



BIM Communication Specification®

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Published by:
Autodesk, Inc.
111 McInnis Parkway
San Rafael, CA 94903, USA

Executive Summary

In today's architecture, engineering, and construction (AEC) industry, new technologies and practices are making a significant difference in how building projects get delivered. Owners, architects, and contractors are using collaborative communication platforms to manage and share information and standardize their business processes. Meanwhile, advanced model creation tools let stakeholders visualize, simulate, and analyze how a building might behave, perform, or appear—with more precision than ever before.

But the plethora of new tools, technologies, and practices may seem confusing. To help users navigate and take advantage of the savings in cost and time these tools can offer, we have created this document.

The BIM Communication Specification outlines practices and provides a framework for using building information modeling (BIM) technology and practices to deliver projects faster and more cost-effectively.

Filled with information and planning templates to streamline project communications, it focuses on helping you reduce design and construction costs through collaborative communication. By using this document as a collaborative, adaptable template to establish project standards and responsibilities from the start, you'll ensure that all stakeholders get the information they need during every phase of the building project.

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I. Overview

In recent years, technologies and practices have emerged that fundamentally change how building projects get delivered - These technologies range from new tools for model creation to the use of visualization, simulation, and analysis tools to better predict a building's behavior, performance, or appearance. In addition, collaborative communication platforms are being used to manage and share information and drive business process standardization.

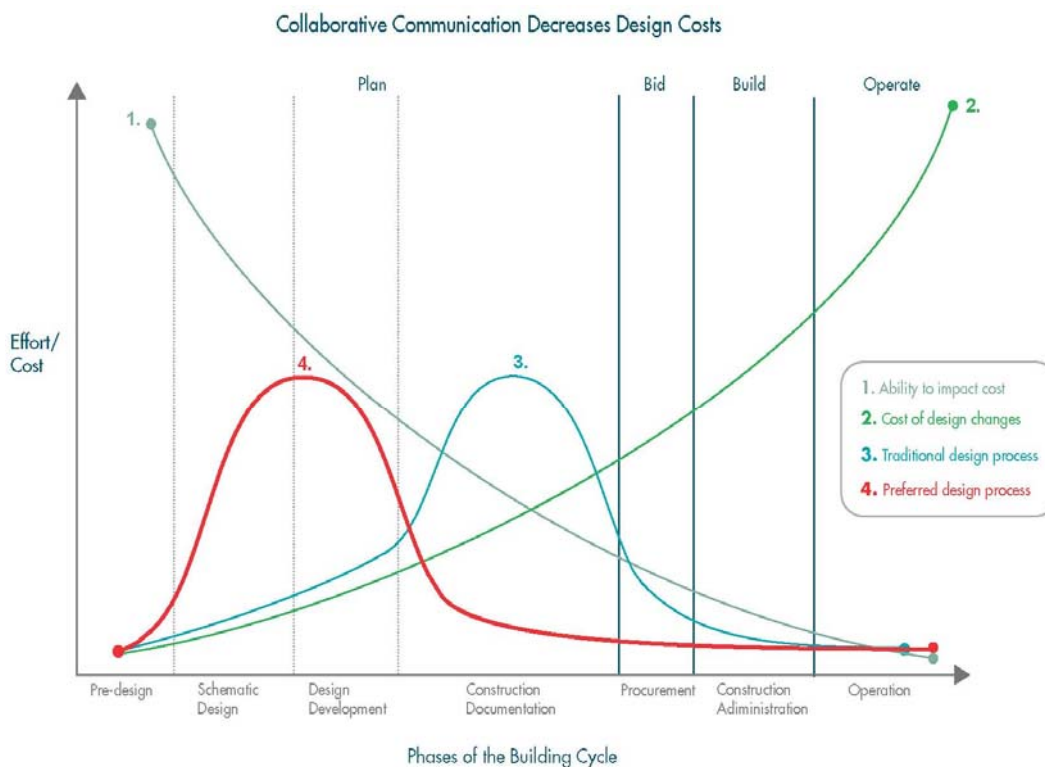
The intent of this BIM Communication Specification document is to provide a framework that lets owners, architects, engineers and contractors deploy building information modeling (BIM) technology and best practices to deliver their projects faster and more cost-effectively. This document also makes recommendations on the roles and responsibilities of each party, the detail and scope of information to be shared, relevant business processes and supporting software.

For stakeholders in building projects, the benefits of applying the framework and recommendations include:

- Improved communication and collaboration among all project team members
- Fewer problems related to overruns in cost, schedule, and scope, or quality concerns
- Being able to reliably deliver projects faster, more economically, and with reduced environmental impact.

BIM technology helps builders ensure that project knowledge remains accessible continuously throughout the different phases—planning, bidding, building, and operating—of any construction project. But before they deploy BIM technology, builders need information on how to streamline their communications and select the right tools.

Autodesk created this BIM Communication Specification to help guide companies like yours through the process. It helps you define project teams, identify key processes and dependencies throughout your project, assign roles and responsibilities, and select software solutions that use collaborative communication to reduce your project costs.



In this document, we establish a planning framework for your building projects, and provide information about different kinds of technology that can help you work more efficiently:

1. Solutions that let project teams create, adapt, and reuse information-rich digital models during every stage of the project, including design, construction, and operations.
2. Analysis tools that deliver insight into the constructability and potential performance of buildings before they are built. Using this analysis, your project teams can make more informed decisions about building materials, energy, and sustainability—and detect and prevent costly clashes between elements such as pipes and beams.
3. A collaborative communication platform that helps reinforce business processes while ensuring that all team members share project information in a structured manner.

With these solutions, you can keep BIM data intact throughout all phases of development. At the beginning of a project, the team can work together to resolve design problems before they break ground. When the project is completed, the team can present the building owner with a complete digital model that provides all the information necessary to manage and operate the building—instead of delivering unwieldy rolls of drawings and boxes of paper documentation.

Your project teams can use the BIM Communication Specification as a collaborative, working template for establishing project standards and alignment early in the project. The BIM Communication Specification will also help your teams define the roles and responsibilities for each team member, what types of information to create and share, and what kind of software systems to use and how to use them. Your project teams will be able to streamline communications and plan more effectively—reducing costs as well as concerns about quality, scope, and schedule across all phases of construction.

II. Project Initiation

In this section you'll define your Core Collaboration Team, as well as your project objectives, project phases, and overall communication plan throughout the project's phases.

A. Project Description

Enter key information about the project below. Include the project name, the owner's project number, the address, and the project description.

Project Name	
Owner's Project Number	
Project Address	
Project Description	

B. Core Collaboration Team

Your project's Core Collaboration Team ideally includes at least one person from each stakeholder involved in the project, such as the owner, architect, contractor, sub-consultants, suppliers, and trade contractors. This team is responsible for:

- Completing this BIM Communication Specification,
- Creating the document management file folder structure and permission levels in the collaborative project management system
- Enforcing the action plan set out in this document throughout the design and construction of the project.

To complete this BIM Communication Specification, the Core Collaboration Team on your project will:

- List the goals and objectives of using BIM and collaborative project management technologies on your project
- Specify the project's phases/milestones
- Map out the communication among project team members for the different project phases.

List the Core Collaboration Team members for your project below.

Contact Name	Role / Title	Company	Email	Phone

C. Project Goals and Objectives

Using collaborative project management and BIM technologies on projects can offer tangible as well as intangible benefits. List your objectives for using BIM and collaborative project management technology and processes on this project below. Also list how you will measure the achievement of these objectives, and their targeted timeframes. The first line shows an example.

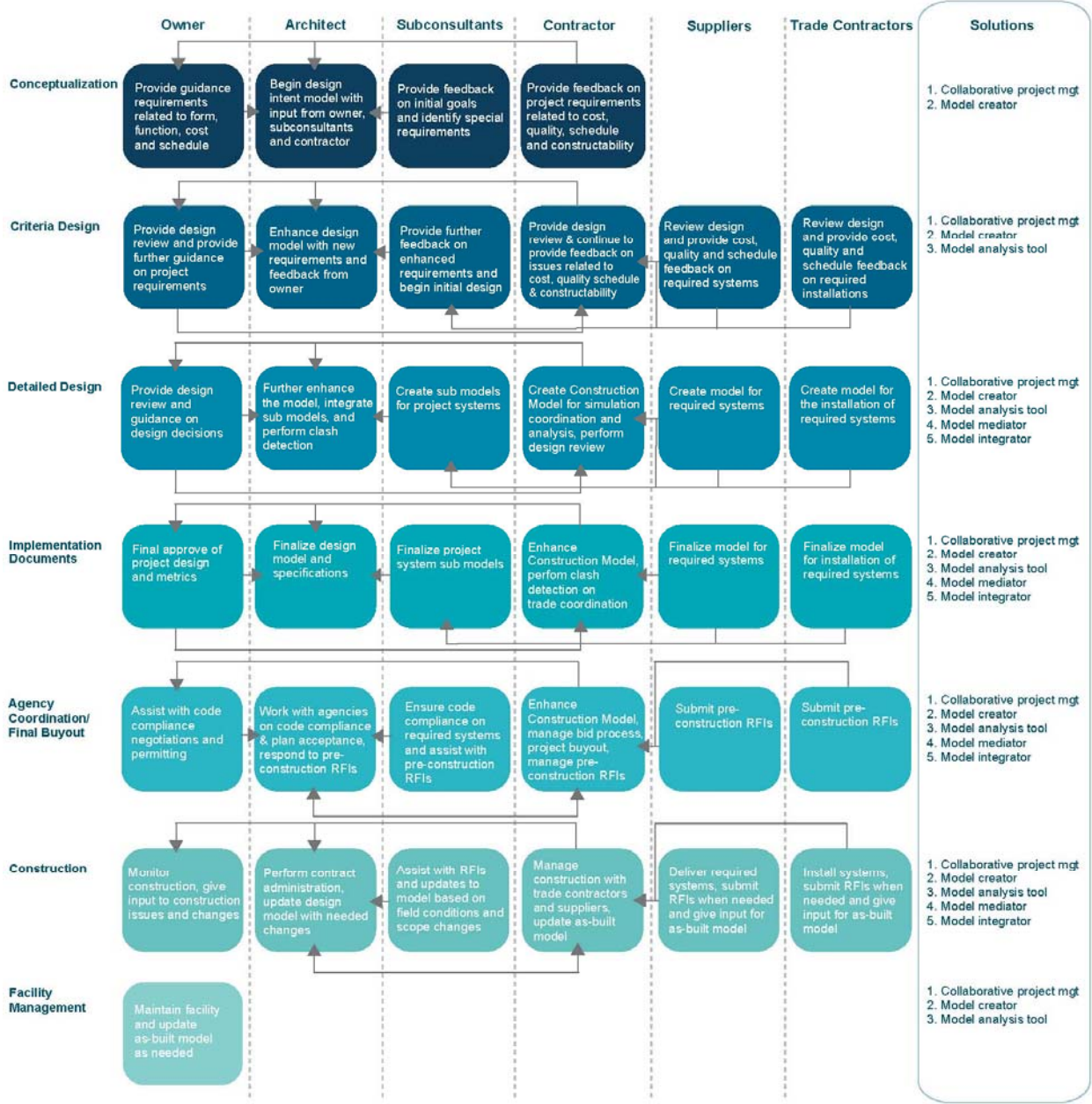
Project Goal	Objective	Achieved if	Projected Timeframe
<i>Streamline structural steel procurement</i>	<i>Include the steel supplier in the modeling process in order the start fabrication earlier</i>	<i>Steel is ready and delivered to site when needed</i>	<i>April, 2010</i>

D. Collaborative Process Mapping

To get the most out of your collaborative project management and BIM initiatives during your project, we recommend investing a bit of time up front to map out anticipated collaboration between team members on the project during its different phases.

As an example, a typical collaboration plan is shown below for three different project delivery methods—integrated project delivery, design-build project delivery, and design-bid-build project delivery. Use the blank chart following the example charts to enter your project’s delivery method and collaboration plan. The resulting process map should show the phases of your project along the y axis, the stakeholders involved in each phase along the x axis, the anticipated collaboration between project team members in the textboxes, and the software solutions to be used in the last column.

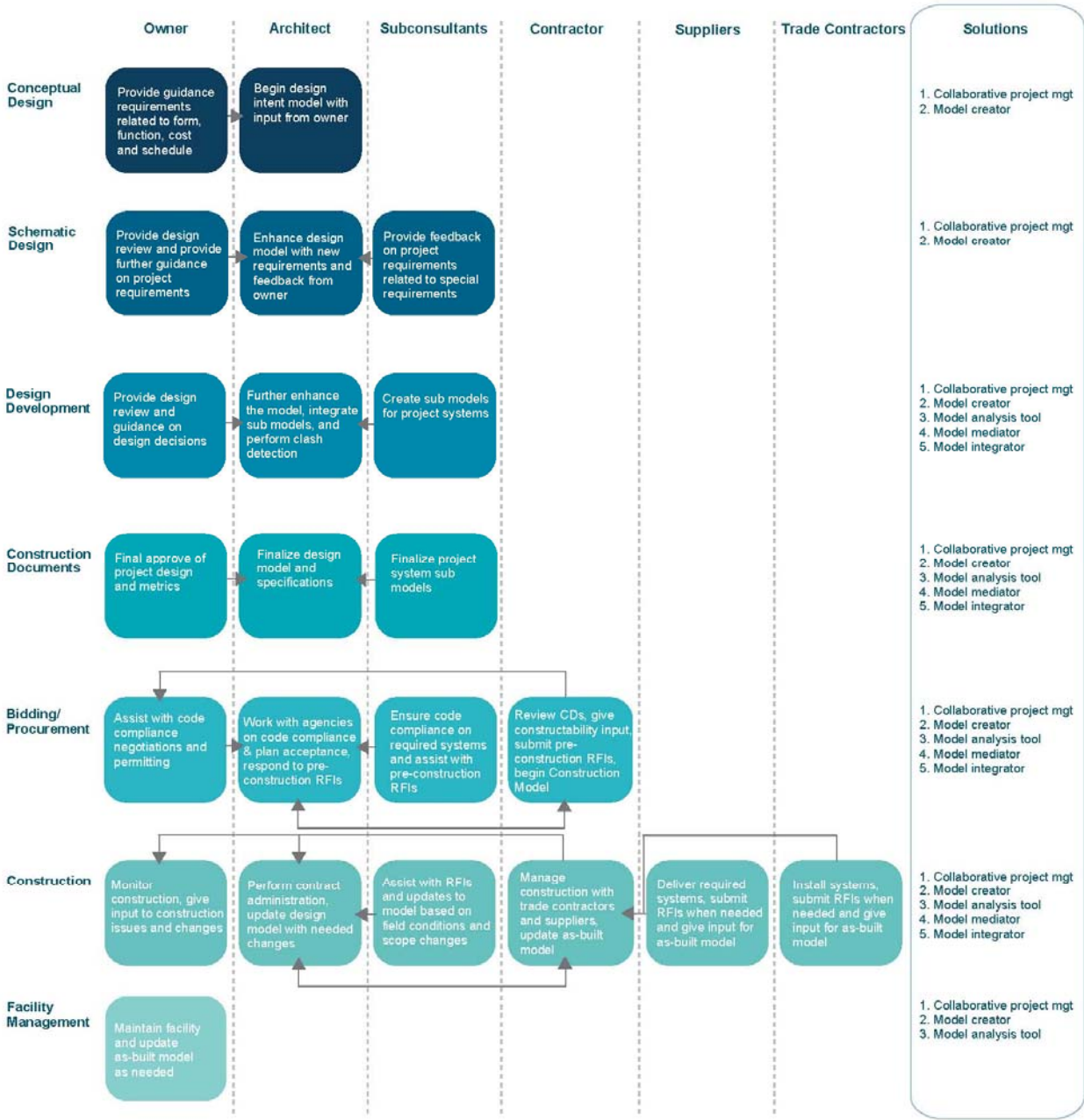
Integrated Project Delivery



Design-Build Project Delivery



Design-Bid-Build Project Delivery



Use the blank chart below to create your project's collaboration plan. The process map should show the phases along the y axis, the stakeholders involved in each phase along the x axis, the anticipated collaboration between project team members in the text boxes, and software solutions to be used in the final column.

Project Collaboration Plan

Project Phases						Solutions
Project Team Members						

E. Project Phases / Milestones

Traditional project delivery includes the phases of schematic design, design development, construction documents, construction operations, etc. Integrated project delivery (IPD) phases may include conceptualization, criteria design, detailed design, implementation documents, and others. For more information on IPD project phases, see the American Institute of Architects publication, *Integrated Project Delivery: A Guide, 2007* (available at www.aia.org/ipdg).

In the table below, outline the phases of your project, their estimated start dates, and the stakeholders involved. The first line shows an example.

Project Phase / Milestone	Estimated Start Date	Estimated Completion Date	Project Stakeholders Involved
Conceptualization	2/1/2008	4/1/2008	Owner, A/E, Sub-consultants, CM

III. Modeling Plan

Advance planning around which models will need to be created during the different phases of the project, who will be responsible for updating models and distributing them, and predetermining the content and format of models as much as possible will help your project run more efficiently and cost-effectively during every phase.

A. Model Managers

Each party—such as the owner, architect, contractor, or sub-consultants—that is responsible for contributing modeling content should assign a model manager to the project. The model manager from each party has a number of responsibilities. They include, but are not limited to:

- Transferring modeling content from one party to another
- Validating the level of detail and controls as defined for each project phase
- Validating modeling content during each phase
- Combining or linking multiple models
- Participating in design review and model coordination sessions
- Communicating issues back to the internal and cross-company teams
- Keeping file naming accurate
- Managing version control
- Properly storing the models in the collaborative project management system

List the model managers for the project in the table below.

Stakeholder Company Name	Model Manager Name	Email	Phone

B. Planned Models

During the course of your project, the project team may generate multiple models. Typically the architect and their sub-consultants generate a Design Intent model to depict the design intent of the building, and the contractor and their subcontractors generate a Construction model to simulate construction and analyze the constructability of the building. The construction team should provide input for the Design Intent model, while the design team should provide input for the Construction model.

Even when the team is committed to using integrated project delivery (IPD) methods, creating separate models is sometimes necessary based on contractual obligations, risk factors, and the functional intent of each model. For example, the Design Intent model—used to depict the design intent—may not include information on the means and method or sequencing of construction. Other models may be created specifically for certain types of analysis, such as energy consumption or safety. These Analysis models are usually spin-offs of either the Design Intent model or the Construction model. Analysis models will be specified further in *Section IV* of this document, which covers Analysis models and planning.

In the table below, outline the models that will be created for the project. List the model name, model content, project phase when the model will be delivered, the model’s authoring company, and the model authoring tool that will be used. For models that will not be used or created in your project, just leave the row blank, and add rows for model types you anticipate needing that are not already listed. The first line offers an example.

Model Name	Model Content	Project Phase	Authoring Company	Authoring Tool
Coordination Model	Architectural, Structural, and MEP components of main building and parking garage structure	Design Development and Construction Documents	ABC Designers	Revit Architecture by Autodesk
Civil Model				
Architectural Model				
Structural Model				
MEP Model				
Construction Model				
Coordination Model				
As-Built Model				

C. Model Components

As an aid to usability during later phases of your project, specify what the content, level of detail, and file naming structure of your models should look like.

i. File Naming Structure

Determine and list the structure for model file names. The first line offers an example.

File Names for Models Should Be Formatted As
<i>model type, hyphen, date, e.g.: DESIGN-011208</i>

ii. Precision and Dimensioning

Models should include all appropriate dimensioning as needed for design intent, analysis, and construction. With the exception of the exclusions listed below, the model will be considered accurate and complete. In the table below, enter which items' placement will not be considered entirely accurate and should not be relied on for placement or assembly.

Items that Will Not Be Considered Accurate for Dimensioning or Placement

iii. Modeling Object Properties

The level of property information in the modeling objects and assemblies depends on the types of analysis that will be performed on the model. See Section IV-A (Analysis Models) for the types of analysis that will be performed.

iv. Modeling Level of Detail

Specify the level of detail in your models below. The level of detail can be defined by exclusions and/or by object size.

1. **Exclusions:** List the objects that will be excluded from the model in the table below. The first line offers an example.

Items that Will Be Excluded from the Model
<i>Door hardware</i>

2. **Size:** Any object smaller than [_____] (Fill in item size, for example, 6"x6"x6") will not be included in the model.

v. **Model Reference Coordination**

Models may be linked or combined. In order for the referencing to work properly, a (o,o,o) reference point must be established. Fill in the (o,o,o) reference point for this project in the table below.

Project's (o,o,o) Reference Point

D. **Contract Documents**

Two-dimensional paper drawings or documents may be generated from certain models to fulfill contract document deliverable requirements. Certain models will be used for analysis purposes only and will not be included as part of the contract documents. List the models that will be considered part of the contract documents in the table below.

Models to Be Considered Part of Project Contract Documents

E. Detailed Modeling Plan

For each phase of the project, the project team should create a detailed modeling plan, which should include the modeling objectives, models included, and the roles and responsibilities of model contributors. Model objectives and model manager roles and responsibilities by phase are outlined below.

i. Conceptualization / Conceptual Design

1. **Objectives:** Provide initial design based on conceptual parameters established by the owner, ensure that code and zoning requirements meet project objectives, establish a 3D reference point of model coordination. *[List further objectives if needed.]*
2. **Model Roles:** A model may or may not take shape during the Conceptualization/ Conceptual Design phase. If a model is created, its role will be to depict the visual concept and general layout of the project. *[List further roles if needed.]*
3. **Responsibilities:** The architect's designated model manager will establish a baseline model to be used as the basis for other models. During the Conceptualization phase, the model managers from all parties will establish modeling standards and guidelines. *[List further responsibilities if needed.]*

ii. Criteria Design / Schematic Design

1. **Objectives:** Provide spatial design based on input from the Conceptualization/Conceptual Design 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. *[List further objectives if needed.]*
2. **Model Roles:** The Architectural model 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 combined Coordination model will show the spatial relationship of the Architectural model and subsystem design models. *[List further roles if needed.]*
3. **Responsibilities:** Once the baseline conceptual structure has been created, the architect's model manager will send the model to the sub-consultants so they can develop their designs. The sub-consultants' designated model managers will audit and deliver the completed models to the architect's model manager. The architect's model manager will review the models to ensure compliance with the phase requirements. Once the models meet the requirements, the architect's model manager will link or combine cross-disciplinary models. The architect's model manager should also eliminate duplicate or redundant objects, and accurately name the Coordination model and store it in the collaborative project management system. *[List further responsibilities if needed.]*

iii. Detailed Design / Design Development

1. **Objectives:** Provide final design of building and building systems; resolve coordination issues between building systems; provide a Construction model capable of analyzing schedule, cost, and constructability; provide Fabrication models to analyze the coordination of trades. Once the final design decisions have been made, the architect's model manager will send the Coordination model to the sub-consultants so they can finalize their designs. *[List further objectives if needed.]*
2. **Model Roles:** The Architectural model will continue to act as the baseline for all other subsystem designs. The subsystem designs will be modified accordingly to represent the enhanced design. The combined Coordination model will continue to show the spatial relationship of the Architectural model and subsystem models. *[List further roles if needed.]*
3. **Responsibilities:** The sub-consultants' model managers will use the Coordination model to revise and complete their designs. Once the models are complete, the sub-consultants' model managers will deliver their models to the architect's model manager. The architect's model manager will review the models to ensure compliance with the phase requirements. Once the models meet the requirements, the architect's model manager will link or combine the multiple models to update a new Coordination model. The model manager should also eliminate duplicate or redundant objects. The architect's model manager will deliver the Coordination

model to the contractor's designated model manager. The contractor will use the Coordination model for the basis of the Construction model. *[List further responsibilities if needed.]*

iv. Implementation Documents / Construction Documents

1. **Objectives:** Finalize design of the building and all building systems, prepare documentation for agency review, and provide construction modeling that highlights constructability, trade coordination, and fabrication. *[List further objectives if needed.]*
2. **Model Roles:** All design models will be used to reflect the final design. The models will then be used to generate the contract documents. The Construction model will be used primarily for estimating, scheduling, and constructability analysis. *[List further roles if needed.]*
3. **Responsibilities:** The architect's and sub-consultants' model managers will prepare contract documents for agency review based on the Coordination model. The contractor's model managers will send the baseline Construction model to the suppliers and subcontractors. The suppliers and subcontractors will submit Fabrication models, which replace traditional "shop drawings." The contractor's model manager will incorporate these models into the Construction model. *[List further responsibilities if needed.]*

v. Agency Coordination / Bidding

1. **Objective:** Revise Coordination model based on agency feedback and finalize Construction model. *[List further objectives if needed.]*
2. **Model Roles:** The design models will be adjusted to reflect agency feedback. The Construction model will be enhanced and further used for estimating, scheduling, construction sequencing, trade coordination, and constructability analysis. *[List further roles if needed.]*
3. **Responsibilities:** The architect's model manager will communicate agency comments back to the design team. The sub-consultants' model managers will revise their design models accordingly and submit them back to the architect. The architect's model manager will update the final Coordination model. *[List further responsibilities if needed.]*

vi. Construction

1. **Objectives:** Update Coordination model based on submittals, RFIs, or owner-directed changes; maintain the Construction model based on construction activities, develop an As-Built model to reflect the actual fabrication of the building. The construction team will submit RFIs and submittals through the collaborative project management system. *[List further objectives if needed.]*
2. **Model Roles:** The Coordination model will be revised throughout construction, based on owner directives and unforeseen conditions. The model will always reflect the revised contract documents. The Construction model will be used for scheduling analysis, construction sequencing, and trade coordination. The As-Built model will be used to represent the actual assembly of the building(s). *[List further roles if needed.]*
3. **Responsibilities:** The architect's model manager will work with their consultants to answer the RFIs and submittals and adjust the Coordination model accordingly. The contractor's model manager will update the Construction model and will work with the suppliers and subcontractors to develop an As-Built model. *[List further responsibilities if needed.]*

vii. Facility Management

1. **Objective:** Use the As-Built model for facility management, update the model based on ongoing operations. *[List further objectives if needed.]*
2. **Model Roles:** The As-Built model will be used to represent the actual assembly of the building(s) from construction. The model can be updated further and used to show construction changes and facilitate the operation of the facility. *[List further roles if needed.]*
3. **Responsibilities:** The facilities management model manager will update the model based on ongoing operations. *[List further responsibilities if needed.]*

IV. Analysis Plan

By listing and specifying what types of analysis your project will likely require at the beginning of your project, you can ensure that your key models will include the relevant information, making the analysis easier and more efficient.

A. Analysis Models

Your project's scope of work may require performing certain kinds of analysis, such as the ones listed below, based on existing or specially created model(s). In most cases the quality of the analysis depends on the quality of the original model that the analysis is derived from. Therefore the project team member performing the analysis should clearly communicate the analysis requirements to the original model authoring team member.

i. Quantity Takeoff Analysis

The objective of quantity takeoff analysis is to use modeling property data to automate or simplify the quantity takeoff process. This information from the quantity takeoff tool can then be imported or tied to cost-estimating software. In order for the quantity takeoff process to work seamlessly, the original modeling author will need to include the relevant property information in the design.

ii. Scheduling Analysis

Scheduling analysis lets the project team use the project model to analyze the timeline and sequencing for construction. This information can then be used to modify or adjust the construction schedule. Tools currently exist that allow project team members to visualize the construction over time, but no systems exist yet that interact automatically with scheduling tools.

iii. Clash Detection Analysis

Clash detection analysis is done to check for interferences between the designs of one or many models. To reduce change orders during construction, clash detection should be performed early and continue throughout the design process. For clash detection to work properly your project's models need to have a common reference point and they must be compatible with the clash detection tool.

iv. Visualization Analysis

Visualization tools let the project team view the design or construction of the project in 3D, giving them a more accurate perspective of the end product.

v. LEED Rating/Energy Analysis

LEED (Leadership in energy and environmental design) Rating/Energy Analysis tools help the project team evaluate the impact of design decisions on sustainability and energy consumption. This analysis model is usually based on the main Architectural model, after which material and building system inputs can be used to evaluate the project's sustainability and energy consumption.

vi. Structural Analysis

Structural analysis tools use the model to analyze the building's structural properties. Structural analysis programs typically use the finite element method (FEM) to measure the stresses on all structural elements of the design. For structural analysis to work seamlessly, the original structural modeling tool needs to be compatible with the structural analysis tool, and the original structural model property data must include information about the structural elements.

B. Detailed Analysis Plan

For each type of analysis that may be performed for your project, list the models used for the analysis, which company will perform the analysis, the file format required for the analysis, the estimated project phase, and the analysis tool that will be used. If there are other special instructions associated with the analysis, mark the Special Instructions column and list the details in the Special Instructions table in the next section. The first two lines in the table below show examples.

Analysis	Analysis Tool	Model	Analyzing Company	Project Phase(s)	File Format Required	Special Instructions
Visualization						
Structural						
Clash Detection						
Quantity Takeoff						
Scheduling / 4D						
Cost Analysis / 5D						
Energy/LEED						
Daylight/Lighting						

i. Special Instructions

Certain types of analysis may call for specific requirements or instructions. The company performing the analysis should communicate these special requirements to the original model authoring company. List these specific requirements in the table below. The first line shows an example.

Analysis Requiring Special Instructions	Detailed Special Instructions

V. Collaboration Plan



Creating a collaboration plan early on—including defining permissions and file structures—will help team members efficiently communicate, share, and retrieve information throughout the project. It lets you get the most out of your collaborative project management system, saving time and increasing your ROI.

A. Document Management

You can create a file folder structure in your collaborative project management system and give project team members the ability to upload, download, edit, mark up, and view documents in the folder structure, based on permissions assigned by the Core Collaboration Team.

i. Permissions and Access

The Core Collaboration Team for your project should decide on permissions for the document management file folder structure. In the table below, list the folder or subfolder, intended file content, and permission levels. Examples are shown below.

Folder	Content	Permissions
 Drawings	All project drawings in subfolders	Upload: A/E Contractor, Owner View: None: Sub
 Schematic Design	Schematic drawings	Upload: A/E Contractor, Owner View: None: Sub

ii. Folder Maintenance

Although the file folder structure and permissions should be defined by the Core Collaboration Team, the project system administrator (PSA) is responsible for setting up the structure and maintaining the system.

iii. Folder Notifications

Select groups, individuals, or the entire project team can be notified based on activities in the file folder structure. Notification messages should include information about the file(s) that were updated and who updated them. List the people and groups that should be notified for different activities in various folders in the table below. The first line shows an example.

Folder	Activity	Group to Notify
<i>Drawings</i>	<i>Upload & Revise</i>	<i>Entire Project Team</i>

iv. File Naming Convention

Earlier in this document (see *Section III-C-i, Model Components File Naming Structure*) you specified the file naming convention for model files for this project. All other files should be accurately and descriptively named. Avoid using the date in the file name, as the collaborative project management system will control the dates and versions. If there are files with special naming requirements, list them in the table below. The first line shows an example.

File Type	Naming Convention
<i>Progress Photos</i>	<i>Location, hyphen, Authoring Company Initials, hyphen, Description (e.g.: Parking Deck-ABC-Cracking)</i>

B. Messaging and Communication Protocol

All electronic communication between Core Collaboration Team companies on the project can be created, uploaded, and sent through the collaborative project management system. A copy of all project-related emails sent from outside the collaborative project management system should be uploaded to a folder in the document management file folder structure, or uploaded to the correspondence module. See *Section V-E-v, Construction Management Correspondence* for instructions on formal correspondence.

C. Design Review

The collaborative project management system lets you efficiently manage your design review process, enabling the appropriate parties to efficiently log and update their design review comments, issues, and clash detection reports. Your collaborative project management system should allow users to automatically import raw data from the clash detection software, while design review comments dealing with clashes should include a description of the issue along with visual evidence of the clash. The system will also track the progress and resolution of the design review comments. In the table below, list the model(s) being reviewed, the reviewers, the estimated design review start and completion dates, and how many days the authoring company has to respond to the design review comments. An example has been provided.

Model	Reviewing Companies	Estimated Review Start Date	Estimated Review Completion Date	Days to Respond by Authoring Company
<i>Schematic Design Model</i>	<i>ABC Owners Acme Contractors</i>	<i>1/21/2008</i>	<i>2/11/2008</i>	<i>14 days</i>

D. Bid Management

For faster, more efficient bids, all bid documentation—including drawings and specifications—can be made available in a Plan Room on the collaborative project management system. The potential bidders can be given access to this Plan Room by the PSA, and will be able to access the documents, download them, or have them printed at a reprographics firm. When there are changes to the plans in the form of addenda, the collaborative project management system will automatically notify all bidders.

E. Construction Management

The collaborative project management system supports your construction management process by managing requests for information (RFIs), submittals, meeting minutes, daily reports, and other modules selected by the Core Collaboration Team. The Core Collaboration Team will also define permission levels and access to the construction management modules.

i. RFIs

RFIs will be created in the collaborative project management system by the [_____] (*specify role*). The RFIs will be issued to the [_____] (*specify role*) for a response, and copied to the [_____] (*specify role*). The primary reviewer will have [___] days to respond to the RFI. The RFI will include all appropriate information that describes the issue along with electronic attachments that may include photos, specifications, and marked-up drawings.

ii. Submittals

Submittals will be organized and electronically submitted through the collaborative project management system. The [_____] (*specify role*) will organize and submit the submittal packages. The packages will be organized by specification section and should be numbered with the following format: [_____] (*Fill in submittal package numbering format, e.g.: spec section-package number within spec section 09900-01*). The packages will consist of one or more items. The items should be numbered with the following format: [_____] (*Fill in submittal item numbering format, e.g.: auto-number 001,002*). The submittal packages will be issued to the [_____] (*specify role*) for a response and copied to the [_____] (*specify role*). The submittal packages will include all appropriate information along with electronic attachments of the submittal items whenever possible. The submittal packages will be issued with an electronic transmittal. The primary reviewer will have [___] days to respond to the submittal package. Each item within the package will receive a response. The possible responses include [_____] (*list responses*). All revised submittal items will be resubmitted through a package revision, as opposed to a new package.

iii. Meeting Minutes

Meeting minutes and agendas can be created in the collaborative project management system. The minutes and agendas should include general information such as time, date, and location of meeting, attendance, and discussion details. The discussion details should include information such as issue origination date, responsible

parties, and required completion date. Meeting minutes should be posted to the system no later than [] business days after completion of the meeting and should be electronically sent to all attendees. The attendees have [] business days to dispute the content of the minutes, and all disputes must be resolved by the following meeting.

iv. Daily Reports

Daily reports can be entered in the collaborative project management system. The following parties are responsible for creating daily reports: [] (specify role). The daily reports will include the date, general information, weather conditions, activities, manpower, major equipment used, major material deliveries, safety incidences, and quality control issues. In addition, progress photos and other electronic files should be attached to the daily reports when necessary. Daily reports should be entered into the system no later than [] day(s) after the day of the report.

v. Correspondence

All formal correspondence between Core Collaboration Team companies should be generated in or scanned and uploaded to the collaborative project management system. Important correspondence received from non-Core Collaboration Team companies can also be scanned and uploaded to the system in the correspondence module.

vi. Other Construction Management Business Processes

Most collaborative project management systems have a number of modules not listed above. List the modules the project team plans to use, including any special instructions and processes, in the table below.

Additional Business Process Modules to Be Used	Special Instructions or Processes

F. Cost Management

The collaborative project management system will facilitate your cost management by managing budgeting, purchasing, the change order process, the payment application process, as well as cost reporting. The Core Collaboration Team for your project will define permission levels and access to the cost management modules.

i. Budgeting

The []'s (specify role) budget will entered and tracked in the collaborative project management system. The [] (specify role) will be responsible for entering and tracking the budget in the system.

ii. Purchasing

The []'s (specify role) contracting documents will entered and tracked in the collaborative project management system. The [] (specify role) will be responsible for entering and tracking the contract documentation in the system. The executed documents may, if needed, be scanned and attached to the contract records.

iii. Change Order Process

Requests for change orders (RCOs) will be created and tracked in the collaboration project management system. RCOs will be created by the [] (specify role). Each RCO will include all appropriate information that supports the change. Electronic backup can be attached the RCO document. RCOs should be sent to the [] (specify role) for review. Once an RCO is approved, the [] (specify role) will issue the [] (specify role) a formal owner change order (OCO).

iv. Payment Applications

Payment applications can be created in the collaborative project management system. The [] (specify role) is responsible for creating a payment application in the system based on an approved schedule of values (SOV). A signed copy of the payment application must be submitted to [] (specify role) and copied to [] (specify role) by the [] day of the month.

G. Project Closeout

The collaborative project management System can ease your closeout process. The punch list process will be managed in the system either through the system functionality or by uploading the documentation to the file folder structure. A number of documents will need to be submitted to the owner, such as As-Builts, commissioning documents, warranties, and O&M Manuals. These documents can be uploaded in the file folder structure.

i. As-Built Model

An As-Built model [] (fill in: will/will not) be delivered to the owner at the end of the project by the [] (specify role). The As-Built model should represent the actual built conditions. The level of detail in the As-Built model will be governed by Section III-C-iv, Modeling Level of Detail. List the inclusions or exclusions from the As-Built model content in the table below.

1. As-Built Model Inclusions	2. As-Built Model Exclusions
<i>[List special items that will be included in the model above and beyond the Level of Detail specified in Section III-C-iv]</i>	<i>List items that will be excluded from the model above and beyond the Level of Detail specified in Section III-C-iv]</i>

ii. System Archiving

At the end of the project, Core Collaboration Team companies can request an electronic copy of the project documents that were created and stored in the collaborative project management system. This information will be provided by the system owner at the requestor’s expense. Each company will have access to the project documents to which they had access while the project was active.

VI. Software Component Selection

To get optimal results from your BIM tools, we recommend using tools that meet the following criteria.

A. Model Creation

The model creation tool should be built on a database platform that allows the creation of parametric and information-rich objects. Parametric modeling dependencies should be automatically updated whenever changes are made. Since the design may come from multiple parties, the BIM tool should accommodate file linking, sharing, or referencing. The BIM technology must be capable of producing 2D plans to fulfill contract document deliverable requirements. The system should be able to create and output files that conform to the IFC (Industry Foundation Classes) file type standards developed by the International Alliance for Interoperability (IAI).

B. Model Integration

The model integrator will be used to combine multiple design files from different software platforms. The tool will also be used for model simulations. The simulation tool must allow the user to simulate construction processes over time and allow for real-time walkthroughs. The model integrator should be able to open and combine at least .dwg, .dxf, .sat, .ifc, .dgn, .prp, .prw, .ipt, .iam, and .ipf file types.

C. Clash Detection / Model Mediation

The clash detection tool should be able to perform clash detection analysis on one or multiple design files. The system should be able to generate clash detection reports, which can be exported into either .xls, .csv, or .xml file formats. The clash detection reports should include a list of clashes along with visual evidence.

D. Model Visualization

The model visualization software will be used by project team members who do not need the full functionality of the BIM model creation, integration, or simulation tools. The visualization tool must allow the user to look around, zoom, pan, orbit, examine, and fly through the model.

E. Model Sequencing

The 4D model sequencing tool will be used to visualize the scheduled assembly of the building. The tool should allow the user to visualize the assembly of the building based on scheduling input. It should also integrate with standard scheduling systems such as Microsoft Project or Primavera.

F. Model Quantity Takeoff

The quantity takeoff tool will be used to extract quantities from BIM models for cost-estimating and purchasing purposes. The tool must be able to extract quantities automatically both from 3D and 2D design files. The quantity takeoff software must be able to integrate with estimating programs, or the information from the system must be exportable to an .xls, .csv, or .xml file format. The quantity takeoff tool must be compatible with the model creation tool listed above in *Section VI-A*.

G. Collaborative Project Management

The collaborative project management system may be made up of one or multiple software packages. However, for best results, the complete collaborative project management system should:

- Be web-based or web-enabled—so all relevant, authorized project team members can remotely access it.
- Accommodate different permissions profiles for different project team members.
- Allow communication through either internal messaging or system-generated email.
- Include document management capability that lets the project team create a customized and permission-based folder structure which offers upload, download, and version control capabilities.
- Include a viewer that allows the project team to view .dwg, .dgn, .plt, .dxf, .pdf, .tif, .jpg, .doc, and .xls files.
- Include construction management capabilities for the tracking of requests for information (RFIs), submittals, design review, meeting minutes, daily reports, issues, correspondence, and transmittals.
- Able to interact with the file folder structure in the document management section.
- Able to automatically accept raw data from the clash detection tool.
- Include bid management capability, and this bid management solution should allow the project team to post the contract drawings and specifications for viewing in the form of a Plan Room.

- Allow for cost management controls, and this cost management capability should include budgeting, contracting, change orders processing, and payments applications tracking.
- Allow the project team to run reports based on the information in the system.
- Allow for the workflow and routing throughout the document, construction and cost management components of the solution.

Select the components and specific software you will use and list them below for easy reference.

Software Component	Model	Software System	Version
Model Creation	Architectural Design		
Model Creation	Civil Design		
Model Creation	Structural Design		
Model Creation	MEP Design		
Model Creation	Coordination		
Model Creation	Construction		
Model Creation	As-Built		
Model Integration			
Model Mediation			
Model Visualization			
Model Sequencing			
Model Quantity Takeoff			
Collaborative Messaging and Communication			
Document Management			
Design Management			
Bid Management			
Construction Management			
Cost Management			
Facility / Operations Management	As-Built		

VII. System Requirements and Administration

A. Model Creation, Clash Detection, Visualization, Sequencing, Simulation, and Quantity Takeoff Tools

i. IT Requirements

The BIM tools should meet the criteria and perform the functionalities outlined in *Section VI-(A-F), Software Component Selection*. All project team members who use the tool should have the hardware and software to use the system properly; refer to the vendor's system requirements for more details. We recommend running BIM software on Intel Core® 2 Duo 2.40 GHz or equivalent AMD Athlon™ processors, Windows® XP Professional (SP2 or later), 4 GB RAM, 5 GB free disk space, and a dedicated video card with hardware support for OpenGL® spec 1.3 or later.

ii. Funding Source

Acquisition and access to the BIM systems will be funded by [_____] (*specify role*).

iii. Data Ownership

For language or information on electronic information and model ownership, see AIA® C106™-2007 Digital Data Licensing Agreement or ConsensusDOCS™ 200.2 Electronic Communications Protocol Addendum.

iv. Administration

Each party is responsible for the access, licensing and administration of the BIM software systems used.

v. User Requirements

All parties are responsible for obtaining training in the use of the BIM tools. [_____] (*specify role*) is responsible for expenses related to training.

B. Collaborative Project Management

i. System Owner

The [_____] (*specify role*) will provide access to the collaborative project management system. System licenses will be provided to all project team members who need to access the information.

ii. IT Requirements

The collaborative project management system should perform all functionality outlined in *Section VI-G, Software Component Selection, Collaborative Project Management*. All project team members who use the tool should have the hardware and software to use the system properly. Most systems operate efficiently on Intel® Pentium® based or equivalent processors, Windows XP Professional (SP2 or later), 256 MB RAM, and a broadband Internet connection. Refer to the vendor's system requirements for more details.

iii. Funding Source

Acquisition and access to the collaborative project management systems will be funded by [_____] (*specify role*).

iv. Data Ownership

Core Collaboration Team companies can request an electronic copy of the project documents that were created and stored in the collaborative project management system at the end of the project at their own cost, as outlined in *Section V-G-ii, System Archiving*. For more language or information on digital data ownership, see AIA® C106™-2007 Digital Data Licensing Agreement or ConsensusDOCS™ 200.2 Electronic Communications Protocol Addendum.

v. Administration

The system owner should designate a Project System Administrator (PSA) to manage the administration of the system. The PSA will be responsible for managing and creating all new user accounts. The PSA will also be responsible for managing the company and contact information in the database.

vi. User Requirements

- High-speed Internet access is required at all locations where the system will be accessed.
- All users should have a unique and valid email address.
- System licenses to use the database will be provided by the system owner for all users who require access.
- Licenses will be granted for current projects only, and in accordance with permission levels defined by the Core Collaboration Team.
- Requests for new user licenses should be submitted to the PSA.
- Company and contact information will be managed in the database by the PSA.
- All parties should submit their company and contact information and revisions to the PSA, and are responsible for ensuring that their information is accurate.
- Each project team member will have their own license and access to the system.

- Licenses should not be shared by two or more persons and passwords should be confidential.
- Users will be prompted to change their password no less than every [] days.
- All users will log into the system no less than once a week (unless otherwise dictated by project requirements) while the project is ongoing to check for messages and outstanding items.
- All parties should notify the PSA immediately when an employee with access to the system has been terminated, in order to deactivate their user account.
- All parties are responsible for obtaining training in the use of the collaborative project management system.

vii. Security Requirements

The security of the collaboration project management system should include 24/7/365 system monitoring, perimeter security with designated access only, mirror data storage with a secondary facility in a different location, daily backups of the information saved for the life of the project, an Intrusion Detection System (IDS), and at least 128 bit Secure Socket Layer (SSL) technology.

VIII. Appendix

A. Definitions of Terms Used in this Document

As-Built Model - The final model that shows how a building was actually delivered and assembled. This is also sometimes referred to as the Record model.

Building Information Modeling (BIM) - An integrated process aimed at providing coordinated, reliable information about a building project throughout different project phases—from design through construction and into operations. BIM gives architects, engineers, builders, and owners a clear overall vision of the project—to help them make better decisions faster, improve the quality, and increase the profitability of the project.

Clash Detection - The process of checking for clashes and interferences in the design of one or more BIM models. It is also referred to as model mediation.

Collaborative Project Management - A software solution that enables effective management of and collaboration on all project-related communication, information, and business processes across the plan, build, and operate phases of the building lifecycle. The most common processes include collaborative documentation, design, bid, construction, cost, and operations management.

Construction Model - The model used to simulate and analyze the construction of a building.

Coordination Model - A model created from two or more models, used to show the relationship of multiple building disciplines, such as architectural, civil, structural, and MEP (mechanical, electrical, and plumbing).

Core Collaboration Team - The group of people—which should include someone from each party working on the project, such as the owner, architect, contractor, sub-consultants, suppliers, and trade contractors—that is responsible for completing this BIM Communication Specification, creating the document management file folder structure and permission levels in the collaborative project management system, and enforcing the action plan set out in this document throughout the design and construction of the project.

Design Intent Model - The model used to communicate the design intent of a building.

Industry Foundation Classes (IFC) - A neutral and open file format structure developed by the International Alliance for Interoperability (IAI) to enable interoperability between modeling software systems.

Integrated Project Delivery (IPD) - A project delivery process that integrates people, systems, business structures and practices to collaboratively harness the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency throughout all phases of design, fabrication, and construction (AIA, *Integrated Project Delivery: A Guide*, 2007, available at www.aia.org/ipdg).

Model Integrator - A tool used to combine and/or link multiple design files from different software platforms.

Model Manager - The project team member(s) responsible for managing the collaboration and sharing of electronic files during the project. Model managers are also responsible for maintaining the integrity of the BIM models, which can include gathering, linking, and uploading updated models.

Parametric - The relationship among and between all elements of a model that enable coordination and change management. These relationships are created either automatically by the software or manually by the user as they work.

Project System Administrator (PSA) - The person who manages the administration of and folder set-up in the collaborative project management system, and is responsible for managing and creating new user accounts as well as the contact and company information in the system.

