AUTODESK UNIVERSITY 2014

Defining a Holistic Owner Driven BIM Project Delivery Standard

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Brian Skripac – Astorino
Andy Burg – Messer Construction Co.

BO6648

Class Description

This session will present how an enlightened building owner (The Ohio State University) has successfully partnered/collaborated with both a BIM savvy architect and contractor to develop a BIM Project Delivery Standard that enables the model to serve as a single-source of truth for relevant spatial and asset information throughout the building lifecycle. This Delivery Standard has truly "begun with the end in mind" by taking advantage of the knowledge gained from the BIM for Existing Buildings portion of the Buckeye BIM Initiative. We'll highlight how the .RVT portion of this deliverable will work in collaboration with COBie structured data to facilitate its utilization in Asset Management, Space tracking, GIS and sustainability. Lastly, we will highlight the need to implement technology solutions and workflows to enable the use of the model across the University and to support interoperability with other data systems.

Learning Objectives

At the end of this class, you will be able to:

- Outline the planning process used to develop a BIM Project Delivery Standard as an owner.
- Explore how BIM can reduce the Total Cost of Operations/Ownership.
- Define how BIM can streamline the turnover of spatial and asset information using RVT and IFC files combined with COBie.
- Discuss the technology to support the use of the model data in O&M and the processes to maintain delivered models.

About the Speakers

Andy Burg

Andy is a proven builder and leader with 23 years of experience in the construction industry. He is a 1994 graduate of the University of Cincinnati with a Bachelor's degree in Construction Management. He joined Messer Construction Company in 1991 and is experienced in managing complex commercial construction projects ranging from education, medical, office and entertainment facilities.

Andy has been involved in project management technology applications for Messer since 1995. In 2001 he managed the first Integrated Design and Construction contract for the company as well as led the first Messer project team to utilize Lean Construction tools.

Today he leads the team responsible for advancing the company's operations in technology, innovation and process improvement to sustain the companies continued growth. His primary responsibility is developing and managing the company's advanced capabilities and strategies for utilizing Building Information Modeling collaboratively on Messer's projects.
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Joe Porostosky

Joe Porostosky is the Director of Facilities Information and Technology Services (FITS) at The Ohio State University (OSU), where he maintains 37 million square feet of space drawings and data, and he provides leadership to facilities-related data systems, including OSU's Enterprise GIS. With a background in technology management, Joe has managed the FITS Team for the past 6 years, providing an active and strategic leadership role within the university and redefining the way his group works by using technology in new and inventive ways. As the team leader for the Buckeye Building Information Modeling (BIM) Initiative, Joe has led OSU in the adoption of BIM for existing buildings and for design and construction to improve the university's overall decision-making processes and management of buildings. Joe's BIM initiatives have been the source of many recent publications and presentations. Joe holds a BS in computer science and an MA in public policy and management from OSU.
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Brian Skripac, Assoc. AIA, LEED AP BD+C

As the Director of Digital Practice at Astorino, Brian has embraced the changing paradigms of architectural practice, and throughout the past 10 years he has integrated BIM technologies well beyond the traditional design and documentation processes. This includes the management of collaborative design/construction processes and defining how building data

can be leveraged to optimize sustainable design outcomes. More recently Brian has focused on the integration of BIM to capture and structure relevant facility data, implementing the value BIM brings to facility owners from an interoperable lifecycle management strategy.

Brian holds a Bachelor of Science degree in architecture from The Ohio State University and is a LEED Accredited Professional. He is an Advisory Group Member and 2014 National Chair of the AIA Technology in Architectural Practice Knowledge Community. He also serves on the BIMForum committee responsible for authoring the LOD Specification. Brian is a frequent lecturer and has served as a guest speaker at The Ohio State University, Carnegie Mellon University, and multiple conferences for the American Institute of Architects.
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BUCKEYE BIM INITIATIVE

The planned transformation from AutoCAD based floor plans to Revit based building models began in 2009. This effort which has been led by Joe Porostosky, Director of Facilities Information and Technology Services (FITS) at The Ohio State University, has provided a significant paradigm shift across the entire university. What originally started as a BIM for Existing Buildings project on just the Wexner Medical Center portion of campus has become so successful that it has grown to include the development of the entire 34,350,000 square foot campus. This continuing project, combined with a new initiative to develop BIM standards and guidelines for design and construction has become known as the Buckeye BIM Initiative. You can also follow the project on Twitter via the hashtag #BuckeyeBIM.

This project has also enabled the evolution of a talented internal BIM Implementation Team along with a strong collaboration with a BIM savvy architectural team and lead Project Consultant, Brian Skripac who is currently the Director of Digital Practice at Astorino. While the project has continued to grow and transform we invite you to learn more about the foundations and start-up of the project in our session from previous Autodesk University events.

Autodesk University 2012:

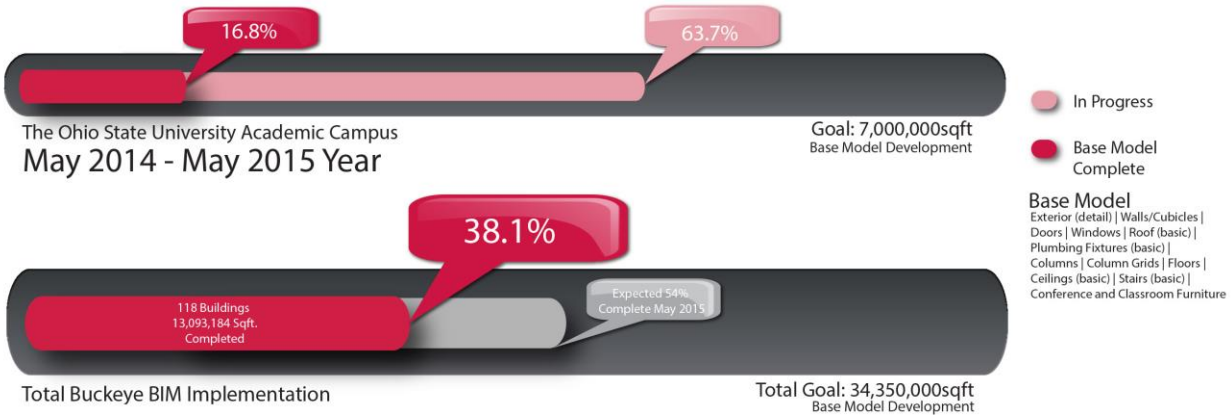
FM2524: What Does it Take to Implement 6 Million Square Feet of BIM? - http://au.autodesk.com/au-online/classes-on-demand/class-catalog/2012/autodesk-revit-for-architects/what-does-it-take-to-implement-6-million-square-feet-of-bim

Autodesk University 2013:

FM2305: Overcoming the Challenges of Building and Maintaining 11,000,000 Square Feet of BIM - http://au.autodesk.com/au-online/classes-on-demand/class-catalog/2013/building-design-suite/fm2305.

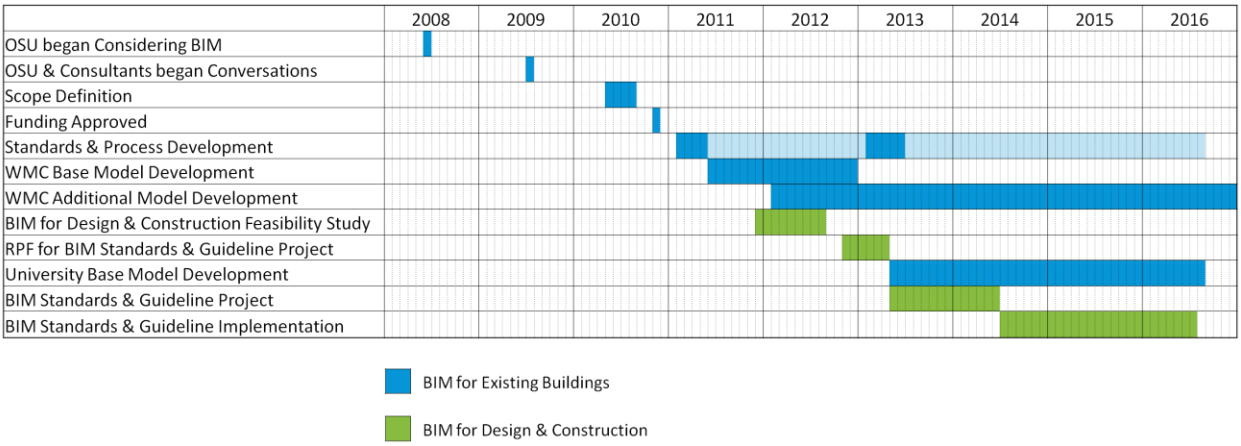
FM2314-R: Exploring Lifecycle BIM from an Owner's Perspective - http://au.autodesk.com/au-online/classes-on-demand/class-catalog/2013/building-design-suite/fm2314-r

As the project is currently progressing Joe and his team have a goal of completing the 564 campus buildings, covering nearly 34,350,000 square feet, by the end of summer of 2017. To date, the current pace of the project team is approximately .050 minutes/square foot and they have 118 completed buildings and more than 13,000,000 square feet. The graphic below highlights the square foot progress of the buildings. You can reference the FITS team's Flickr page for visual updates of the individual building models – http://bit.ly/OSU_Fits_Gallery



The BIM for Existing Buildings initiative lead to the development of the BIM for Design and Construction work that will be discussed in this presentation. This effort has resulted in the development of a BIM Project Delivery Standard that outlines a collaborative project delivery process focusing most heavily on how the models and facility information will be developed throughout the design and construction process so they can be optimized for use in Operations and Maintenance, starting at turnover.

Below is a general timeline of the Buckeye BIM Initiative, starting in 2008.



WHAT IS THE PURPOSE OF AN OWNER BIM STANDARD?

When embarking on the development of a BIM Project Delivery Standard an Owner needs to stay focused on solving their specific organizational needs. For The Ohio State University we approached this by asking:

- How are our project deliverables formatted and received today?
    - How can BIM helps us to improve this process?

- What data do we need to support our planning and operational efforts, especially at turnover?
    - Do we currently receive this data?
    - Is there data missing from our current requirements?
    - Of this information what can begin to be captured during the design/construction process?
    - How is this data structured, who owns it, are people sharing it and what technologies use it?
- What challenges exist in changing our culture to support a BIM-enabled project workflow?
- How do we evolve into this new BIM-enabled process across our organization?

DISCOVERY AND PROCESS REVIEW

Developing a Core Team

Developing the core team is a critical step in the success of the development and implementation of BIM Standards for an organization. The process is challenging, requires significant effort, and belief in the benefits that a BIM enabled design and construction process can bring to an organization. This core team does not need to be large, but needs to have sufficient knowledge and influence in the organization to help enable change. Here are some tips in building that team.

- Find individuals who have utilized BIM in any capacity during design, construction, renovations, planning, or operations in your organization.
- Find individuals who would see a benefit in adopting BIM somewhere in the building lifecycle.
- Find individuals that can become champions for a BIM enabled workflow and deliverables throughout the organization.

Educate

Educate the organization on what BIM is and the potential value it can bring. Enlist the help of knowledgeable industry experts in this area.

BIM Focus Groups

Once this core team has been defined, the next opportunity to further the reach of understanding how a BIM Standard can impact an organization is to engage the internal departments who are reliant on the collection and application of facility information. There is a significant value in deeply understanding how these groups function individually, but it's equally as important to have these meeting be multi-departmental so the core team have a certain level

cross pollination to see how information travels from one use case to another, allowing for synergies to be created while streamlining the process.

For example, when asking a question about how a specific item of spatial information is structured and tracked within a CAFM solution you may find that same data is needed by another department like the GIS and CMMS team. Often times this data is utilized in a non-standard or structured way creating redundancies and inconsistencies within an organization.

This effort follows the data as it flows through the university and ultimately helps identify the problem you looking to solve with a BIM Standard.

Persona Development

Persona development is also a way for Owner team members to gain a better understanding of the different individuals and functions while documenting their needs without having to vocalize them in a larger group setting. By understanding the goals of their current positions and department and who their customers are, the core team will be able to engage them in a manner that will allow for them to explain how they see opportunities for innovation and how this could apply to the developing BIM Standard.

Tasklist

After completing the interviews and research as stated above, the information collected along with needed follow-up questions can be assembled into a project tasklist. This provides a great outlet to document and organize what information will be most beneficial to include in the BIM Standard along with what additional research needs to be conducted. At the same time this research may provide other additional outlets for organizational improvements which may be outside of the scope of your BIM Standard efforts but still have the chance to deliver a high value.

Technology Matrix

Another outlet from the data collection effort can result in a detailed Technology Matrix describing all the related technology systems, their use cases, file format exchanges and more details about the software package. Here an organization can begin to plan for the future needs while better understanding how their current infrastructure can best be utilized.

Facility Information Matrix

A final potential use of the collected information would be the development of a detailed facility information matrix. This document could identify individual pieces of data, where they were housed, who was responsible for maintaining them, and who uses them. There is a significant value in understanding this as a key component to identifying how this would become part of the required deliverables in the BIM Standard moving forward.

OUTCOMES

BIM Project Delivery Standard

Based upon the known challenges, opportunities, and benefits, as well as the on-going cultural evolution into a BIM-enabled environment, the University developed a BIM Project Delivery Standards (BIM PDS) as instructions to the Design and Construct partners of the University to outline processes and best practices to create an integrated, holistic BIM enabled "One University" approach to project delivery and turnover.

This document is a reference manual for defining what relevant 3D geometry and data shall be delivered. Project Teams working on BIM-enabled University projects will be responsible for documenting the people, process and technologies that will ensure adherence to these standards.

For The Ohio State University this standard encompasses the development of the following key BIM Project Deliverables:

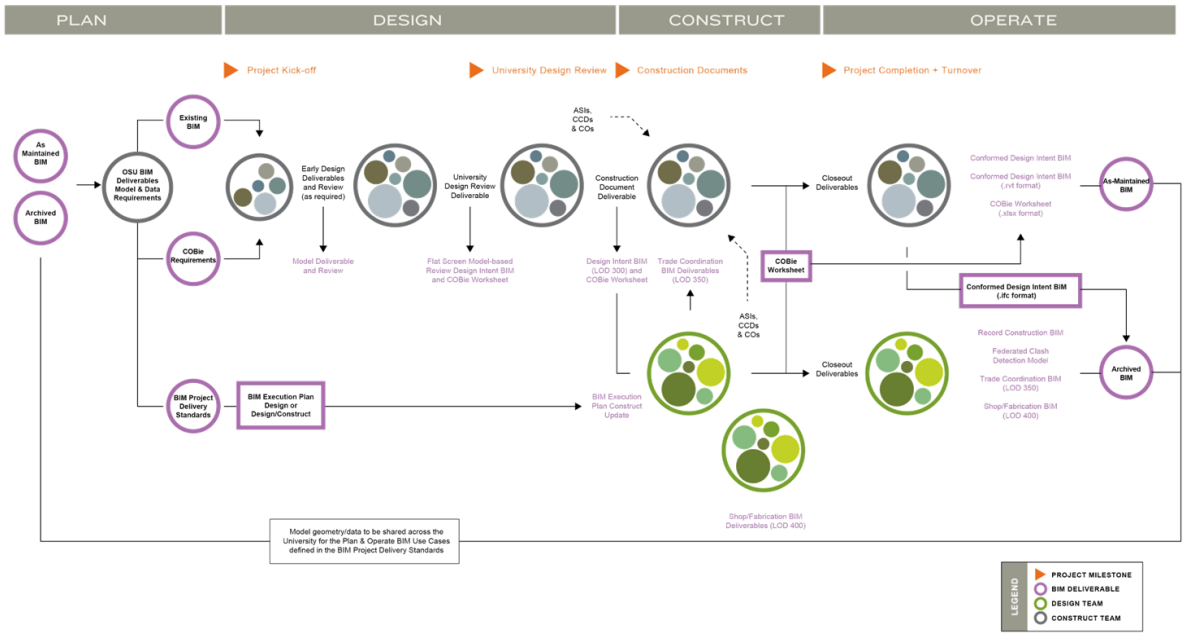
- BIM Execution Plan (BIM EP)
- Conformed Design Intent Model
- Record Construction Model
- COBie Worksheet

What works for us may not work or you and this is an important art of the process to be focused on your Owner's specific needs. In our Standard we've outlined the Table of Contents for the Standard:

- BIM Use Cases
    - Plan (University/Internal Use Case)
        - Programming/Planning - Facility Condition Index - Capital Needs
    - Design
        - Model Authoring – Design Intent BIM
        - Existing Conditions Documentation/Modeling
        - Program of Requirements (PoR) Validation
        - Site Design
        - Model Reviews
        - Sustainability (Energy Modeling, Simulation and Performance)
        - Design Simulation/Analysis
        - Clash Prevention
        - Conformed Design Intent BIM
    - Construct
        - Model Authoring – Trade Coordination BIM
        - Model Authoring – Shop/Fabrication BIM
        - Clash Detection

        - Model-based Scheduling (Sequencing/Simulation)
        - Model-based Estimating (Quantification/Cost Estimating)
        - Site Analysis Planning
        - Record Construction BIM
    - Operate (University/Internal Use Case)
        - Asset/Maintenance Management
        - Space Management
        - Building Systems/Energy Management
        - Geographic Information System
        - Document Management (Archives)
- BIM Project Participant Roles
- BIM Deliverables
    - BIM Execution Plan
    - Conformed Design Intent BIM
    - Record Construction BIM
    - COBie Worksheet
- BIM Deliverable Development
- Glossary/Abbreviations/Acronyms
- Appendix – BIM Execution Plan

While not applicable to every unique type of delivery method, the following BIM Process Map provides an overview of how the final turnover documentation is to be developed and maintained during the life of the project.



IMPLEMENTATION

BIM Implementation Strategy

Most Organizations stop progress when the BIM Standard is complete. For the continued success of our Buckeye BIM Initiative the implementation phase of this effort will be the most critical component. While the BIM Project Delivery Standards alone cannot generate the value (potential cost avoidance of a fully adopted BIM Standard), it is important for the University to integrate the recommendations that were brought forth in the developed BIM Implementation Strategy document.

This document includes an internally facing commentary that outlines how to implement the BIM Project Delivery Standards and get the most value out of BIM over the life of a building. This plan can include the following:

- People
  - Education
  - University Model Manager
- Process
  - Pilot Projects for BIM Project Delivery Standard
  - COBie Definition and Integration
- Technology
  - Revit Templates
  - Model Checker
  - Technology Consistency
- BIM Contracts Items
  - BIM Updates to the Building Design Standards
  - BIM-based Design Fee Schedule
  - BIM Pre-Qualifications Capabilities
  - Accountability for BIM Project Deliverables
- Additional Recommendations and Opportunities

Additional Resources

There are a number of publically available BIM Standards available. Below are some links to aid in researching existing standards.

http://www.cad-addict.com/2013/02/list-of-existing-bim-standards.html

http://bim.natspec.org/index.php/resources/bim-guidelines

http://facilities.usc.edu/leftsidebar.asp?ItemID=448

http://www.gsa.gov/portal/content/105075

http://www.nyc.gov/html/ddc/downloads/pdf/DDC_BIM_Guidelines.pdf

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

http://network.aia.org/technologyinarchitecturalpractice/home/bimstandards

http://www.wbdg.org/ccb/browse_cat.php?c=256

http://bim.psu.edu/