

**June 6, 2023**

**Facilities Management**

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| **BIM PROJECT EXECUTION PLAN For:** |
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| [Type the Campus Location]  [Example: Tampa Campus] |
| [USF-000] |
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**BIM Project Execution Plan**

FOR

**[PROJECT TITLE]**

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# Section 1: BIM Project Execution Plan Overview

## Introduction

The University of South Florida requires the Project Team to develop a detailed BIM Project Execution Plan for successful implementation of Building Information Modeling (BIM) on University projects. The BIM Project Execution Plan (BIM-EP) defines uses for BIM on the project (Example: design authoring, cost estimating, and design coordination), along with a detailed design of the process for executing BIM throughout the project lifecycle. The BIM-EP will provide for the establishment of protocols for the development, use, transmission, and exchange of digital data, defining expectations of Level of Development for Model Elements at various milestones of the project.

The University has determined that Building Information Modeling (BIM) represents both an enhanced technology and a process change for the Architecture, Engineering, Construction, and Facilities Management industry. USF is committed to the utilization of BIM technology on University projects. All University projects shall strive for implementation as effectively and efficiently as possible, and to integrating BIM process requirements and Integrated Project Delivery (IPD) methodologies into its delivery requirements.

## Instructions for Use

The intent of this BIM Execution Plan Template is to provide a framework that will allow the University and the Project Team (Architects, Engineers and Contractors) to deploy BIM technology and best practices to be utilized on USF projects. The use of this template is required for BIM utilization on all USF institution projects. The Project Team shall complete the template in cooperation, working through each section together, adding, revising and deleting as needed to provide a project specific plan to present to the USF Project Manager and to the Facilities Information Services Assistant Director for review and approval (30) days after contract award. The first two pages of this document are to be omitted allowing the project title page to become the project cover. The table of contents will require an update after omission of the pages, click on the table and pick “Update Table” and select “Update page numbers only”.

## Project Development Requirements

BIM authoring tools, data integration, and collaborative team workflow environments shall be used to develop and produce project information and documentation as required for submittals. BIM use shall be maximized for project reviews, decision support, design analysis, and quality assurance during all phases of the project.

It is the responsibility of the consultants and contractors to have or obtain, at their cost, the trained personnel, hardware, and software needed to successfully use BIM for the project. Equipment used by the subcontractors during the on-site coordination meetings must meet the requirements of the software being implemented so as not to cause delays in modeling and redrawing. All technical disciplines shall be responsible for their data integration and data reliability of their work and coordinated BIMs.

## Data Utilization and Ownership

It is important to USF to own, reuse, and properly manage building data throughout the facility lifecycle. USF places significant importance on the accurate creation, management, and stewardship of building information during the design and documentation process. The design process shall allow refinements during and after the construction process, with the goal being delivery of project data in support of the owner, and utilization in facility management. USF shall have ownership of all CAD files, BIM Models, and Facility data developed for the Project. USF may make use of this data following any deliverable.

## Applicability

The application of BIM shall progressively build and update comprehensive models for any USF facility. This template is intended to be used on all projects, including new construction, renovation, remodeling, and building utility type projects. The development of BIM projects shall adhere to the **USF-BIM-EP**, **USF-BIM** and **USF-CAD** documents for proper guidance. USF will determine the extent of adherence when considering the scope and scale of minor projects. When variations are necessary, a flexible approach to the process of BIM execution will be considered for minor projects.

## Team Leads

The terms “Design Team”, “Construction Team”, and “Design/Construction Team” have been used in this document to assist in defining which group the guidance applies to. However, because project delivery can define risk differently, for some projects the responsibility will shift to either the AE or Contracting entity, or both. The **USF-BIM-EP** should properly define the duties of the parties before BIM modeling begins.

*NOTE: This document contains document abbreviations as referenced above and throughout this document (Example: USF-BIM-EP), full names and the location of these documents can be found in the “USF Referenced Documents and Abbreviations” located at the end of this document.*

# Section 2: Project Information

This section defines basic project reference information and determined project milestones.

Note: Text shown in light grey is for illustrative purposes only, this and all information throughout this document should be used as a guide and is intended to be replaced /updated /completed with project specific information as agreed upon by the University and Project Team.

## Project and Title Information

1. Project Owner: University of South Florida – Facilities Management
2. Project Name:
3. Project Location and Address: [Add Project Location] USF Tampa Campus
4. Contract Type/Delivery Method: [CM, DB, BID]
5. Brief Project Description: [FACILITY USAGE]
6. Additional Project Information: [BIM PROJECT CHARACTERISTICS AND REQUIREMENTS]
7. Project Numbers: [USF PROJECT NO – “USF-000”]

## Project Phases/Milestones

Include BIM milestones, pre-design activities, major design reviews, stakeholder reviews, and any other major events which occur during the project lifecycle.

|  |  |  |  |
| --- | --- | --- | --- |
| **PROJECT PHASE /**  **MILESTONE** | **ESTIMATED START DATE** | **ESTIMATED COMPLETION DATE** | **PROJECT STAKEHOLDERS INVOLVED** |
| PRELIMINARY PLANNING |  |  |  |
| DESIGN DOCUMENTS |  |  |  |
| CONSTRUCTION DOCUMENTS |  |  |  |
| CONSTRUCTION |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Section 3: Project Contacts

List of lead BIM contacts for each organization on the project. Additional contacts can be included later in the document.

## Core Collaboration Team

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ROLE** | **ORGANIZATION** | **CONTACT NAME** | **E-MAIL** | **PHONE** |
| USF |  |  |  |  |
| Architect |  |  |  |  |
| Construction Manager |  |  |  |  |
| Civil Engineer |  |  |  |  |
| Structural Engineer |  |  |  |  |
| Mechanical Engineer |  |  |  |  |
| Plumbing Engineer |  |  |  |  |
| Project manager |  |  |  |  |
| Design Team BIM Manager |  |  |  |  |
| Lead BIM Coordinator |  |  |  |  |
| Construction BIM Manager |  |  |  |  |
| Other Project Role |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Signatures** (Required before project start)

(Add additional signatures lines as necessary for the project)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

Design Team BIM Manager

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

Lead BIM Coordinator

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

Construction Team BIM Manager

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

USF Project Manager

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

USF BIM Manager (Assistant Director – Facilities Information Services)

# Section 4: Project Goals /BIM Uses

This section describes how the BIM Model and Facility Data will be leveraged to maximize project value.

## Major BIM Goals/Objectives

Major BIM Goals and Objectives for this Project are to be determined by project team and owner.

The priorities shown here are suggested. Indicate “H, M, L” in the chart below.

|  |  |  |
| --- | --- | --- |
| **PRIORITY**  **(HIGH/ MED/ LOW)** | **GOAL DESCRIPTION** | **POTENTIAL BIM USES** |
|  | Accurate documentation of building systems geometry and data to facilitate and automate O&M operations. | RECORD MODELING |
|  | Reduce and eliminate building system construction errors by digital modeling of building system geometries to detect conflicts or clashes. | 3D COORDINATION |
|  | Provision of standardized 3D digital construction document models which facilitate audit, analysis, construction and renovation. | DESIGN AUTHORING |
|  | Utilize intelligent modeling software to achieve optimum, cost-efficient design solutions for building systems such as mechanical, electrical and structural. | ENGINEERING ANALYSIS |
|  | Improved communication and cooperation between project participants to achieve LEED credits and obtain sustainability goals. | SUSTAINABILITY (LEED) EVALUATION |
|  | Improved visualization and presentation of virtual designs to validate design goals such as aesthetics, layout, sightlines, security, etc. | DESIGN REVIEWS |
|  | Efficient and accurate assessment of design performance parameters in regard to spatial requirements. | PROGRAMMING |
|  | Precise estimate of building systems costs and alternative schemes during the life-cycle of a project. | COST ESTIMATION |
|  | Enhanced efficiency and accuracy of existing conditions documentation by use of current software to create 3D models that can be queried for information | EXISTING CONDITIONS MODELING |
|  | Utilization of digital information to automate building component fabrication and field construction. | DIGITAL FABRICATION |
|  | Utilization of the information model to provide detailed control points in assembly fabrication and field construction. | 3D CONTROL AND PLANNING |
|  | Increased efficiency in building maintenance staff by use of information model data links to the Owner’s computerized maintenance management system (CMMS). | BUILDING MAINTENANCE SCHEDULING |
|  | Automated access to building asset information by linking the record information model to the owner’s computerized maintenance management system (CMMS). This would include linked access to building system operation routines, maintenance manuals, equipment specifications and fabrication documents. | ASSET MANAGEMENT |
|  | Use of the information model to track, analyze and report proposed and current use of space and related resources within facility. | SPACE MANAGEMENT / TRACKING |

## BIM Uses

Highlight and place an X next to the additional BIM Uses to be developed in the BIM model as selected by the project team. Additional items can be added and may be needed on the project.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **PROGRAMMING** | | **DESIGN** | | **CONSTRUCTION** | | **OPERATE** | |
| X | Existing Conditions Modeling | X | Existing Conditions Modeling | X | Existing Conditions Modeling | X | Existing Conditions Modeling |
| X | Cost Estimation | X | Cost Estimation | X | Cost Estimation | X | Cost Estimation |
|  | Phase Planning  (4d Modeling) |  | Phase Planning  (4d Modeling) |  | Phase Planning  (4d Modeling) |  |  |
|  |  | X | Design Authoring |  |  |  |  |
| X | Programming |  |  |  |  |  |  |
|  | Site Analysis |  |  |  |  |  |  |
|  |  | X | Design Reviews |  |  |  |  |
|  | Code Validation |  | Code Validation |  |  |  |  |
|  | Project Site Survey |  | Ada Verification |  |  |  |  |
| X | Sustainability (LEED) Evaluation | X | Sustainability (LEED) Evaluation |  |  |  |  |
|  |  |  | Energy Analysis |  |  |  |  |
|  |  | X | Structural Analysis |  |  |  |  |
|  |  | X | Lighting Analysis |  |  |  |  |
|  |  | X | Mechanical Analysis |  |  |  |  |
|  |  |  | Other Eng. Analysis |  |  |  |  |
|  |  | X | 3d Coordination | X | 3d Coordination |  |  |
|  |  |  |  | X | Site Utilization Planning |  |  |
|  |  |  |  |  | Construction System Design |  |  |
|  |  |  |  | X | Digital Fabrication |  |  |
|  |  |  |  | X | 3d Control And Planning |  |  |
|  |  |  |  | X | Record Modeling | X | Record Modeling |
|  |  |  |  |  |  | X | 2d Record Documents |
|  |  |  |  |  |  | X | COBie DELIVERABLES |
|  |  |  |  |  |  | X | Building Maintenance Scheduling |
|  |  |  |  |  |  |  | Building System Analysis (Commissioning) |
|  |  |  |  |  |  | X | Asset Management |
|  |  |  |  |  |  | X | Space Management / Tracking |
|  |  |  |  |  |  |  | Disaster Planning |

# Section 5: Organizational Roles /Staffing

## Design Team BIM Manager

Individual assigned by the Design Team to serve as the main point of contact between the Design Team, Construction Team, and USF for all BIM related issues. This individual shall have sufficient BIM experience required for the size and complexity of the project and shall have relevant proficiency in the BIM authoring and coordination software. Responsibilities include the following:

* Ensures development and compliance with the approved **USF-BIM-EP**
* Responsible for the development, coordination, publication, and verification that all necessary configurations and standards required for seamless integration of design and construction modeling information has been implemented
* Coordinates software training and team file management
* Coordinates the setup of a shared file server with the Design Team IT staff. This shall include interfacing with Design Team IT staff to set up web portal, access permissions, etc.
* Assembles composite design model for coordination meetings
* Facilitates use of composite design models in design coordination/clash detection meetings and provides detection reports by the identification and resolution of all hard and soft collisions
* Ensures that BIMs are used appropriately to test design requirements/criteria for functionality
* Assumes responsibility for the proper classification of all spaces and equipment in the model to ensure direction comparison with the Program for Design (PFD) and downstream use for facility management
* Interfaces with Design Team BIM and IT Managers to ensure software is installed and operating properly
* Schedules, coordinates, and facilitates BIM technical meetings between the Design and Construction Team and all design disciplines
* Determines the project BIM geo-reference point(s), and assures all technical discipline models are properly referenced
* Primary interface between the Design and Construction Teams and USF for BIM data and file transfers as required at each design phase or otherwise
* Assures that the BIM design deliverables specified and/or required by the contract and the **USF-BIM-EP** are provided in accordance with the formats specified
* Assures COBie information is provided to the Construction Team for milestone submittals
* Assures proper BIM derived 2D information conforms to the USF CAD Standards and for paper printing as required
* Coordinates with the Construction Team BIM Manager to assure the creation of proper BIM final deliverables
* Monitors compliance with the **USF-BIM-EP** and the **USF-BIM** documents and related BIM Level of Detail (LOD) requirements

## Lead BIM Coordinators

All major design technical disciplines/trades (Architecture, Structural, MEP, Interior design, etc.) shall assign an individual to the role of lead BIM Coordinator to coordinate their work with the entire Design/Construction Team. These individuals shall have the relevant BIM experience required by the complexity of the project and shall have, as a minimum, the following responsibilities for their discipline:

* Coordinate technical discipline BIM development, standards, data requirements, etc. as required with the Design Team BIM Manager
* Lead the technical requirements needed for BIM documentation and analysis for their discipline/trade
* Coordinate clash detection and resolution activities
* Coordinate internal and external BIM training as required
* Coordinate trade items into the BIMs

## Construction Team BIM Manager

Individual assigned to serve as the main point of contact for the Construction Team for BIM related issues. This individual shall have sufficient BIM experience required for the size and complexity of the project and shall have relevant proficiency in the BIM authoring and coordination software. Responsibilities include the following:

* Overall responsibility for the Construction Teams BIMs coordinating creation and information developed during construction
* Coordinates software training and establishes protocol software for Construction Team for efficient delivery of project
* Acts as the main point of contact for BIM and related issues between the Construction Team, subcontractors, USF and the Design Team and others as required
* Provides specifications for General Contractor’s BIM Coordination Room to USF for approval Ensures that the Construction Team has necessary hardware and BIM Software properly installed and accessible for project use
* Coordinates construction sequencing and scheduling activities, and assures they are integrated with the Construction Team BIMs
* Facilitates use of composite trade models in construction coordination/clash detection meetings and provides detection reports by the identification and resolution of all hard and soft collisions
* Communicates with the Design Team, coordinates the data extraction sets required by the construction trades and ensures that these requests are met
* Coordinates with the Design Team to facilitate design changes in the field have been documented and are updated in the BIMs in a timely manner
* Prior to approval and installation, works with Lead Fabrication Modelers to integrate 3D fabrication models with the updated design model to ensure compliance with design intent
* Coordinates update to the Record BIM deliverable included as-constructed conditions as indicated in the “Recorded Field Data”
* Coordinates with Design Team and Commissioning Agent to assure COBie information is complete

# Section 6: BIM Responsibilities

## Design Team Responsibilities

The Design Team will manage and update the BIMs through the end of the construction phase, incorporating all updates and/or revisions to the BIMs as necessary to reflect design changes initiated by ASI, RFI, owner changes, or coordination with existing conditions.

1. All BIM updates by the Design Team shall be complete three (3) weeks prior to Substantial Completion at which time the BIMs shall be transmitted to the Construction Team who shall be responsible for the construction related updates to the BIMs.
2. Prior to final completion, the Construction Team will transmit the Record BIMs back to the Design Team who shall then be responsible for the final preparations and delivery of the Record BIM and Documents to the University due 45 days after final completion and prior to final payment.

## Construction Team Responsibilities

1. During the construction phase, the Construction Team will maintain “Recorded Field Data”. This data shall be used by the Design and Construction Teams to review and compare any changes, deviations, additions or corrections to the BIM’s as implemented during the construction process.
2. Three (3) weeks prior to Substantial Completion the Design Team will transmit the BIMs to the Construction Team who will then incorporate the following updates and/or revisions into the Record BIM:
   * Assure all updates and/or revisions to the BIMs as necessary reflect the “Recorded Field Data” information. This includes drawings, specifications, addenda, change orders and other modifications, in good order and marked currently to indicate field changes and selections made during construction, including a copy of approved shop drawings, product data, samples and similar required submittals. This data shall be available to the owner and Design Team and shall be delivered to the Design Team as a record of the work As-Constructed. (The marked field set drawings have historically been referred to as “red-line” (As-Built) set maintained by the Construction Team)
   * Incorporate final updates to material/equipment data and properties where installations differ from the Basis of Design (BOD) included in the Design Teams BIMs
   * Incorporation or linking of certain close-out documents to the BIMs (examples: submittal information, O&M manuals, warranty information, and documentation photos)
3. All model updates by the Construction Team shall be complete at Substantial Completion at which time the BIMs and “Recorded Field Data” shall be transmitted back to the Design Team for updates as required to deliver “As-Constructed Record BIMs and Documents”.

## Record Models

The University recognizes the complementary nature of the Design and Construction Models that are created during the Project and that, at the end of the project, components from both models will be compiled into an Record Model. For example, the architectural design model may be used as background for individual trade Component Models as part of the Construction Model, and eventually the As‐Constructed Record Model.

## Project Team Responsibilities

| **ROLE** | **DESCRIPTION MANAGEMENT PLAN AND DEVELOPMENT** | **BIM RESPONSIBILITY** |
| --- | --- | --- |
| USF Project Manager | Manages and coordinates project execution and BIM to meet project delivery and cost containment | Oversight |
| Design Team Project Manager | Team manager and coordinator, assures BMP | Coordination & review |
| BIM Manager | Coordinate BIM use on project, determine schedule of use, sharing activities, quality control, modeling responsibilities and document in bmp | Oversight, management execution, and model exchange |
| Architecture | Design execution –formulate with BIM mgr. Map BIM use for architectural design | Modeler and review |
| Structural | Engineering - formulate with BIM mgr. Map BIM use for structural design – determine BIM use for structural simulations, analysis, and documentation. Identify tools | Modeler & review, and model exchange |
| MEP | Engineering - formulate with BIM mgr. Map BIM use for MEP design – determine BIM use for simulations, analysis, and documentation. Identify tools | Data development modeler, and model exchange |
| Interior Design | Interior design execution –formulate with BIM mgr. And architect - map BIM use for architectural design | Data development modeler and model exchange |
| Sustainability and Energy | Engineering - formulate with BIM mgr. Map BIM use for sustainability, 3rd party rating systems. – determine BIM use for simulations, analysis, and documentation. Identify tools | Data development review & user |
| Medical Center Users | Determine facility functionally issues to be modeled and tested | Development of critical medical issues, review and input of testing |
| Commissioning | Support. Provides architectural, engineering, equipment compliance reports produced in COBie format | Data development review & user |
| BIM Modeling Expertise by Software Application | Supports BIM manager on application specific content, issues | Modeler and data integrator |
| Project Estimator | Supports alignment of project delivery to BIM development & cost containment strategies | Oversight |
| Contractor | Receives or helps create BIM for constructability and handover for field use. Determine interference checking responsibility | Model user and review, and model exchange |
| Sub-Contractor and/or Fabricator (as appropriate) | Off-site fabrication - formulate with BIM mgr. And designer. Map BIM use for fabrication and shop drawing design. Determine BIM use for simulations of maintenance space analysis, and documentation. Identify tools | Model user, modeler, integrator |

# Section 7: Model Objectives and application

Reference the USF BIM Standards document for specific requirements for each individual phase.

## Programming/Pre-Design Phase

1. **Objectives:**

Provide initial design based on conceptual parameters established by the owner, ensure that code and zoning requirements meet project objectives, and establish a 3D reference point for BIM coordination. Provide Program of Requirements and all space considerations for reference in the BIM. Surveys shall be provided in an electronic format. A preliminary energy BIM will be used to narrow down design strategies to those that are in line with and will achieve the projects energy goals and targets. Comparative design simulations will be used to inform deign decisions with reference to building envelope, lighting, domestic water, and HVAC systems.

1. **Model Roles:**

A BIM may or may not take shape during the Conceptualization/Program of Requirements phase. If a model is created, its role will be to depict the visual concept and general layout of the project along with space requirements. The Design Team shall model all existing conditions needed to explain the extent of the construction work for alterations and additions to projects.

1. **Responsibilities:**

The Design Teams designated BIM Manager will establish a baseline BIM to be used as the basis for other BIMs. During the Conceptualization/Program of Requirement phase, the BIM Managers from all parties will establish modeling standards and guidelines.

## Schematic Design Phase

1. **Objectives:**

Provide spatial design based on input from the Conceptualization/Program of Requirement phase; provide initial design for building system and attributes including architectural, structural, and MEP; identify initial coordination issues between building systems; receive input from suppliers and fabricators regarding system cost, placement, fabrication and scheduling. The Design Team shall extract quantity take-off information to support comparative analysis. The Design Team shall submit data in COBie format, if applicable.

1. **Model Roles:**

The Design Teams BIMs will show the general design and layout of the building structure and act as the baseline for all other subsystem designs, such as MEP and Structural models. The subsystem designs will be used to show the initial selection and layout of building components. The Design BIM and Consulting Engineers BIM will be used to inform and develop the Energy BIM. The purpose of the energy BIM is to continue to refine design strategies and to calibrate the building’s energy performance.

1. **Responsibilities:**

Once the baseline conceptual structure has been created, the Design Teams BIM Manager will send the model to the sub-consultants so they can develop their designs. The Consulting Engineers designated BIM Managers will audit and deliver the completed BIMs to the Design Teams BIM Manager. Design Teams BIM Manager will review the BIMs to ensure compliance with the phase requirements. Once the BIMs meet the requirements, the Design Teams BIM Manager will link or combine cross-disciplinary BIMs. The Design Teams BIM Manager should coordinate with the Consulting Engineers BIM Managers to eliminate duplicate or redundant objects.

## Design Development Phase

1. **Objectives:**

Provide final design of building and building systems; resolve coordination issues between building systems; provide a Construction BIM capable of analyzing schedule, cost, and constructability. The Design Team shall submit a COBie deliverable that is updated from the Schematic Design Phase.

1. **Model Roles:**

The Design Teams BIM will continue to act as the baseline for all other subsystem designs. The subsystem designs will be modified accordingly to represent the enhanced design.

1. **Responsibilities:**

The consulting engineers BIM Managers will use the Design Teams BIM to revise and complete their designs. Once the BIMs are complete, the consulting Engineers BIM Managers will deliver their BIMs to the Design Teams BIM Manager. The Design Teams BIM Manager will review the BIMs to ensure compliance with the phase requirements. The Design Teams BIM Manager will provide the Construction Teams BIM Manager with the Design Teams BIM and the Consulting Engineers BIMs.

## Construction Documents Phase

1. **Objectives:**

Finalize design of the building and all building systems, prepare documentation for USF FM review, and provide a Construction BIM that highlights constructability, trade coordination, and fabrication. The Design Team shall submit quantity take-off information. The COBie Construction Document set shall be an update to the Design Development COBie data set.

1. **Model Roles:**

All design models will be used to reflect the design. The BIMs will then be used to generate the contract documents. The Construction BIMs will be used primarily for estimating, scheduling, and constructability analysis.

1. **Responsibilities:**

The Design Team and the Consulting Engineers BIM Managers will prepare contract documents for USF review based on the Design Intent BIMs.

## University Review

1. **Objective:**

USF FM will review the Design Intent BIMs as necessary providing feedback to the Design Team. The Design Team will revise finalized design BIMs based on USF feedback and coordinate with the project team BIM Managers to update all BIMs as necessary.

1. **Model Roles:**

The Design Teams BIMs will be adjusted to reflect USF feedback. The Design Teams BIM Manager will provide updated BIMs to the Construction Teams BIM Manager. The Construction Teams BIM Manager will incorporate updates to the Construction Teams BIMs as necessary. The Construction Teams BIMs will be enhanced and further used for estimating, scheduling, construction sequencing, trade coordination, and constructability analysis, etc.

1. **Responsibilities:**

The Design Teams BIM Manager will communicate USF comments back to the Consulting Engineers. The Consulting Engineers BIM Managers will revise their design BIMs accordingly and submit them back to the Design Teams BIM Manager. The Design Teams BIM Manager will coordinate updates with the Construction Teams BIM Manager and the project team.

## Construction Phase

1. **Objectives:**

Update Design Team and Consulting Engineers BIMs based on submittals, RFIs, or owner-directed changes; maintain the Construction BIM based on construction activities. The construction team will submit RFIs and submittals through the collaborative project management system. Navisworks files shall be created for all critical milestones. A full collision report shall be submitted.

1. **Model Roles:**

The Design Team and Consulting Engineers BIMs will be revised throughout construction, based on owner directives and Recorded Field Data. The BIMs will always reflect the revised contract documents. The Construction BIMs will be used for scheduling, analysis, construction sequencing, and trade coordination.

1. **Responsibilities:**

The Design Team BIM Manager will work with their Consulting Engineers to answer the RFIs and submittals and adjust the BIMs accordingly. The Construction Teams BIM Manager will update the Construction BIMs and will work with the Design Team to update the Design Team and Consulting Engineers BIMs.

## Project Closeout – Record Deliverables Phase

1. **Objective:**

The Design/Construction Teams will work in a collaborative effort to deliver the Final Record Model(s)and Documents. During the construction process, the design team will incorporate changes triggered by requests for information (RFIs), architect’s supplemental instructions (ASIs) and change orders in into the Architectural and Consultant models. At specified dates during the construction process, the Construction Team will provide the Design Team with necessary changes due to shop drawings, coordination drawings and change orders etc. The Design Team will then incorporate the changes reported by the Construction Team into the Architectural and Consultant models.

1. **Model Roles:**

The Design Team’s BIMs will be used as the coordinated Record BIMs representing the actual conditions As-Constructed. The Record BIMs will be used by USF for space management, scheduling and maintenance, etc.

1. **Responsibilities:**

The Design Team BIM Manager will deliver the Record BIMs, including As-Constructed information and all other supporting BIMs to USF in accordance with the **USF-BIM-EP**, **USF-BIM** and the **USF-CAD** documents unlocked and available for updates. (See Section 6 of this document for additional requirements)

# Section 8: Level of Development (LoD)

## Level of Development Procedures

1. A detailed BIM plan shall be developed for each phase of the project and shall clearly describe the desired BIM maturity and “Level of Development” (LOD) necessary for the various phases of project design.
2. All design BIMs will be performed utilizing Autodesk "Revit" software platforms (Architecture, Structure, MEP), etc. The Design Team shall collectively coordinate platform versioning for compatibility purposes during the design process. Any deviations shall require approval from USF.
3. At each design phase, the BIM maturity shall be developed to the extent that it will generate the drawing document deliverables in compliance with the **USF-CAD** and will be developed with the content, level of detail, and format, as required by the **USF-BIM-EP** and the **USF-BIM** documents. Each phase shall be consistent with the Level of Development as agreed apron in the **USF-BIM-EP**. The resulting output, depicted in traditional two-dimensional drawing format with drawing sheets organized by discipline, dimensioned and detailed, shall serve as validation of the accuracy and completeness contained within the BIMs.
4. The project shall be developed with the understanding that not all project designs will require the same phases and durations. Adjustments to the model(s) Level of Development and phase durations will be agreed upon as necessary by the project team (for example; a small minor project may only require a 50% and 100%CD review, whereas a larger scale major project may require conceptual, advanced Schematic, design development, 60% CD, and 100% CD review phases).

## Model Detail & Level of Development (LOD) Chart

The chart below is used to define the LOD for the project and is based on section “8 Model Element Specifications” included in the USF BIM Guidelines and Standards

|  |  |  |  |
| --- | --- | --- | --- |
| **Model Name** | **Model Elements**  **(As Indicated in USF BIM Guidelines and Standards)** | **Project Phase** | **Level of Development** |
| Civil Model | f1, f2 | Schematic Design | 100 |
| f1 – f3 | Design Development | 200 |
| f1 – f3 | Construction | 300/350 |
| f3 | Record /Deliverables | 350/500 |
| Structural Model | b1 | Schematic Design | 100 |
| b1 – b3, b5 | Design Development | 200 |
| b1 – b3, b5 | Construction | 300 |
| b2, b3, b5 | Record /Deliverables | 350/500 |
| Architectural Model | a1, a2, a4, a5 | Schematic Design | 100 |
| a1 – a7 | Design Development | 200 |
| a1 – a7 | Construction | 350/400 |
| a2- a4, a6 | Record /Deliverables | 350/500 |
| MEP Model | c1 – c5, d1 – d3, e1 – e5 | Design Development | 200 |
| c1 – c5, d1 – d3, e1 – e5 | Construction | 300/400 |
| c1, d1,e1 | Record /Deliverables | 350/400/500 |
| Construction/Record Model(s) | Includes all of the above elements. | Construction | 350/400 |
| Includes all of the above elements. | Record /Deliverables | 500 |

## Construction & Record BIM

The Construction BIM is considered a composite of multiple BIMs developed with an LOD of 100-400. This BIM will be further developed and submitted as the Record BIMs including “Recorded Field Data”. During construction, changes shall be included in this model as accurate representation of model elements, including fabrication, RFI’s, and change orders. The Record BIMs shall include work As-Constructed and be developed with an LOD of 500. (See Section 6.2)

## Understanding Level of Development

The following, LOD descriptions identify the specific content requirements and associated authorized uses for each Model Element at each phase. The LOD for each phase provides guidance for each progressively detailed level of completeness. Each subsequent LOD builds on the previous level and includes all the characteristics of previous levels. These LOD’s described will be used to establish the required LOD for each Model Element at each phase of the Project.

**LOD 100 Conceptual:**

* Overall building massing representative of area, height, volume, location, and orientation may be modeled in three dimensions or represented by other data
* Analysis may occur based on the volume, area and orientation of the general representation of the Model Element

**LOD 200 Approximate:**

* Model Elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. Any additional information may also be attached to Model Elements
* Analysis may occur based on the quantities, size, shape, location and orientation of the general representation of the Model Elements

**LOD 300 Precise:**

* Model Elements are modeled as detailed assemblies that accurately represent quantity, size, shape, location, and orientation. Any additional information may also be attached to Model Elements
* Analysis may occur based on the performance of selected systems of the specific representation of the Model Element

**LOD 350 Assemblies for Coordination:**

* Model Elements are modeled as detailed assemblies that accurately represent specific systems, objects, or assemblies in terms of quantity, size, shape, orientation, and interfaces with other building systems with the detail necessary for cross-trade coordination and construction layout. Non-graphic information may also be attached to the Model Element

**LOD 400 Fabrication:**

* Model Elements are modeled as detailed assemblies that accurately represent size, shape, location, quantity, and orientation with complete fabrication, assembly, and detailing information. Any additional information may also be attached to Model Elements
* Analysis may occur based on the performance of selected systems of the specific Model Elements

**LOD 500 Record Documents (Record BIM):**

* Model Elements are modeled as constructed assemblies actual and precisely representing size, shape, location, quantity, and orientation, including “Recorded Field Data”. The model should be configured to be the central data storage for integration into building maintenance and operational systems. Any additional information may also be attached to modeled elements

# Section 9: BIM Information Exchanges and model sharing

The success of a BIM enabled project delivery process is highly dependent upon the level at which the entire Design/Construction Team can communicate and work collaboratively for the duration of the project. This section documents collaboration procedures for effectively managing this process.

## Integrated Project Delivery (IPD) Methodology

IPD is a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.

* 1. The project is to be delivered using Integrated Project Delivery (IPD) methodology. The project requires open lines of communication between all disciplines. There will be a need of review meetings to facilitate the coordination and execution of effective design. Each member is expected to apply his knowledge and expertise when applicable.
  2. The Project Team will need to reach an agreement on how the BIMs will be developed, accessed, and used, and how information can be exchanged between BIMs and participants.
  3. The project requires information from every participant to be shared where applicable throughout the Project’s duration. All project participants are to share information in order to meet the needs of the Project and USF.
  4. Please refer to the following documents for more information on IPD:
  + AIA IPD Agreements: C196-2008 and C197-2008
  + AIA Integrated Project Delivery Guide (IPDG)

## Geo-Referenced Model

The Design Team BIM Manager at start of project shall establish geo-reference placement for the project to the actual project site location using Florida State Plane coordinates. The following datums should be used: North American Datum (NAD) 1983 for horizontal control and North American Vertical Datum (NAVD) 1988. All models shall maintain this reference throughout the project phases.

## Collaboration & Model Sharing

For general project correspondence and milestone/phase BIM deliverables, the Project Team will use a designated server as a means of sharing and storing information. During the design phase, BIM-related files utilized by the Design Team will be shared through the common project site managed by the Design Teams BIM Manager. During the construction phase, BIM-related files may be shared utilizing either the Construction Teams Managers, selected A/E site or the designated server.

**Design Phases:**

* The qualifications, experience, and previous success in BIM coordination of the Proposed BIM Manager and the Design Team shall be a part of the evaluation factors for BIM Manager Selection.
* The Design Team shall be responsible for providing a fully coordinated and assembled BIM in a collaboration software format (Navisworks or approved) as well as separate copies of each technical discipline model in the original software authoring tool, as well as a 2D plan set, derived from the assembled BIM, for construction.

**Construction Phase:**

* It is the General Contractors responsibility to assure that all major trades are modeled and used for clash detection, construction phasing, and installation coordination.
* The General Contractors fabrication BIMs shall be coordinated with the Design BIM. Any conflicts to the Design BIM that need to be made prior to fabrication and construction shall be reported to the Design Team in the form of a Request for Information (RFI). Clash reports may also be issued by the General Contractor as background information for RFI’s and submittals.

## Version Control

It shall be the Design Team BIM Managers responsibility to monitor and regulate software version updating if required during the course of the Project. It is understood that a number of the software tools utilized in this **USF-BIM-EP** are not backwards compatible and must be carefully synchronized. Since the majority of the BIM software platforms utilized on the project do not contain backward capabilities, the entire Project Team will need to evaluate the advantages and disadvantages of performing software upgrades during the design phase, and reach an agreement on whether or not to proceed with such upgrades if/when they may become available.

## Efficient Project Work Flow

The project is to facilitate coordinated, efficient work processes so that each party shall make their design data available to the team in an approved and shared repository or exchange protocol. These files shall be accessible by all from a central location, or replicated in a shared environment utilizing an established project folder structure for each party. Prior to sharing, the data shall be checked, approved, and validated by the Design Team BIM Manager.

* Only BIM data or files that have been checked, and approved shall be transferred to the shared location.
* Sharing of BIMs shall be carried out on a regular basis in order that other disciplines are working to latest validated information as defined in the **USF-BIM-EP**
* BIM files shall be issued in conjunction with verified 2D document submissions to minimize the risk of errors in communication.
* It is recommended that BIM files be issued exactly as produced with no additional merging, or editing. All necessary references and linked files should also be issued.
* The shared location shall also act as the repository for formally issued data provided by external organizations that are to be shared across the project.
* Changes to the shared data shall be effectively communicated to the team through traditional drawing issues, change logs or other suitable notice, such as e-mail or by other approved methods.

**Publication and Document Issue:**

* Alongside other project documentation, exported data and 2D electronic drawings produced from the BIMs shall be stored in the Published Area of the project central designated server, once formally checked, approved and authorized in accordance with the project review procedures.
* Revision/Issues control shall follow the document control systems established for the project.
* A record of all issued deliverables shall be maintained in both softcopy and hardcopy where appropriate.
* Information within BIMs are interdependent and changes in one view may affect other views. As such the BIMs and all associated views shall be treated as the master project data and once published become uncontrolled documents as they leave the BIM environment and are published in a non-editable format.

**Archiving:**

* Archiving of all approved output data from the BIMs shall be stored in the archive section on the central designated server, including published, superseded, and Record BIMs and documents, and data.
* Additionally, at key stages of the design process, a complete version of the model, exported data and associated drawing deliverables shall be copied into an archive location.
* Project history should be maintained for knowledge, regulatory and legal requirements.

# Section 10: Quality Control

## Overall Strategy for Quality Control

The Design Team BIM Manager shall be responsible for verifying that the BIMs meet the requirements described in both the **USF-BIM-EP** and the **USF-BIM** documents. The Design Team BIM Manager shall be responsibility for quality control of all submissions includes the ability to reject and require correction of any deliverables or formats that do not meet requirements. The Design Team BIM Manager shall verify that the deliverable files contain only the content required in accordance with the **USF-BIM-EP** and the **USF-BIM** documents.

## Quality Control Checks

The following checks should be performed to assure quality.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CHECKS** | **DEFINITION** | **RESPONSIBLE PARTY** | **SOFTWARE PROGRAM(S)** | **FREQUENCY** |
| VISUAL CHECK | Ensure there are no unintended model components and the design intent has been followed |  |  |  |
| INTERFERENCE CHECK | Detect problems in the BIM where two building components are clashing including soft and hard |  |  |  |
| STANDARDS CHECK | Ensure that the **USF-BIM-EP**, **USF-BIM** and **USF-CAD** documents have been followed (Fonts, dimensions, line styles, levels/layers, etc.) |  |  |  |
| MODEL INTEGRITY CHECKS | Describe the QC validation process used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans |  |  |  |
|  |  |  |  |  |

## Model Accuracy and Tolerances

Models should include all appropriate dimensioning as needed for design intent, analysis, and construction.

|  |  |  |
| --- | --- | --- |
| **PHASE** | **DISCIPLINE** | **TOLERANCE** |
| DESIGN DOCUMENTS | ARCH | ACCURATE TO +/- [ # ] OF ACTUAL SIZE AND LOCATION |
| DESIGN DOCUMENTS | MEP | ACCURATE TO +/- [ # ] OF ACTUAL SIZE AND LOCATION |
| DESIGN DOCUMENTS | CIVIL | ACCURATE TO +/- [ # ] OF ACTUAL SIZE AND LOCATION |
| SHOP DRAWINGS | MECH CONTRACTOR | ACCURATE TO +/- [ # ] OF ACTUAL SIZE AND LOCATION |

## Clash Detection/Coordination

1. It is the Design/Construction Teams responsibility to conduct and manage an adequate and thorough Clash Detection process so that all major interferences between building components will have been detected and resolved before construction. It shall be the goal of the Design/Construction Teams to reduce the number of changes during construction due to major building interferences to zero before construction starts.
2. The Design/Construction Teams BIM Managers shall assemble a composite BIM from all of the BIMs of each design discipline for the purpose of performing a visual check of the building design for spatial and system coordination. Vertical shafts should also be reviewed to ensure that adequate space has been allocated for all of the vertical mechanical systems and that all of the shafts line up floor to floor. Prior to each scheduled coordination meeting, an updated clash report will be issued by the Design/Construction Teams BIM Manager to the project team.
3. On a multistory project, the BIMs may need to be split on a level by level basis for MEPF coordination. If a floor is particularly large, it may also need to be split by zones to reduce file size. Typically, 3D clash detection /coordination continues on a single floor until building systems are fully coordinated, and then continues on up to the next floor level.
4. Coordination software (Navisworks or other approved software) shall be used for assembling the various design BIMs to electronically identify, collectively coordinate resolutions, and track and publish interference reports between all disciplines. The technical disciplines shall be responsible for updating their BIMs to reflect the coordinated resolution.
5. The Project Team shall review the model and the Clash Reports in coordination meetings on a regular as-needed basis throughout the design phases until all spatial and system coordination issues have been resolved.
6. During the construction phase, the accuracy of fabrication models shall be verified and approved, prior to submittal and fabrication. Fabrication contractors shall submit their BIMs to the Construction Teams BIM Manager for integration and Clash Detection /coordination and resolution.
7. **Internal Clash Resolution** – The Design Team and Subcontractors who are responsible for multiple scopes of work are expected to coordinate the clashes between those scopes prior to providing those models to the Construction Teams BIM Manager for spatial and system coordination.
8. Spatial Coordination: Verification and tracking of resolved conflicts of all trade coordination issues which could result in change orders or field conflicts shall be provided to USF during project milestone dates, and should be fully resolved before construction start.

## Meeting Procedures

The following are examples of meetings that should be considered.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MEETING TYPE** | **PROJECT STAGE** | **FREQUENCY** | **PARTICIPANTS** | **LOCATION** |
| BIM REQUIREMENTS KICK-OFF |  |  |  |  |
| BIM PROJECT EXECUTION PLAN DEVELOPMENT |  |  |  |  |
| DESIGN COORDINATION |  |  |  |  |
| CONSTRUCTION OVER-THE-SHOULDER PROGRESS REVIEWS |  |  |  |  |
| ANY OTHER BIM MEETINGS THAT OCCURS WITH MULTIPLE PARTIES |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

## Model Delivery Schedule of Information Exchange for Submission and Approval

Document the information exchanges and file transfers that will occur on the project.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **INFORMATION EXCHANGE** | **FILE**  **SENDER** | **FILE**  **RECEIVER** | **ONE-TIME or FREQUENCY** | **DUE DATE or START DATE** | **MODEL FILE** | **MODEL SOFTWARE** | **NATIVE FILE TYPE** | **FILE EXCHANGE TYPE** |
| DESIGN AUTHORING - 3D COORDINATION | STRUCTURAL ENGINEER | DESIGN TEAM BIM MANAGER | WEEKLY | DATE | STRUCT | REVIT | .XYZ | .XYZ  .ABC |
| DESIGN AUTHORING - 3D COORDINATION | MECHANICAL ENGINEER | DESIGN TEAM BIM MANAGER | WEEKLY | DATE | MECH | REVIT | .XYZ | .XYZ  .ABC |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

# Section 11: Technology Platform and Software

## Approved BIM Software for USF Projects

The University of South Florida has adopted Autodesk Revit software platforms as its standard BIM software. The **USF-BIM-EP** shall address all software to be used on the project as needed. Any other software applications, such as Third Party Applications shall be approved by USF before use. The Autodesk Revit products currently used by USF are:

* Autodesk Revit Architecture
* Autodesk Revit MEP
* Autodesk Revit Structure

In addition to the Revit-based applications, the University of South Florida has adopted, as well, the following applications for its BIM effort:

* Autodesk Navisworks
* Autodesk AutoCAD Civil 3D
* Autodesk 3D MAX Design
* Autodesk Design Review

*NOTE: Refer to the USF BIM Guidelines and Standards (USF-BIM) and the USF CAD Guidelines and Standards (USF-CAD) for detailed requirements and software versions.*

# Section 12: Acknowledgements and References

## Resources and References

* National Institute of Building Sciences BuildingSMART Alliance

<http://www.nibs.org/?page=bsa>

* General Services Administration (GSA) – 2003 National 3D-4D BIM Program

<https://www.gsa.gov/real-estate/design-construction/3d4d-building-information-modeling>

* NBIMS National BIM Standard

<https://www.nationalbimstandard.org>

* U.S. Department of Veterans Affairs - VA BIM Guide

[http://www.cfm.va.gov/til/bim/BIMGuide](http://www.cfm.va.gov/til/bim/BIMGuide/)

* Pennsylvania State University, Computer Integrated Construction (CIC) Research Program [http://bim.psu.edu/Project/resources](http://bim.psu.edu/Project/resources/)
* Indiana University, University Architect's Office

<http://www.iu.edu/~vpcpf/consultant-contractor/standards/bim-standards.shtml>

* Building SMART International Home of Open BIM

https://www.buildingsmart.org/

* Construction Operations Building Information Exchange (COBie)

<http://www.wbdg.org/resources/cobie.php>

# Glossary

| **Term** | **Definition** |
| --- | --- |
| **3D/4D/5D** | Descriptions of BIM implementation with increasing 'richness' of associated information. |
| **A/E** | **Architect and/or Engineer --** Collective acronym for professions working in the creation/maintenance of the built environment. |
| **ASF** | **Assignable Square Feet (Assignable Areas) --** The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use. (Includes: classrooms, labs, offices, study facilities, special use, general use, support, health care, residential, and unclassified – that are used to accomplish the institution’s mission) Note: ASF calculations do not include wall thickness or space that is open to below. Also referred to as **Net Assignable Square Feet (Net Assignable Area) NASF**. |
| **ASI** | **Architect’s Supplemental Instruction --** The process used to resolve minor issues in the construction documents so long as they do not affect contract time or money. |
| **BOD** | **Basis of Design --** The design parameters and subsequent design systems and materials incorporated into the project model(s). The BOD is owner provided functional requirements for the facility with expectations of use and operation. It may include project and design goals, budgets, limitations, schedules, owner directives and supporting information. |
| **BEP** | **BIM Execution Plan --** Written plan to integrate the BIM tasks and information with all stakeholders and processes. |
| **BIMs** | **Building Information Model(s) - Product --** An object-based digital representation of the physical and functional characteristics of a facility. The Building Information Model or Models serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its lifecycle from inception onward. |
| **BIM** | **Building Information Modelling - Process --** A collection of defined model uses, workflows, and modeling methods used to achieve specific, repeatable, and reliable information results from the model. Modeling methods affect the quality of the information generated from the model. |
| **BMP** | **Best Management Practice --** Is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered. |
| **BIM Authoring Tools / Software** | The software or tool used to create the models. (Design applications such as Autodesk Revit) |
| **CAD** | **Computer Aided Design --** (Also known as 2D Drawings) A geometric/symbol based computer drawing system that replicated hand drawing techniques. The production of CAD documents are to be completely derived from the BIM model(s). |
| **CAFM** | **Computer-Aided Facilities Management --** Includes the creation and utilization of Information Technology (IT)-based systems in the built environment. A typical CAFM system is defined as a combination of Computer-Aided Design (CAD) and/or relational database software with specific abilities for Facilities Management. |
| **Clash detection** | Process of identifying conflicts and issues using 3D collaboration and coordination software tools. |
| **CMMS** | **Computerized Maintenance Management Systems --** A software package that maintains a computer database of information about an organization’s maintenance operations, enabling the facility manager to track the status of maintenance work on their assets and the associated costs and manpower related to that work. |
| **COBie** | **Construction Operations Building Information Exchange --** Information exchange standard/protocol for BIM projects - generally spreadsheet based progressively developed through construction process passed to building operator. The model and facility data for the commission, operations, and maintenance of the project expected from BIM for facility handover in formats suitable for integration into current and future CAFM systems. |
| **Construction**  **Team** | A group of professionals working together for a common goal in utilizing techniques and industry involved in the assembly and erection of structures. |
| **Contracting Entity** | Is the party or company who enters into a binding agreement with the owner as the primary responsible entity that is awarded the contract. |
| **Design Team** | A group of design professionals working together for a common goal or purpose. It is made up of different individuals with different skills or talents. It may consist of architects, engineers, artists etc. |
| **Design/ Construction Team** | The term use when both the Design Team and Construction Team is referenced. (See Design Team, Construction Team) |
| **Fabrication** | The act or process of manufacturing, to make, build, or construct in reference to building systems or components. Usually means off site fabrication done within a controlled environment resulting in improved accuracy and efficiencies. |
| **FM** | **Facilities Management --** The University department that manages building design and construction. Each USF institution has a Facilities Department. FM Tampa provides oversight for the entire USF portfolio. |
| **Geo-reference** | To associate something with locations in physical space. The term is commonly used in geographic information systems to describe the process of association to spatial locations. Establishes control points, coordinate system and other projection parameters. |
| **GSF** | **Gross Area Square Feet --** The sum of all areas on all floors of a building included within the outside faces of its exterior walls. Includes: exterior covered areas, and all vertical penetration areas, for circulation and shaft areas that connect one floor to another. Note: GSF calculations do not include space that is open to below. |
| **HVAC** | **Heating, ventilation, and air conditioning --** The system used to provide heating and cooling services to building |
| **Information model** | Another name or reference to the Building Information Model. |
| **IPD** | **Integrated Project Delivery --** Contractual form relevant to the BIM design and construction process. Not widely used outside of the USA at present. |
| **LEED** | **Leadership in Energy and Environmental Design --** Is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification. |
| **LOD** | **Level of development --** Scales applied to provide a common understanding of information requirements at different stages of a project (A scale developed by the American Institute of Architects). |
| **MEP** | **Mechanical, Electrical and Plumbing --** The professional engineers designing the building systems for Mechanical, Electrical and Plumbing disciplines. |
| **Model** | General term used to refer to the computer file or files that may contain BIM data. |
| **NASF** | **Net Assignable Square Feet (Net Assignable Area) --** The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use. Excluding: public corridors, elevators, stairwells, and all types of mechanical rooms, public bathrooms, custodial rooms, and shaft spaces. Note: NASF calculations do not include wall thickness or space that is open to below. |
| **Non-ASF** | **Non Assignable Square Feet --** The sum of all areas on all floors of a building not available for assignment to an occupant or for a specific use, but necessary for the general operation of a building. (Includes: building services, circulation, and mechanical that are used to support the building’s general operation) Note: Non-ASF calculations do not include wall thickness or space that is open to below. |
| **NSF** | **Net Square Feet** -- The total square footage of all the rooms/areas on a floor. This includes assignable and non-assignable rooms. Note: NSF calculations do not include wall thickness or space that is open to below. Also referred to as **Net Usable Area (Net Usable Square Feet) NUSF** |
| **O&M** | **Operations & Maintenance --** Encompasses a broad spectrum of services required to assure that the built environment will perform the functions for which a facility was designed and constructed. |
| **Parametric** | A digital description of a physical object using parameters. |
| **PFD** | **Program for Design --** The development of a comprehensive and purposeful system or plan to achieve a specific goal. |
| **RFI** | **Request for Information --** The process of requesting additional information, directive or clarification from the architect or client. |
| **USF** | **University of South Florida --** Identity or name of project owner. |

# USF REFERENCE DOCUMENTS AND ABBREVIATIONS

| **Document Title** | **Document Abbreviation** | **Location** |
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| USF CAD Guidelines and Standards | **USF-CAD** | All documents can be found on the <http://www.usf.edu/fm> web site. |
| USF BIM Guidelines and Standards | **USF-BIM** |
| USF BIM Project Execution Plan (Template) | **USF-BIM-EP** |
| USF BIM Equipment Asset Tags | **USF-BIM-EA** |
| USF Layer Guidelines | **USF-LG** |
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