00R2	Roof Level 2

	If Multi-Floor		
		##_____	Lower Floor Level
		##	Higher Floor Level
____-__-__-_-__-_-____-G.ext	Sector/Area/Zone	(to be determined based on our area breakdown-minimize)	
		0	Entire Floor
		1	Area 1
		2	Area 2
		3	Area 3
____-__-__-_-__-_-____-_.ext	File Extension		
		.pdf	Adobe Acrobat
		.dwg	AutoCAD Drawing File
		.nwc	NavisWorks Cache File Format
		.nwd	NavisWorks Published File
		.nwf	NavisWorks File Format
		.rvt	Revit File Format
		.rcp, .rcs	Autodesk Recap File Format (Point Cloud)

UC San Diego

Attachment 2 – Space ID Guidelines

University of California San Diego

UCSD Space ID Guidelines

Version 1.0: May 16, 2019

UC San Diego

1. Space ID Guidelines Overview

To better leverage common facilities information across departmental functions, these space ID guidelines are applied to the entire campus for space and asset management activities. These activities involve planning, analysis, maintenance, operations, and especially first responder wayfinding throughout UC San Diego. These guidelines apply to all spaces where the University has a need to understand its operational footprint or maintains physical assets.

All accessible spaces at UC San Diego related to a building enclosure must have space identifiers (space numbers) assigned according to established guidelines and in consultation with Campus Planning. Space boundaries must be defined by discrete, individual polylines or similar bounding objects within graphic models such as BIM, CAD, GIS, photo-mesh model, etc.

- Initial room uses will be confirmed by Campus Space Planning for initial load.
- Boundaries, room separation, and/or polylines are measured paint to paint, not centerlines.

These space identification guidelines will most often be applied for new design-construction projects. For existing buildings with spaces not conforming to this guideline, project teams may use ID's that fit within the existing buildings naming and numbering pattern.

2. Coordination of Space ID Guidelines

Representatives from the three areas below must coordinate, review and agree on the final numbering outcome for all construction activity that modifies space geometry (usually walls, windows, and doors, but may include exterior areas such as parking or tennis courts):

A. The architectural and/or engineering design consultant (A/E)
B. The UC San Diego project manager (PM) or contact, usually from
    a. Capital Program Management for most major projects
    b. Facilities Management for most campus renovations
    c. Facilities Engineering for Healthcare (Med Center) projects
    d. Facilities Management for Housing, Dining, and Hospitality (HDH)
    e. Real Estate for most lease Tenant Improvements (TIs).
C. Campus Planning

(B) and/or (C) will confirm the final plan with the intended post-construction/renovation occupant(s) of the space. For all projects, review of space numbering and adherence to the numbering standard is mandatory. Space ID milestones are tied to the following project milestones:

- **100% Schematic Design** – Preliminary validation. Campus Planning will engage with a preliminary review of space IDs and Bluebeam comment process.
- **100% Construction Documents** – Final validation and sign-off.

UC San Diego

3. Non-Building Spaces

A non-building space ID framework is under development. There is a need to locate assets not enclosed by a facility. Further details on this topic are forthcoming.

4. Floor and Space ID - Syntax and Assignment

1. Room numbers/space IDs should not exceed seven alphanumeric characters in total, including below grade prefixes, to allow prorating (subdividing) space allocations.
    a. Space IDs must be unique within each building, with only one number per space.
    b. The leading characters indicate the floor (such as 1, 2, 14, 15, P1, L3, etc)

Intermediate or mezzanine levels will be designated with an alphabetic character after the floor level below the intermediate level. For example, a floor between floors 3 and 4 will be designated "3A."

        i. Numbered levels below grade prefixed with L or P, will increase with depth away from the ground plane. For example, descending below grade: L1, L2, L3, etc.
        ii. In the case of additions to an existing building, the new structure's floor nomenclature should match the existing floor nomenclature.

    c. The remaining 5 characters indicate the space. Use the least possible number of characters to indicate unique spaces for a floor. For example, 99 spaces would entail 2 characters plus the floor prefix.

2. **Subspaces** - Spaces typically include all rooms and corridors within a building, but are also individuated further in at least two cases:
    a. **Lab bench spaces** – Lab benches will have poly-lined subdivisions and space ids as needed by the managing department.
    b. **Open office workstations** – all cubicles and bench work points must have an individual, non-overlapping boundary or polyline and a unique space id, using centerlines delineated by furniture or similar features.
        i. The architect/designer shall provide an initial list and layout for open office areas.
        ii. Typically, final open office designs will be provided by furniture vendors, and may be omitted from final room/space IDs provided by the architect/designer
        iii. In cases of smaller renovations, or when the furniture design will not be provided by another vendor, the designer shall provide the IDs.
3. In order to keep numbers available for later use, openings in the numbering scheme should be left where future rooms or renovations are most likely to occur.
    a. For example, for rooms 12 feet or longer, presume the possibility they may be subdivided at a later date. Leave room for number expansion (plus the floor prefix) when numbering.

1120 (8')	1122 (8')	1128 (24')	1130 (8')

UC San Diego

5. Sequence logic within building, floor, and suite

1. Begin numbering sequences at the main entrance of a floor or suite. If the entrance opens into the middle of a long hallway with many rooms, start numbering at the end of the hallway closest to the entrance. The main entrance may be located at any level but should be the predominant public entrance to the building.
2. Numbering sequences should follow consistent logical patterns throughout the building. Sequence path variations are discouraged but permitted when necessary due to building geometry.
    a. Preferred sequences within a floor are:
        i. Circular, moving clockwise or counterclockwise,
        ii. Ascending (such as along a corridor) and either alternating evens and odds or following a sequence up one side and returning on the other.
    b. Examples
        i. Alternate even and odd on opposite sides of a corridor
        ii. Numbers increase clockwise or counterclockwise from the main entrance
3. "Stack" rooms in multi-floor buildings both above and below where the geometry is similar.
    a. For example, 101, 201, and 301, etc., might be vertically aligned if in the same corner of the building.
4. When renovating an area on a floor, and not the whole floor, number uniformity on the floor shall be maintained. If this means that a room not within the renovation area is re-numbered, the cost of signage is rolled into the contingency costs of the renovation project.

UC San Diego

Attachment 3 – University Facility Data Specification

The Facility Data Specification (FDS) is an information specification for project teams to define university-required facility asset data through the course of a design–construction project for the purpose of post-construction business use cases.

The FDS defines assets (products) and asset attributes that an organization needs to manage facilities throughout their useful life.

The FDS is formatted to be complementary to a project BIM LOD matrix. It is a scoping and control document for facility asset information. The FDS is not a specification for model element names. Refer to the UCSD BIM Guidelines document for information on model element naming standards.

The FDS matures over time to encompass facility data requirements for all university facilities. The FDS is updated and expanded with the delivery of each new project, which builds on the known used asset classes and attributes, appending any new asset classes and related attributes through a review of the project-specific design documents and following the steps summarized in this instructional guide to update the FDS.

Viewing the FDS

The FDS can be viewed through two worksheets in the provided Excel file: (1) **PRODUCTS**; (2) **ATTRIBUTES.**

Products Summary Worksheet
The PRODUCTS worksheet summarizes the asset classes (product subclass) in the overall FDS. This worksheet is a pivot table that pulls data from the "Master-PRODUCTS" worksheet. The slicers (buttons) in the PRODUCTS worksheet allow the user to filter subsets of the asset classes that are relevant to particular needs when reviewing the FDS contents.

The pivot table can be modified to show additional columns of data from the "Master-PRODUCTS" worksheet that may be useful to display in summary form, such as the associated owner tag abbreviations that are required for each asset class. By right-clicking on the pivot table, the user can show the master field list and expand the displayed set of data columns.

Table 4.1 describes each slicer, the data source it filters from in the "Master-PRODUCTS" worksheet, and the intended use of the slicer. Figure 4.1 shows where in the worksheet these slicers appear.

Table 4.1: PRODUCTS pivot table slicer information

Slicer #	Slicer Title	Source Data Column in "Master-PRODUCTS"	Intended Use
Slicer 1	In Project?	In Project? [Yes/No]	Allows the user to filter the master FDS for asset classes that appear in the specific project.
Slicer 2	Is Product Modeled?	Modeled?	Allows the user to filter the FDS for asset classes that have been confirmed to exist or not in project models. Helpful in identifying gaps between FDS-required assets and those that will not be modeled per the project team.
Slicer 3	Which Trade Model?	Trade Model	Allows the user to filter asset classes that are only relevant to one particular subcontractor. Useful to provide a short list of assets the subcontractor should focus on addressing in their deliverables.
Slicer 4	Is Product Tagged Uniquely?	Tagged Individually in Model?	Allows the user to filter for assets that will require unique identifiers. Useful to help understand assets that will need to be uniquely identified in a model.
Slicer 5	B20,B30…(Uniformat Code)	System[Uniformat Level 2]	Used to filter the FDS by functional system. Helpful to review FDS before subcontractors are brought on-board.
Slicer 6	HDH Data Requirement, FM Data Requirement, Med Center Data Requirement	HDH Data Requirement, FM Data Requirement, Med Center Data Requirement	Allows the user to filter the FDS according to the internal UCSD FM client need. Useful to filter and view asset classes related to individual UCSD clients.

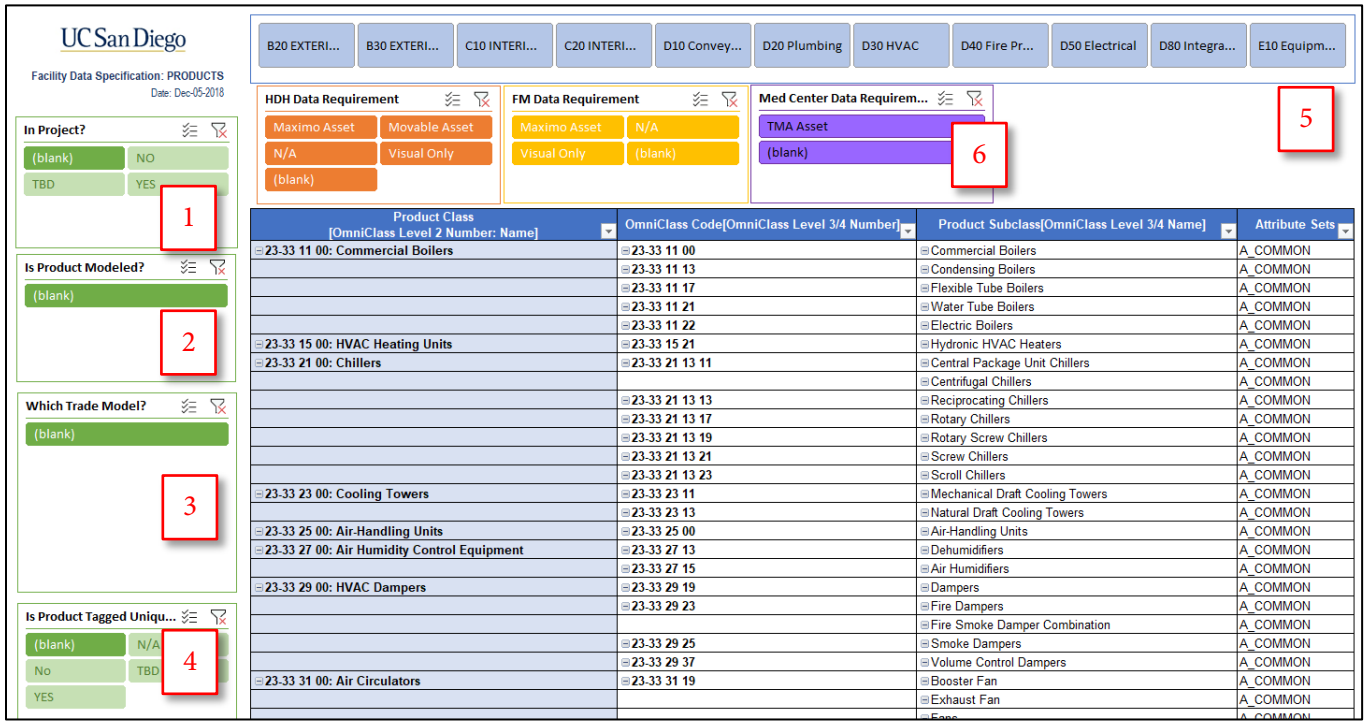


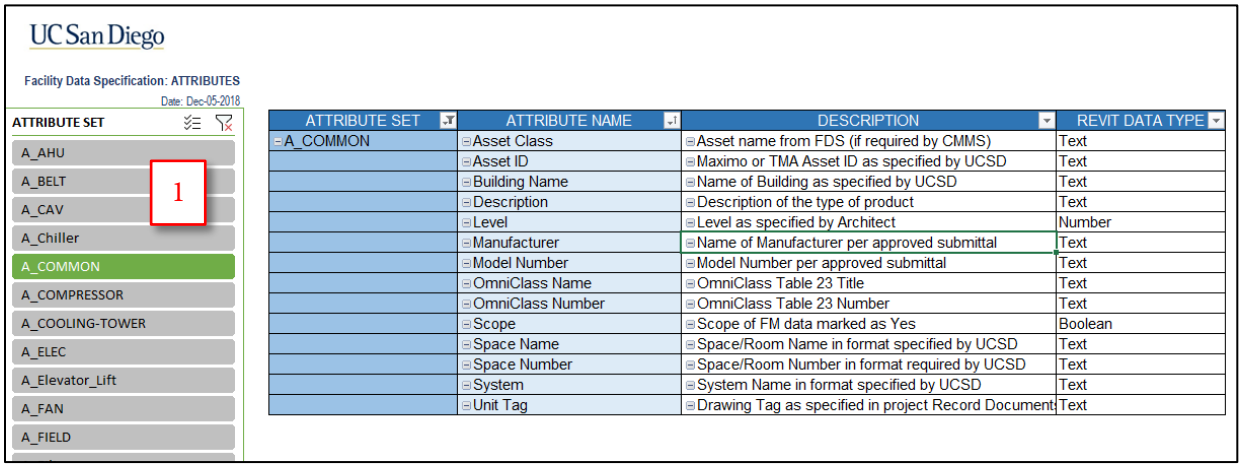
Figure 4.1: Screenshot of the FDS summary page ("PRODUCTS") with slicer references. See Table 4.1 for an explanation of the use for each slicer.

Attributes Summary Worksheet

Similar to the PRODUCTS worksheet, the ATTRIBUTES worksheet summarizes the definition of each attribute set and the associated individual attributes. An attribute set is simply a grouping of asset attributes that are required for multiple asset classes (e.g., A_ELEC consists of a group of attributes needed to determine the electrical panel a powered asset is connected to). The core set of minimum attributes for all assets is named "A_COMMON". The attributes in A_COMMON are the most commonly requested attributes for nearly all managed assets.

The slicer 1 on the ATTRIBUTES worksheet allows the user to quickly toggle the display of attributes in the selected attribute set to appear in the pivot table. The pivot table pulls data from the Master_ATTRIBUTES worksheet.

Between the two FDS summary worksheets, PRODUCTS and ATTRIBUTES, the project team can filter and review the project-specific asset class and attribute data requirements that individual team members must deliver over the course of the project.



ATTRIBUTE SET	ATTRIBUTE NAME	DESCRIPTION	REVIT DATA TYPE
A_COMMON	Asset Class	Asset name from FDS (if required by CMMS)	Text
	Asset ID	Maximo or TMA Asset ID as specified by UCSD	Text
	Building Name	Name of Building as specified by UCSD	Text
	Description	Description of the type of product	Text
	Level	Level as specified by Architect	Number
	Manufacturer	Name of Manufacturer per approved submittal	Text
	Model Number	Model Number per approved submittal	Text
	OmniClass Name	OmniClass Table 23 Title	Text
	OmniClass Number	OmniClass Table 23 Number	Text
	Scope	Scope of FM data marked as Yes	Boolean
	Space Name	Space/Room Name in format specified by UCSD	Text
	Space Number	Space/Room Number in format required by UCSD	Text
	System	System Name in format specified by UCSD	Text
	Unit Tag	Drawing Tag as specified in project Record Document	Text

Figure 4.2: Screenshot of the FDS summary page for attributes with slicer reference.

Editing the FDS

Products Source Data

The PRODUCTS summary worksheet is populated from raw data stored in the Master-PRODUCTS worksheet. The Master-PRODUCTS worksheet is organized from left to right starting with information that the client or facility manager will define at the campus or enterprise level (blue columns).

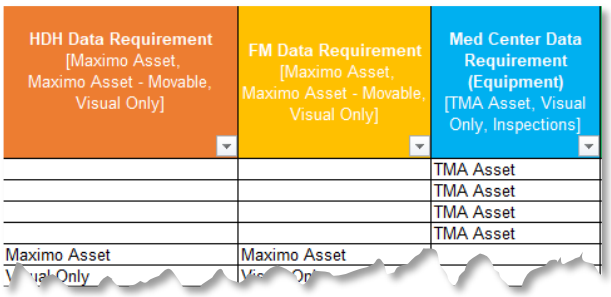
Throughout the design phase of a project, the project team should review the asset (product) classes in the FDS and compare them to the project design documents (specifications and drawings). Any products used in the project that are not specified in the FDS "Master-PRODUCTS" worksheet that would have a closeout submittal (e.g., warranty, O&M manuals, training requirements, service maintenance contracts, as-built drawings) or data that a facility manager would find useful to access throughout the life of the asset, should be raised to the university project manager and considered for inclusion in the project-specific FDS.

Appending new asset classes to the FDS is as simple as adding a row in the "Master-PRODUCTS" worksheet and filling out all of the blue columns (UCSD specification).

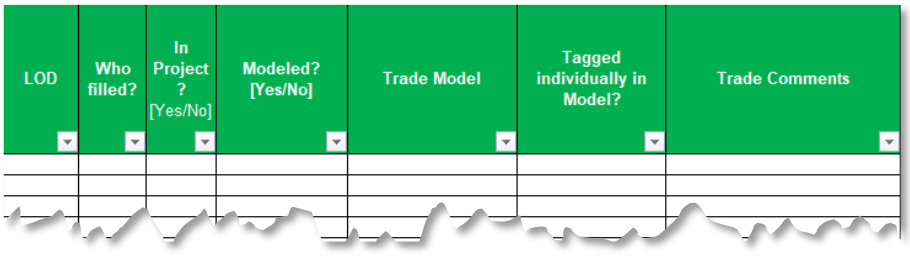
System [Uniformat Level 2 Number: Name]	Product Class [OmniClass Level 2 Number: Name]	OmniClass Code [OmniClass Level 3/4 Number]	Product Subclass [OmniClass Level 3/4 Name]	Owner Tag Abbreviation	Attribute Sets
B20 EXTERIOR VERTICAL ENCLOSURES	23-17 11 00: Doors	23-17 11 00	Doors		Tag only
B20 EXTERIOR VERTICAL ENCLOSURES	23-13 35 00: Framing Products	23-13 35 21	Structural Walls		no data
B30 EXTERIOR HORIZONTAL ENCLOSURES	23-13 35 00: Framing Products	23-13 35 23	Structural Floors		no data
B30 EXTERIOR HORIZONTAL ENCLOSURES	23-13 39 00: Roof Coverings, Claddings, Linings	23-13 39 00	Roof Coverings, Claddings, Linings		no data
B30 EXTERIOR HORIZONTAL ENCLOSURES	23-13 39 00: Roof Coverings, Claddings, Linings	23-13 39 31	Roof Membranes		A_COMMON
B30 EXTERIOR HORIZONTAL ENCLOSURES	23-19 00 00: Specialty Products	23-19 29 19 11	Sound, Vibration and Seismic Control Products		A_COMMON
C10 INTERIOR CONSTRUCTION	23-17 11 00: Doors	23-17 11 00	Doors		no data
C10 INTERIOR CONSTRUCTION	23-17 19 00: Hardware for Openings	23-17 19 11 31	Automatic Door Controls and Operators		A_COMMON
C10 INTERIOR CONSTRUCTION	23-17 21 00: Protection of Openings	23-17 21 15	Fire and Smoke Shutters and Curtains		A_COMMON
C10 INTERIOR CONSTRUCTION	23-19 11 00: Information Display Specialties	23-19 11 21	Plaques		A_COMMON

Figure 4.3: Excerpt of the Master-PRODUCTS worksheet showing UCSD-specified columns

After the university project manager has agreed with the project team that the product should be added to the project-specific FDS, the university project manager will coordinate with the appropriate facilities groups (HDH, FM, and/or Med Center) to determine if any internal client-specific data is required for the new asset classes.



Through discussions with the university project manager, the project team should denote in the FDS if a target system exists for the data (HDH Data Requirement, FM Data Requirement, Med Center Data Requirement columns). TMA and Maximo are the primary CMMS (Computerized Maintenance and Management Systems) that the university FM groups use to manage assets and generate work orders. "Visual only" indicates the asset class will be used only to view in the model for context and no data is typically collected for asset classes designated as such. Conversely, moveable assets may or may not be modeled, but still have a data requirement from an FM standpoint.



The right-most columns (green columns) are meant for the project team to fill out through the course of implementing the FDS on a project. These green columns assist the project team with the review of client requirements and collection of facility data from the appropriate team member and track how it relates to modeled assets. The project team can use these columns to understand what asset classes will be modeled or not, which in turn will inform how data is collected from the team member providing the related asset attribute data. It is up to the project team to develop an approach for collecting data within or outside of model deliverables including when there are no model deliverables associated with an asset.

Table 4.2 describes each column of data in the "Master-PRODUCTS" raw data sheet, the information source for who populates the column (UCSD or project team), and a functional description of the column.

Table 4.2: Description of raw data columns in the Master-PRODUCTS worksheet

Column Name	Information Source	Description
System	UCSD Specification	Concatenation of the Uniformat Level 2 code and name
Product Class	UCSD Specification	Column used to denote the Omniclass level 2 group description
Omniclass	UCSD Specification	Column used to denote the Omniclass level 3 group number that the asset class falls within based on its' product subclass

Product Subclass	UCSD Specification	Column used to denote a more detailed product class grouping description (from Omniclass level 3, 4, or 5 classification system)
Owner Tag Abbreviation	UCSD Specification	Column used to denote the preferred tag prefix for the asset class in question (e.g., "AHU" for air handling units).
Attribute Sets	UCSD Specification	Column used to denote the attribute sets required for the asset class in question. See "ATTRIBUTES" worksheet for attributes contained in each attribute set.
HDH Data Requirement	UCSD HDH FM Specification	Column used to denote if the UCSD Housing, Dining, and Hospitality FM group requires data for the asset class in question and if so, the CMMS that will consume the data
FM Data Requirement	UCSD FM Specification	Column used to denote if the UCSD FM group requires data for the asset class in question and if so, the CMMS that will consume the data
Med Center Data Requirement	UCSD Med Center FM Specification	Column used to denote if the UCSD Med Center FM group requires data for the asset class in question and if so, the CMMS that will consume the data
Owner Additional Notes	UCSD Specification	Clarifications by the owner on exceptions or other detailed information related to the asset class that was not explained in other columns
LOD (0,100,200,300,350,400)	Project Management	Column used to denote the LOD of the asset class, according to the project BIM Execution Plan
Who filled?	Project Management	Column used to denote the designer or trade partner that has provided the information on if the asset class will be found in the model
In Project? (Yes/No)	Project Management	Yes/No value used to denote if the asset class will be found in the current project.
Modeled?	Project Management	Column used to denote if the asset class will be modeled in the current project.
Tagged Individually in Model?	Project Management	Column used to denote if each instance of the asset class will be uniquely tagged.
Trade Comments	Project Management	Used to capture comments on project-level information regarding the asset class to manage the collection of data related to that asset class. For example, if the asset class will be excluded for an upcoming deliverable, if the responsibility has been re-assigned or delegated to another party, or other project-level decisions and discussions that affect the asset class.

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Attributes Source Data

The ATTRIBUTES summary worksheet is populated from raw data stored in the Master-ATTRIBUTES worksheet. The Master-ATTRIBUTES worksheet lists information required to define attributes, how their values are generated, and if they are to be stored in Revit, requirements for how the attributes are setup within a model. The worksheet can also be extended to denote how attributes map into COBie, CMMS, and other destination systems and deliverables.

Attributes in the raw data sheet should be provided by the University internal client groups (HDH, FM, Med Center, etc.) based on use cases for the attribute data post-construction. Similar to the development of asset class requirements in the Master-PRODUCTS worksheet, the University PM should coordinate with UCSD client groups to obtain attribute requirements for any newly identified asset classes that emerge out of any specific project.

ATTRIBUTE INFORMATION			REVIT IMPLEMENTATION				CC
ATTRIBUTE SET	ATTRIBUTE NAME	DESCRIPTION	Data Population	REVIT OOB PARAMETER NAME	REVIT PARAMETER TYPE	REVIT SHARED PARAMETER NAME	REVIT DATA TYPE
A_COMMON	Asset Class	Asset name from FDS (if required by CMMS)	Data entry	N/A	Type	UCSD Asset Class	Text
A_COMMON	Manufacturer	Name of Manufacturer per approved submittal	Data entry	Manufacturer	Type	N/A	Text
A_COMMON	Model Number	Model Number per approved submittal	Data entry	Model	Type	N/A	Text
A_COMMON	Unit Tag	Drawing Tag as specified in project Record Documents	Auto-populate	Mark	Instance	UCSD Tag	Text
A_COMMON	Description	Description of the type of product	Data entry	Description	Type	N/A	Text
A_COMMON	OmniClass Number	OmniClass Table 23 Number	Data entry (from R	Classification.OmniClass.23.Number	Type	N/A	Text
A_COMMON	OmniClass Name	OmniClass Table 23 Title	Auto-populate	Classification.OmniClass.23.Description	Type	N/A	Text
A_COMMON	Asset ID	Maximo or TMA Asset ID as specified by UCSD	Data entry	N/A	Instance	UCSD AssetID	Text
A_COMMON	Scope	Scope of FM data marked as Yes	Data entry	N/A	Type	UCSD FM	Boolean
A_COMMON	Building Name	Name of Building as specified by UCSD	Data entry	Building Name	Project Information	N/A	Text
A_COMMON	Level	Level as specified by Architect	Auto-populate	Level	N/A	N/A	Number
A_COMMON	Space Number	Space/Room Number in format required by UCSD	Data entry	Space Name	N/A	N/A	Text
A_COMMON	Space Name	Space/Room Name in format specified by UCSD	Data entry	Space Number	N/A	N/A	Text
A_COMMON	System	System Name in format specified by UCSD	Data entry	System	Instance	UCSD System	Text
A_BELT	V-Belt size			N/A	?	UCSD V-Belt Size	Text
A_BELT	V-Belt quantity			N/A		UCSD V-Belt Qty	Te

Figure 4.4: Excerpt of the Master-ATTRIBUTES worksheet

Table 4.3: Description of raw data columns in the Master-ATTRIBUTES worksheet

Column Name	Description
Attribute Set	Attribute set that the attribute belongs to
Attribute Name	Attribute name as defined in the FDS
Description	Functional description of the attribute
Data Population	Indicates if the attribute is auto-generated or manually entered by the user
Revit OOB Parameter Name	If the attribute is a default Revit "out-of-the-box" attribute, this column indicates the name of the default Revit parameter name
Revit Parameter Type	Indicates if the attribute is a type, instance, or other type of parameter in Revit.
Revit Shared Parameter Name	If the attribute is to be setup as a shared parameter in Revit, indicates the shared parameter name in this column
Revit Data Type	Indicates the Revit "Type of Parameter" needed to setup the attribute as a parameter in a Revit model file.

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Attachment 4 – Asset Information Form (AIF) Instructions

The asset information form should be used to provide basic facility data to the University for design and construction projects. The AIF is one of several methods project teams may use to submit facility data required by the UCSD facility data specification (FDS). Each project team with the University BIM lead and University PM should plan and agree upon the required facility data, how, and when it will be submitted. Each project team should develop a facility data deliverables schedule with the University PM as part of the overall Digital Data Deliverables Schedule. The deliverables schedule will lay out the timing of when completed AIF's are due. See the BIM Guidelines for guidance on facility data deliverables.

The AIF is broken down into three sections:

1. The "**UCSD General"** section are attributes required for **all projects** regardless of the University Facilities Management group managing the facility.
2. The **"Med Center"** section are additional attributes required for all projects on facilities managed by the **Medical Center FM group**. Contractors performing work and submitting AIF's for assets in Med Center FM managed facilities should provide **both** the **UCSD General** and **Med Center** attributes.
3. The **"Campus"** section are additional attributes required for all projects on facilities managed by the Campus FM group. Contractors performing work and submitting AIF's for assets in Campus FM managed facilities should provide **both** the **UCSD General** and **Campus** attributes.

Requirements for values used for each attribute are denoted in the table below:

***If there is no value for an attribute, then use "NA" to denote "not applicable". Do not leave the attribute blank on the form, as this will indicate an omission of information.**

Attribute Name	Attribute Description
Building	Building name. Check with UCSD campus representative for acceptable value.
Floor	Must match the floor naming as shown on architectural drawings for the facility
Manufacturer Name	Manufacturer company name
Model Number	Only use for a true model number. Do not use for product series or product line.*
Equipment Description	Freeform short description of the asset
Asset Tag (Equipment Tag)	Tag number as used in equipment schedules or on floorplan drawing. Should be a unique value to the facility.*
Omniclass Name (Table 23)	The Omniclass Table 23 name from the classification coding system table. See www.omniclass.org
Omniclass Number (Table 23)	The Omniclass Table 23 number from the classification coding system table. See www.omniclass.org
Space Name	Room or space name as shown on architectural floor plans
Space Number	Room or space number as shown on architectural floor plans

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Warranty Expiration Date	Date of manufacturer's warranty expiration (MM/DD/YYYY)
Installation Date	Date of installation of the asset (MM/DD/YYYY)
Facility Code	Four possible values: **GSDC**, **KANX**, **MCHC**, **MCLJ**. GSDC = Greater SD County; KANX = Kearny Mesa Annex; MCHC = Medical Center Hillcrest; MCLJ = Medical Center La Jolla
Equipment Type Code	The equipment type code from column A of the Attachment 4.1 list of acceptable values for this field.
Type Description	The equipment type description from column B of the Attachment 4.1 list of acceptable values for this field.
Serial Number	Serial number for the asset, if applicable.*
Barcode	Barcode number applied to the asset. Only applies to certain assets required to be barcoded. Check with UCSD campus representative on necessity of barcoding.*
Purchase Price	List price for the asset (do not include labor).

Asset Photo

Click this button to attach a photo or image of the asset to the PDF.

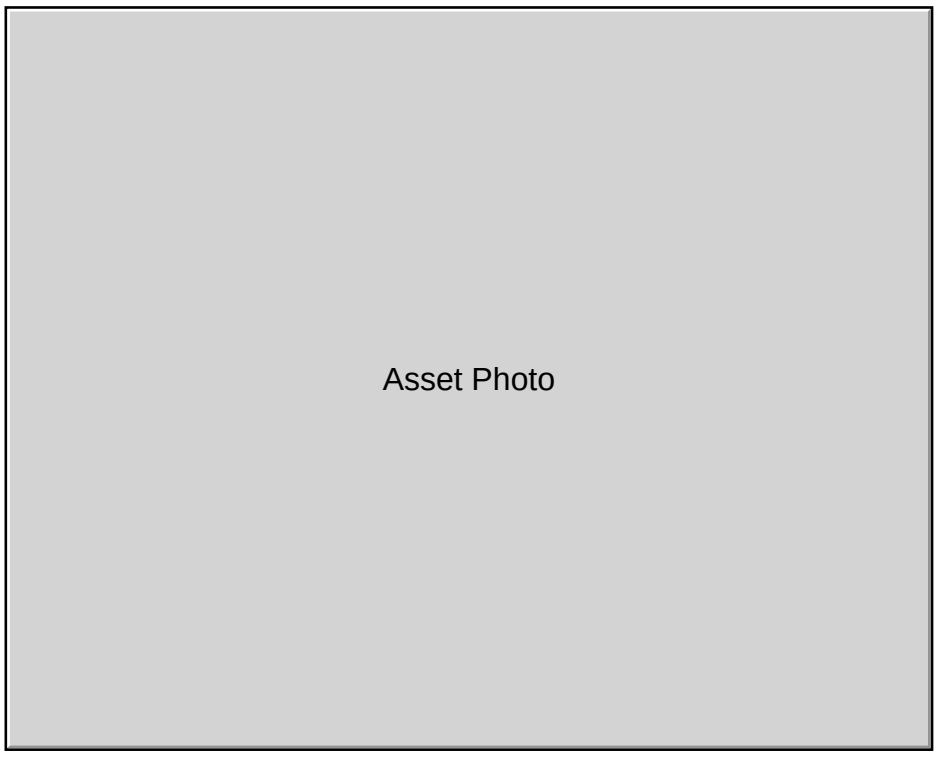
Reset Form

Click this button to erase all text from the fields in the form.

UCSD Asset Information Form

UCSD General	Building
	Floor
	Manufacturer Name
	Model Number
	Equipment Description
	Asset Tag (Equipment Tag)
	Omniclass Name (Table 23)
	Omniclass Number (Table 23)
	Space Name
	Space Number
	Warranty Expiration Date
	Installation Date
Med Center	Facility Code
	Equipment Type Code
	Type Description
	Serial Number
Campus	Barcode
	Purchase Price

Reset Form



Version 1.0 (April 29, 2019)

Equipment Type Code	Type Description
AUTOMATIC DOORS	AUTO DOORS
BUILDING ENVELOPE	AREA INSPECTION
BUILDING ENVELOPE	ROOF INSPECTION
BUILDING ENVELOPE	SECURITY DOORS
COMPRESSED AIR	COMPRESSOR
COMPRESSED AIR	DRYER
COMPRESSED AIR	FILTER
ELECTRICAL EMERGENCY	AIRCRAFT WARNING LIGHTS
ELECTRICAL EMERGENCY	AUTO TRANSFER SWITCH
ELECTRICAL EMERGENCY	BATTERY EGRESS
ELECTRICAL EMERGENCY	BATTERY EXIT SIGNS
ELECTRICAL EMERGENCY	BATTERY TASK LIGHTS
ELECTRICAL EMERGENCY	BREAKERS
ELECTRICAL EMERGENCY	BUSS DUCT
ELECTRICAL EMERGENCY	CONTROL PANEL
ELECTRICAL EMERGENCY	DIESEL DAY TANK
ELECTRICAL EMERGENCY	Diesel recirc pump
ELECTRICAL EMERGENCY	Earth Safe
ELECTRICAL EMERGENCY	ELECTRICAL RECEPTICALS
ELECTRICAL EMERGENCY	EXIT SIGNS
ELECTRICAL EMERGENCY	GENERATOR
ELECTRICAL EMERGENCY	LIGHTING CONTROLS
ELECTRICAL EMERGENCY	LIGHTING, EPS SYSTEM
ELECTRICAL EMERGENCY	LIGHTING, SURGICAL
ELECTRICAL EMERGENCY	MOTOR CONTROL
ELECTRICAL EMERGENCY	MOTOR VFD
ELECTRICAL EMERGENCY	PANEL, DISTRIBUTION EPS
ELECTRICAL EMERGENCY	PORTABLE GENERATORS
ELECTRICAL EMERGENCY	POWER PANEL
ELECTRICAL EMERGENCY	SUBSTATION
ELECTRICAL EMERGENCY	TRANSFORMER
ELECTRICAL EMERGENCY	UPS
Electrical Emergency	DISTRIBUTION PANEL
ELECTRICAL NORMAL	BREAKERS
ELECTRICAL NORMAL	CONTROL PANEL
ELECTRICAL NORMAL	DISCONNECT
ELECTRICAL NORMAL	DISTRIBUTION PANEL
ELECTRICAL NORMAL	LIGHTING PANEL
ELECTRICAL NORMAL	MASTER CONTROL PANEL
ELECTRICAL NORMAL	MOTOR CONTROL
ELECTRICAL NORMAL	MOTOR VFD
ELECTRICAL NORMAL	POWER PANEL
ELECTRICAL NORMAL	POWER PANEL
ELECTRICAL NORMAL	POWER PANEL
ELECTRICAL NORMAL	SUBSTATION
ELECTRICAL NORMAL	TIE BREAKERS

Equipment Type Code	Type Description
ELECTRICAL NORMAL	TRANSFORMER
ELECTRICAL NORMAL	VAULT
ELEVATOR	ELEVATOR
FIRE ALARM	FIRE ALARM TESTING
FIRE BARRIERS	FIRE DOOR
FIRE BARRIERS	FIRE WALL
FIRE BARRIERS	ROLL DOWN DOOR
FIRE BARRIERS	SMOKE DOOR
FIRE BARRIERS	SMOKE WALL
FIRE BARRIERS	WON DOOR
FIRE SUPRESSION	ANSUL SYSTEM
FIRE SUPRESSION	Clean Agent System
FIRE SUPRESSION	CONTROL VALVE
FIRE SUPRESSION	EXTINGUISHER
FIRE SUPRESSION	FIRE PUMP
FIRE SUPRESSION	HALON SYSTEM
FIRE SUPRESSION	STANDPIPE
FIRE SUPRESSION	WATER BASED FOAM FIRE SYSTEM
HVAC	A/C SPLIT SYSTEM
HVAC	A/C UNIT
HVAC	A/C UNIT W/HUMIDIFIER
HVAC	BOILER
HVAC	CHILLER
HVAC	CONTROL PANEL
HVAC	COOLING TOWER
HVAC	EXHAUST FAN
HVAC	FAN COIL
HVAC	FANMOT
HVAC	FUMEHOOD
HVAC	Heating Pad
HVAC	HEATPUMP
HVAC	HEPA FILTER
HVAC	HUMIDIFIER
HVAC	Mist Eliminators
HVAC	NUMEVE
HVAC	PUMP, CENTRIFUGAL
HVAC	Refrigerant
HVAC	Strainer
HVAC	SUPPLY FAN
INFECTION CONTROL	ISOLATION RMS
KITCHEN EQUIPMENT	CART WASHER
KITCHEN EQUIPMENT	DEEP FAT FRYER
KITCHEN EQUIPMENT	EXHAUST HOODS
KITCHEN EQUIPMENT	GRIDDLE
KITCHEN EQUIPMENT	STEAM KETTLE
MED GASES	LIQUID O2 TANK

Equipment Type Code	Type Description
MED GASES	MED AIR COMPRESSOR
MED GASES	MED AIR DRYER
MED GASES	MED GAS ALARM
MED GASES	MED GAS MANIFOLD
MED GASES	MED GAS SYSTEM
MED GASES	O2 MONITOR
MED GASES	VACUUM PUMP
MED GASES	VACUUM SYSTEM
PLUMBING DI WATER	DI UNIT
PLUMBING DI WATER	PUMP
PLUMBING DI WATER	UV LIGHT
PLUMBING DOMESTIC WATER	BOOSTER PUMP
PLUMBING DOMESTIC WATER	EXPANSION TANK
PLUMBING DOMESTIC WATER	EYEWASH/SHOWER
PLUMBING DOMESTIC WATER	FAUCETS & TOILETS
PLUMBING DOMESTIC WATER	FILTER
PLUMBING DOMESTIC WATER	HIGH TEMP CUT-OUT
PLUMBING DOMESTIC WATER	PRESSURE REDUCING STATION
PLUMBING DOMESTIC WATER	PUMP, CENTRIFUGAL
PLUMBING DOMESTIC WATER	TANK
PLUMBING DOMESTIC WATER	WASHING MACHINE
PLUMBING DOMESTIC WATER	Water Feature
PLUMBING DOMESTIC WATER	WATER HEATER
PLUMBING INDUSTRIAL WATER	BACK FLOW PREVENTOR
PLUMBING INDUSTRIAL WATER	FILTER
PLUMBING INDUSTRIAL WATER	HEATER
PLUMBING INDUSTRIAL WATER	MIXING VALVE
PLUMBING INDUSTRIAL WATER	PRESSURE REDUCING VALVE
PLUMBING INDUSTRIAL WATER	Scope Cabinet
PLUMBING INDUSTRIAL WATER	SUMP PUMP
PLUMBING SEWER	DRAINS
PLUMBING SEWER	GREASE INTERCEPTOR
PLUMBING SOFTWATER	SOFTENER
REFRIGERATION	CHILLER
REFRIGERATION	CONDENSER
REFRIGERATION	DISPLAY CASE
REFRIGERATION	DRINKING FOUNTAIN
REFRIGERATION	FREEZER
REFRIGERATION	ICE MACHINE
REFRIGERATION	PORTABLE A/C UNIT
REFRIGERATION	REFRIGERATOR
REFRIGERATION	REFRIGERATOR, LAB
REFRIGERATION	REFRIGERATOR, WALK-IN
SHOP EQUIPMENT	Fork Truck
SHOP EQUIPMENT	GOLF CART
SHOP EQUIPMENT	PLUMBING EQUIPMENT

Equipment Type Code	Type Description
SHOP EQUIPMENT	SCISSOR LIFT
SHOP EQUIPMENT	SHOP MAINTENANCE
SHOP EQUIPMENT	TEST EQUIPMENT
STEAM	BOILER
STEAM	DEAERATING FEED TANK
STEAM	FEED PUMP
STEAM	FLASH TANK
STEAM	Flow Meter
STEAM	FLUID HEATER
STEAM	FORCED DRAFT FAN
STEAM	FUEL OIL SUPPLY
STEAM	GAS TRAIN
STEAM	HEAT EXCHANGER
STEAM	MUDLEG
STEAM	PRESSURE REDUCING STATION
STEAM	PRESSURE REDUCING VALVE
STEAM	PUMP
STEAM	PUMP, CENTRIFUGAL
STEAM	RECEIVER, CONDENSATE
STEAM	STEAM GENERATOR
STEAM	STEAM TRAP
STEAM	TANK
SYSTEM NOT ASSIGNED	ACID PIT
SYSTEM NOT ASSIGNED	GROUNDS EQUIPMENT
TUBE SYSTEM	BLOWER
TUBE SYSTEM	DIVERTER
TUBE SYSTEM	TUBE STATION

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Attachment 5 – Sheet and View Requirements

Project teams should use sheet names as specified in the University CAD Standards (Attachment 6), which utilize the National CAD Standard.

View names used on sheets should conform to the naming convention shown below:

Format	[UCSD Project Number] Space [Discipline Designator] Space [Sheet Sequence Number] Space [-] Space [Sheet Title]
Example	11456 A0101 – First Floor Plan

Space Management Floorplan Views

To facilitate the use of CAD exports from BIM for use in space management applications, architect should store a set of overall 2D floorplan views in their model which show building elements needed for space management. These floorplans need not be issued as part of any drawing issuance. Space management floorplan views should be created starting at the beginning of construction documents or equivalent design phase.

Architect should reference **Attachment 6.1 – University CAD Exports – Layer Mapping and Modeling Guidance** to identify the list of elements to appear on the space management floorplans and their related layer mapping requirements.

Architect should reference **Attachment 2 – Space ID Guidelines** and **Attachment 6 – CAD Standards** for timing of submissions and additional requirements.

Facilities 3D Views

To facilitate the use of BIM into facility operations, design authors should store a set of 3D views in their model which show only their discipline or trade by level.

1. There should be no overlap in scope between these 3D views (e.g. no duplicate elements found between multiple views).
2. Each view should use the Revit section box or similar feature (if other authoring tool is used) to isolate level-specific scope in each view.
3. Each view should use a section box that cuts just below the finish floor at the level below and just above the underside of slab at the level above.
4. For levels with ramps or changes in finish-floor elevation, model author should use the closest elevation that represents the primary elevation for the floor in question and the same section box limits should be used across all project team members' models.
5. Model authors should avoid cutting through any element that is a managed asset with a section box plane.
6. Any supports, brackets, hangers, and other LOD 400 and greater objects should be hidden, frozen, or otherwise turned off in the views.
7. Linework, annotations, points, and other non-3D elements should be turned off in the views.

UC San Diego

Attachment 6 – CAD Standards

UC San Diego

University of California San Diego

CAD Standards

Version 3.0: April 14, 2019

UC San Diego

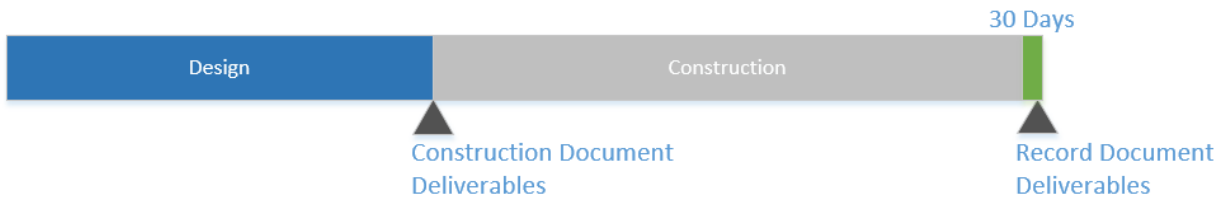
1. University CAD Standards

1.1 Summary and Intent

Two Dimensional CAD files are produced and used by the University and its business partners for a wide variety of facilities planning and management purposes throughout the building lifecycle. To this end, UC San Diego has established campus-wide standards for the creation and maintenance of CAD facility drawings. These standards are based on delivering a minimally viable product (MVP) at the appropriate points in the design and construction process to enable the efficient transition of the building to an operational state.

1.2 Deliverables

a. Timeline



b. Construction Document Deliverables

At the completion of Construction Documents the following deliverables shall be submitted:

- Space Management Floorplans - One overall architectural floor plan export (.DWG format) per floor illustrating fixed building elements (fixed casework, furniture, fixed floor or roof mounted equip, major medical equip, walls, doors, windows) and room numbers/names.
    - Plans shall include an overall site plan and roof plan
    - Plans shall include one floor plan for every floor, above or below grade
    - Unique room identifiers are required, on a separate layer
    - Include closed polyline space boundaries if available
    - Include power/data locations if available
    - Unused CAD Layers shall be purged.
    - If produced in Revit, export according to the layer mapping specified in Attachment 6.1 of this CAD Standard
    - If not produced in Revit, general conformance to AIA Layer Guidelines is acceptable. At a minimum the following elements must be on a separate individual layer
        - Room Identifiers
        - Space Boundaries (if available)
- PDF equivalent of the Construction Documents
    - One PDF per sheet
    - Subfolder organization shall align with the physical organization of the documents.

c. Record Document Deliverables

Within thirty (30) days of Substantial Completion, the following deliverables shall be submitted:

- Space Management Floorplans - One overall architectural floor plan export (.DWG format) per floor illustrating fixed building elements (fixed casework, furniture, fixed floor or roof mounted equip, major medical equip, walls, doors, windows) and room numbers/names.
    - Plans shall include an overall site plan and roof plan
    - Plans shall include one floor plan for every floor, above or below grade
    - Unique room identifiers are required, on a separate layer
    - Include closed polyline space boundaries if available
    - Include power/data locations if available
    - Unused CAD Layers shall be purged.
    - If produced in Revit, export according to the layer mapping specified in Attachment 6.1 of this CAD Standard. If not produced in Revit, general conformance to AIA Layer Guidelines is acceptable. At a minimum the following elements must be on a separate individual layer
        - Room Identifiers
        - Space Boundaries (if available)
- DWG equivalent of the Record Documents (NO LAYER CONVERSION)
    - One DWG per sheet
    - Subfolder organization shall align with the physical organization of the documents
- PDF equivalent of the Record Documents
    - Subfolder organization shall align with the physical organization of the documents.

d. File Organization and Naming for Record Documents

Master Folder

- Master folder name shall include the UCSD project number and project name.

Subfolder organization shall consist of the following folders:

- Record Documents-PDF
- Record Documents-DWG
- Space Management Floor Plans-DWG

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Attachment 6.1 - University CAD Export Deliverables from Revit Layer Mapping and Modeling Guidance

The list of element categories below indicates element types that the University anticipates may appear on floor plans that will be transmitted by the project team to the University in DWG and PDF formats at a frequency described in the CAD Standards document. These floor plan deliverables are referred to as space management floorplans.

The categories indicated below list the CAD layer that Revit object categories should be mapped to in the exported DWG deliverable files. These layer mappings should match the provided UCSD CAD Layer Export Revit template file **(UCSD CAD Export Template.rvt)**, from which the team can transfer project standards from to expedite the configuration of layer mapping. The project team member having responsibility to create and deliver the CAD exports should verify layer mappings have been set up according to this document. This document will govern if there are any conflicting mapping specifications between the Revit template and this document.

In addition to the mapping, this document also clarifies the intent behind the usage of certain Revit categories and how those categories impact the representative linework that appears on the specified and required layers in CAD exports. In some cases, modeling strategies must be undertaken to accomplish the intended CAD layer mappings. The project team should review these requirements carefully to properly configure their Revit content to meet the needs of these CAD layer requirements at export to avoid design rework.

Model Categories

Casework
Layer mapping: AIA Default (Q-CASE)

Both casework and millwork should appear on this layer.

Columns
Layer mapping: A-WALL

For structural column enclosures made from drywall and wall framing, use A-WALL. See structural columns for additional information.

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Curtain Wall Panels, Mullions, Curtain Wall Systems
Layer mapping: A-GLAZ

All glazed walls should be mapped to the major layer A-GLAZ.

Doors
Layer mapping: AIA Default (A-DOOR)

Glass doors may require a minor grouping into project implementation. Check with UCSD Planning for latest guidance for layer mapping of glass doors.

Floors
Layer mapping: AIA Default (A-FLOR)

All floor finish boundaries and patterns for floor finish should map to A-FLOR.

UCSD is in the process of developing asset registers and layer mapping for assets in this category is subject to change and different project specific requirements. Check with UCSD Planning for latest guidance for layer mapping of floors.

Furniture
Layer mapping: AIA Default (I-FURN)

Non-owner furnished furniture purchased as part of the project budget should be modeled for space planning purposes and mapped to the I-FURN layer.

The table below lists representative types of building components that may be found on the I-FURN layer.

Element type
Chairs
Tables
Work Surfaces
Cubicle partitions
Modular offices

Generic Models
The use of the generic models category should be limited and when used, the type of element should be evaluated against the tables in this guideline to see if the element should fall within a different category first.

If the element will be modeled as a generic model, the model author should check with UCSD Planning to determine an appropriate sub-category to model as. A related sub-category CAD layer mapping to associate with the element should be applied after loading in the UCSD Standard CAD Export Template settings, for the purpose of CAD exports. Any project-specific CAD layer mappings should be documented using the Project-Specific CAD layer mapping sheet at the end of this document.

Plumbing fixtures
Layer mapping: AIA Default (P-SANR-FIXT)

The table below lists representative types of building components that may be found on the P-SANR-FIXT layer.

Element type
Sinks
Toilets
Urinals
Shower heads
Floor Sinks
Grab bars
Shower surround
Soap/Hand sanitizer dispenser
Toilet accessories
Toilet and urinal partitions
Floor Drains

Railings
Layer mapping: AIA Default (A-FLOR-HRAL)

Roofing
Layer mapping: AIA Default (A-ROOF and A-ROOF-PATT)

Roof cut and surface patterns will be mapped to A-ROOF-PATT. All other components of roof map to A-ROOF.

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Site
Layer mapping: AIA Default layers

Site elements at the exterior of the building should be exported to the default AIA standard layers and appear on exported drawings. This is particularly important if managed assets and equipment are located on the exterior site.

Specialty Equipment
Layer mapping: AIA Default (Q-SPCQ)

UCSD is in the process of transitioning layer standards and project teams may encounter the use of A-EQPM in CAD files received from the University. All new CAD files should follow the layer naming standard as defined in this guide.

The table below lists representative types of building components that may be found on the Q-SPCQ layer.

Element type
Medical equipment
Monitors
Waste bins
Elevators
Computers
Fume Hood
Fire Extinguisher Cabinet
Patient Bed
Examination equipment
Control panels
Kitchen equipment
Moveable and folding partitions

UCSD is in the process of developing asset registers and layer mapping for assets in this category is subject to change and different project specific requirements. Check with UCSD Planning for latest guidance for layer mapping of floors.

Stairs
Layer mapping: A-FLOR-STRS

Structural Beams
Layer mapping: AIA Default (S-BEAM)

Walls
Layer mapping: A-WALL

All walls except glass, curtainwall, storefront, moveable or operable partitions, toilet partitions, and walls that are part of a furniture system, should be mapped to A-WALL.

Fire-Rated Walls
UCSD is in the process of developing asset registers and layer mapping for assets in this category is subject to change and different project specific requirements. Check with UCSD Planning for latest guidance for layer mapping of fire-rated wall assemblies.

Windows
Layer mapping: AIA Default (A-GLAZ)

All interior and exterior glazing, glass partition, and windows will map to A-GLAZ.

Data Devices
Layer mapping: AIA Default (E-DATA)

Data outlets (IT/telecom) should appear on CAD export floor plans.

Electrical Fixtures
Layer mapping: AIA Default (E-ELEC-FIXT)
Examples:
Outlets
Door push plates

Electrical Equipment
Layer mapping: AIA Default (E-ELEC-EQPM)

The table below lists representative types of building components that may be found on the Q-SPCQ layer.

Element type
Future electrical panel space reservation
Electrical Panels
Electrical Equipment

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UCSD is in the process of developing asset registers and layer mapping for assets in this category is subject to change and different project specific requirements. Check with UCSD Planning for latest guidance for layer mapping of electrical equipment.

Annotation Categories

Dimensions
Layer mapping: AIA Default (A-ANNO-DIMS)

Any dimensioning created on plan for the purposes of construction documentation should be mapped to A-ANNO-DIMS. No additional dimensioning should be created for the purposes of CAD deliverables.

Room tags
Layer mapping: AIA Default (A-AREA-IDEN)

Room tags should contain room names and room numbers. The University prefers the room number is placed on the A-AREA-DETL layer. *At the time of writing, it is not possible in Revit to map separate components of the room tag to different layers with out-of-the-box features.*

Others

Room/Space Boundary
Layer mapping: A-AREA

Room/space boundary should appear as closed polylines in the CAD export. For open floor plan and non-partitioned space such as lab benches, each assignable space for one user should be represented by one closed polyline.

In Revit, to enable export of room boundaries, check the box in the "**General**" tab of the DWG export setup settings labeled "Export rooms, spaces and areas as polylines".