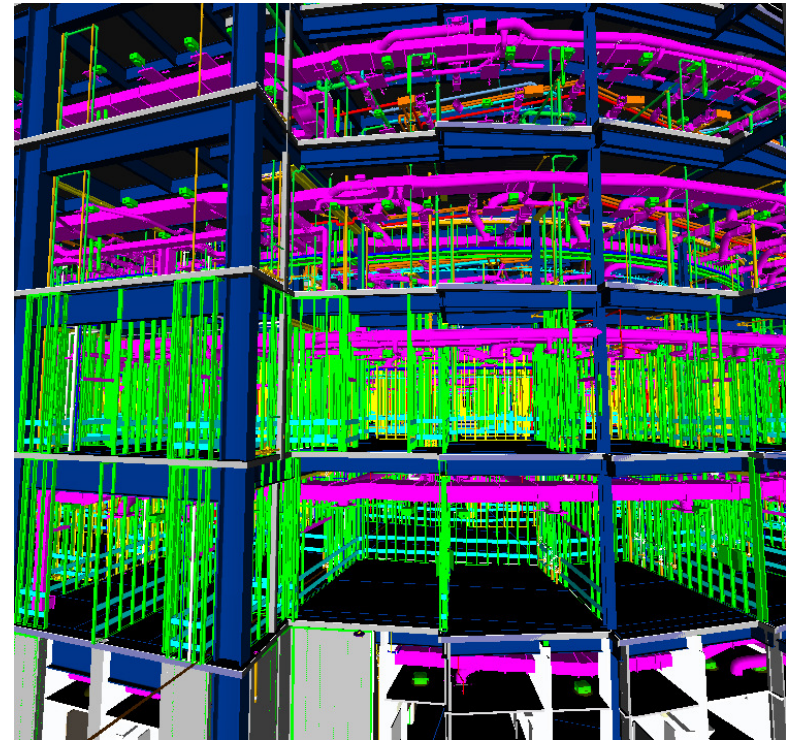
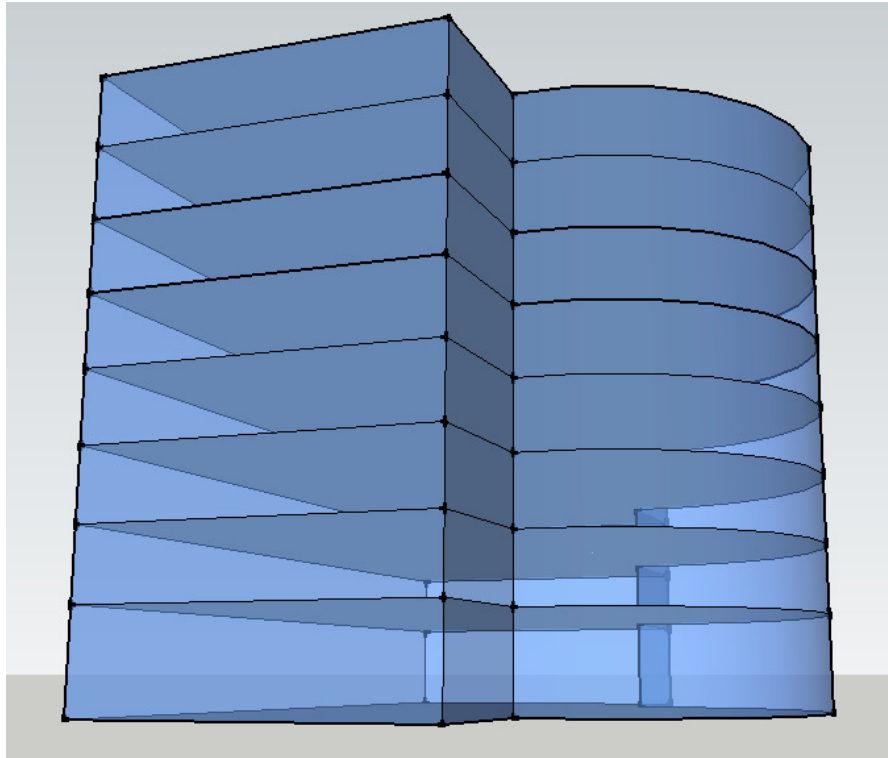


# WHAT IS THIS THING CALLED LOD?

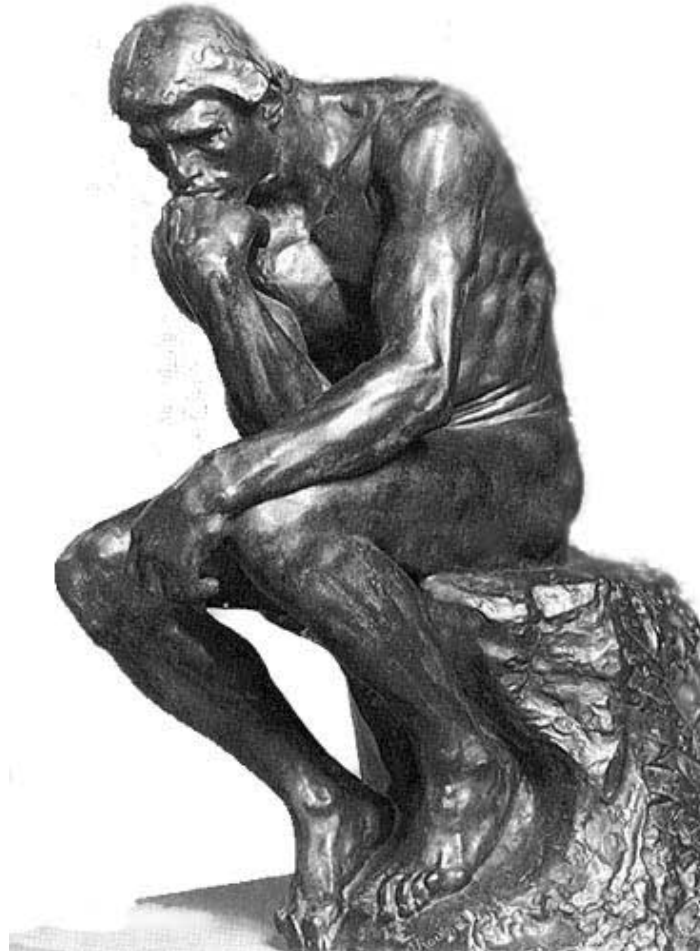
# Problem: How can We Define a BIM?



# Problem: How can We Define a BIM?

- What is the owner expecting when they ask for “BIM” on a project?
- How much information needs to be in a model?
- How much effort will it take (how do I price it?)
- How do I know I’m meeting my deliverables?
- Who’s going to rely on it for what?

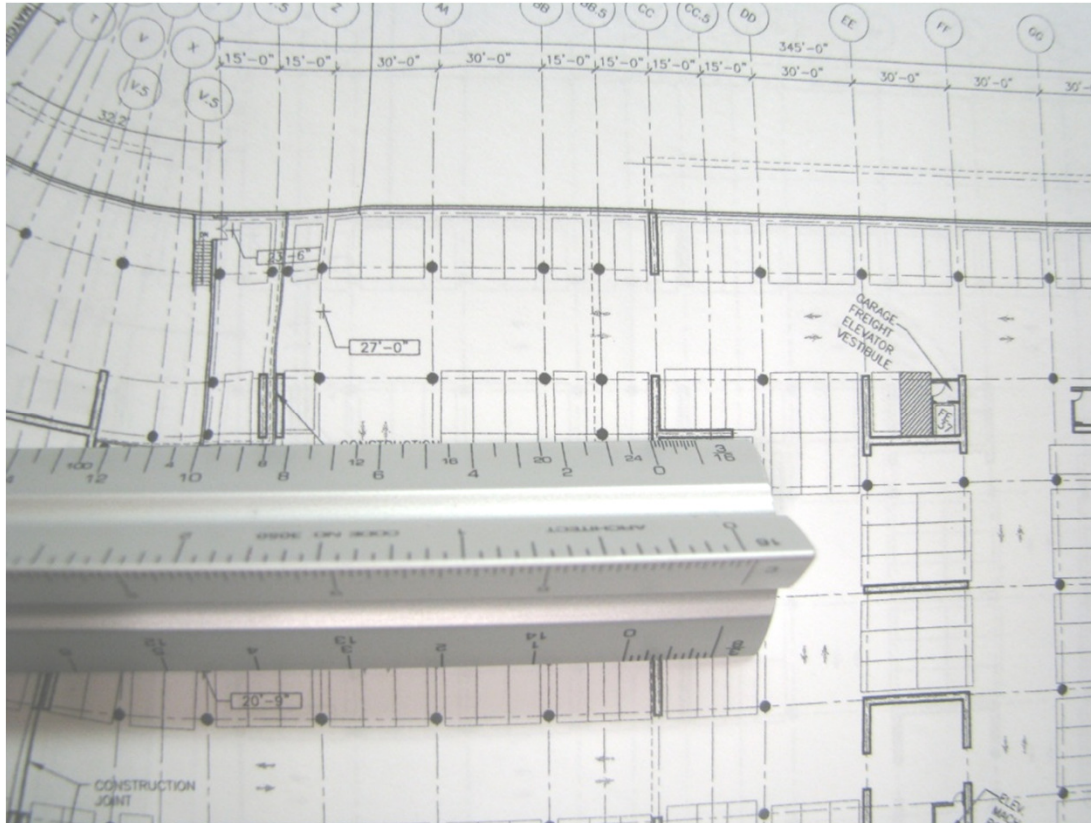
# We Never Had this Problem with Paper Drawings – Why Now?





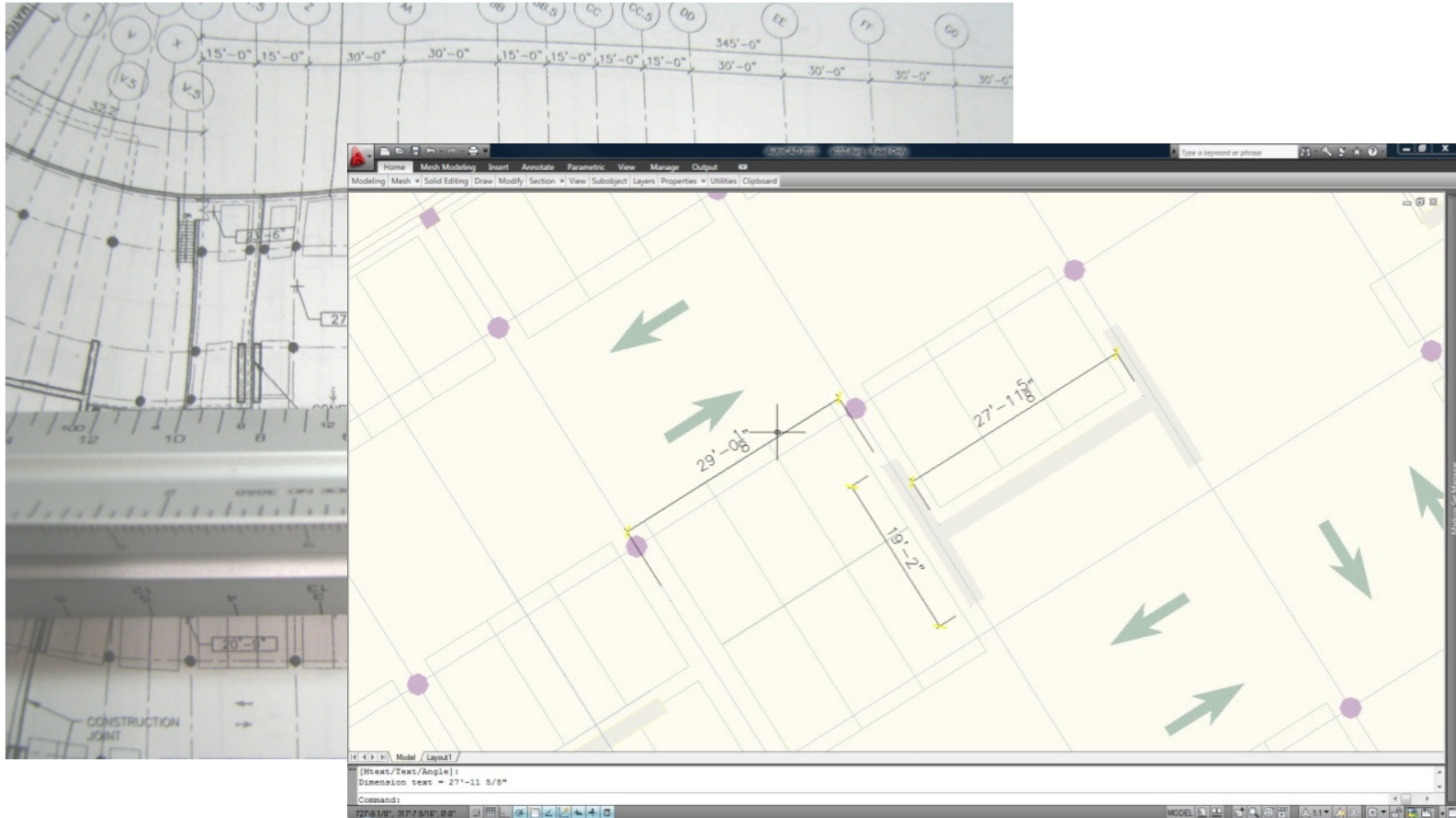
# Paper vs. BIM

## Precision



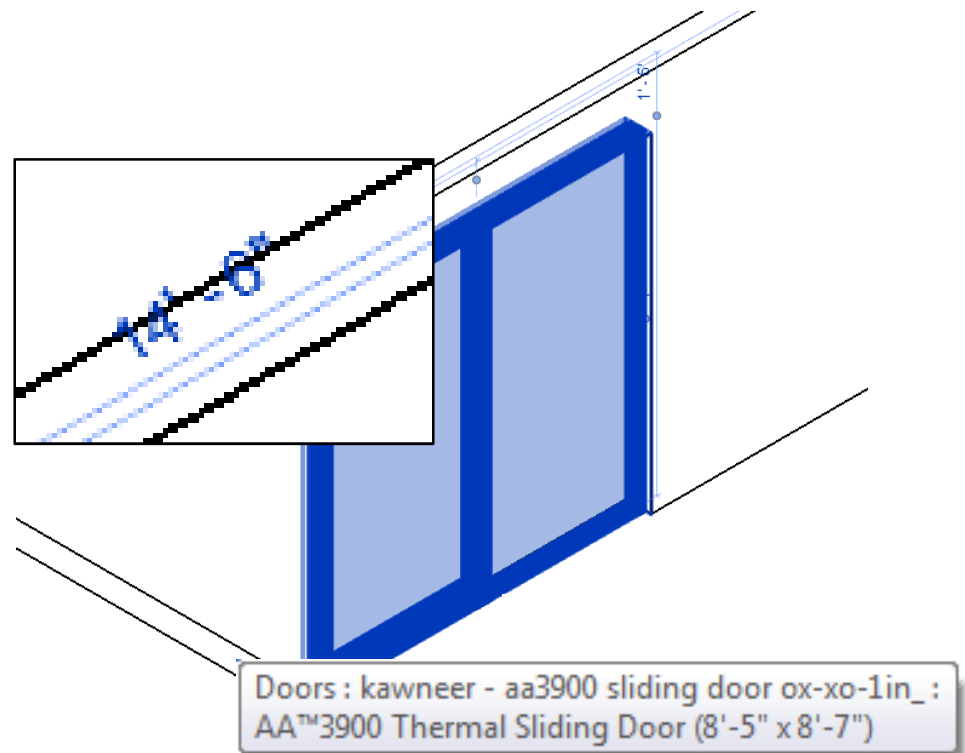
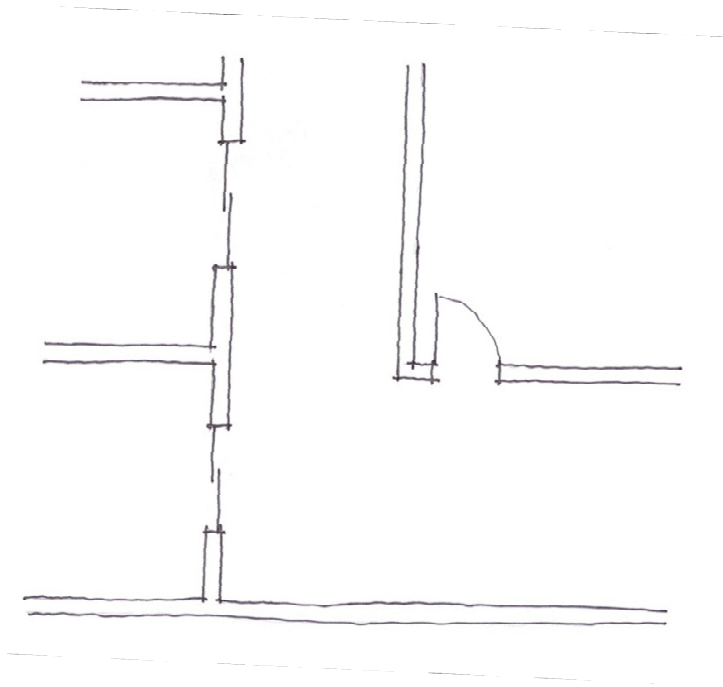
# Paper vs. BIM

## Precision



# Paper vs. BIM

- Visual cues about state of development
- BIMs often carry unintended information



# Response?

## The Disclaimer:

*This model looks great so you can look at it but you can't use it for anything or rely on it for anything which includes, but is not limited to, everything.*

*If you use it for anything anyway then you have to pay my lawyers anything they want if I get sued for anything related to your use of the model for anything.*

*Have a nice day.*



# Response?

## Disclaimer Approach:

*Some of it's not reliable so don't rely on any of it.*

## Specified-Use Approach:

*Some of it's not reliable so only rely on*

- what I say you can,*
- for the purposes I say you can,*
- to the degree of precision I say you can.*

# Model Progression Spec

## Level of *Detail*

The image is a screenshot of a presentation slide. On the left side, there is a spreadsheet with a blue header row. The columns are labeled 'Pad Footing', 'LoD 100', 'LoD 200', and 'LoD 300'. The rows are numbered 1 through 146. The spreadsheet is partially obscured by a web browser window on the right.

The web browser window shows the AECbytes website. The address bar displays the URL <http://www.aecbytes.com/feature/2008/MPSforBIM.html>. The page title is 'AECbytes' and the subtitle is 'Analysis, Research, and Reviews of AEC Technology'. The main content area features an article titled 'Organizing the Development of a Building Information Model' by Jim Bedrick, AIA, Vice President of Virtual Building and Design, Webcor Builders. The article discusses the need for a framework for defining a BIM's precision and suitability for specific uses.

On the right side of the browser window, there is a vertical sidebar with a spiral notebook graphic. It contains the text 'Are you AECconnected?' and a small image of a building.

# Model Development Spec

## Level of *Development*

Pad Footing      LoD 100      LoD 200      LoD 300

Model

Estimate

Schedule

Procurement

Fabrication

Ready

IPD print value sub

IPD Definition

AIA Document E202™ – 2008

Building Information Modeling Protocol Exhibit

This Exhibit is incorporated into the accompanying agreement (the "Agreement") dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

BETWEEN: \_\_\_\_\_

AND: \_\_\_\_\_

for the following project: \_\_\_\_\_

TABLE OF CONTENTS

ARTICLE 1

§ 1.1 This Exhibit is Information as defined in the Agreement.

§ 1.1.1 This Exhibit is for the Project.

INT.

AIA Document E202™ is a trademark of the American Institute of Architects.

§ 4.3 Model Element Table

Identify (1) the LOD required for each Model Element at the end of each phase, and (2) the Model Element Author (MEA) responsible for developing the Model Element to the LOD identified.

Insert abbreviations for each MEA identified in the table below, such as "A – Architect," or "C – Contractor."

NOTE: LODs must be adapted for the unique characteristics of each Project.

		Conceptualization		Criteria Design		Detailed Design		Implementation Documents		Construction				Note Number (See 4.4)	
		LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA		
<b>Model Elements Utilizing CSI UniFormat™</b>															
A	SUBSTRUCTURE	A10	Foundations	A1010	Standard Foundations	100		200		300		400		500	
				A1020	Special Foundations	100		100		300		400		500	
				A1030	Slab on Grade	100		200		300		400		500	
	A20	Basement Construction	A2010	Basement Excavation	100		200		300		300		500		
			A2020	Basement Walls	100		200		300		400		500		
B	SHELL	B10	Superstructure	B1010	Floor Construction	100		200		300		300		500	
				B1020	Roof Construction	100		200		300		300		500	
	B20	Exterior Enclosure	B2010	Exterior Walls	100		200		300		400		500		
			B2020	Exterior Windows	100		200		300		400		500		
			B2030	Exterior Doors	100		200		300		400		500		
	B30	Roofing	B3010	Roof Coverings	100		200		300		300		500		
			B3020	Roof Openings	100		200		300		300		500		
C	INTERIORS	C10	Interior Construction	C1010	Partitions	100		200		300		400		500	
				C1020	Interior Doors	100		200		300		400		500	

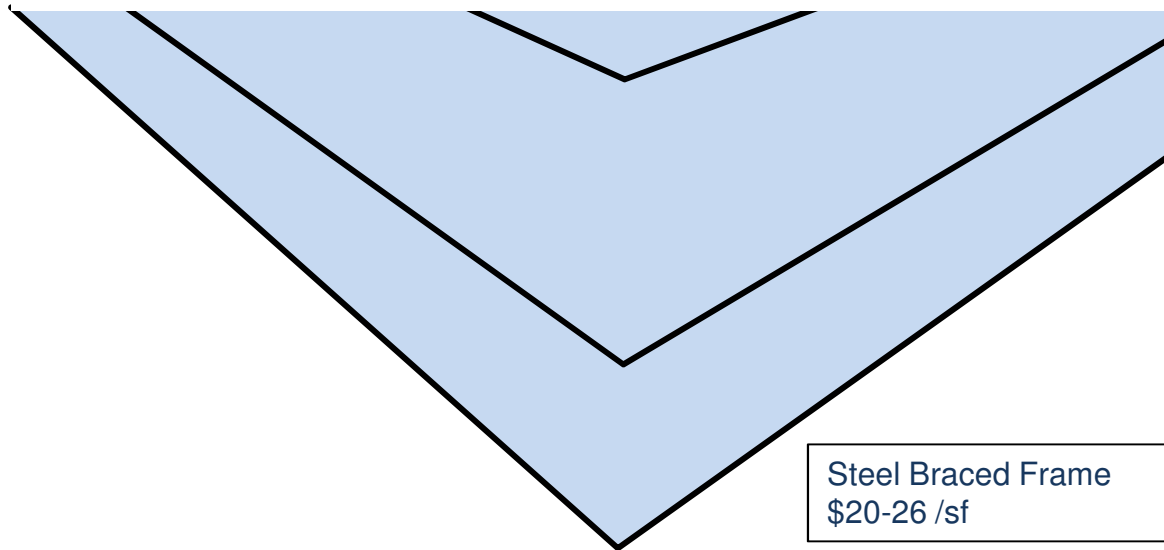
# LOD Definitions

- 100 Conceptual.** The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.
- 200 Generic Placeholders.** The Model Element is graphically represented within the Model as a generic system, object, or assembly with **approximate** quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.
- 300 Specific Assemblies.** The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.
- 400 Detailed Assemblies.** The Model Element is graphically represented within the Model as a **specific** system, object or assembly in terms of size, shape, location, quantity, and orientation with **detailing**, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

*The Level of Development Definitions are produced by the AIA and have been used here by permission. Copyright © 2011. The American Institute of Architects. All rights reserved.*

# LOD Definitions

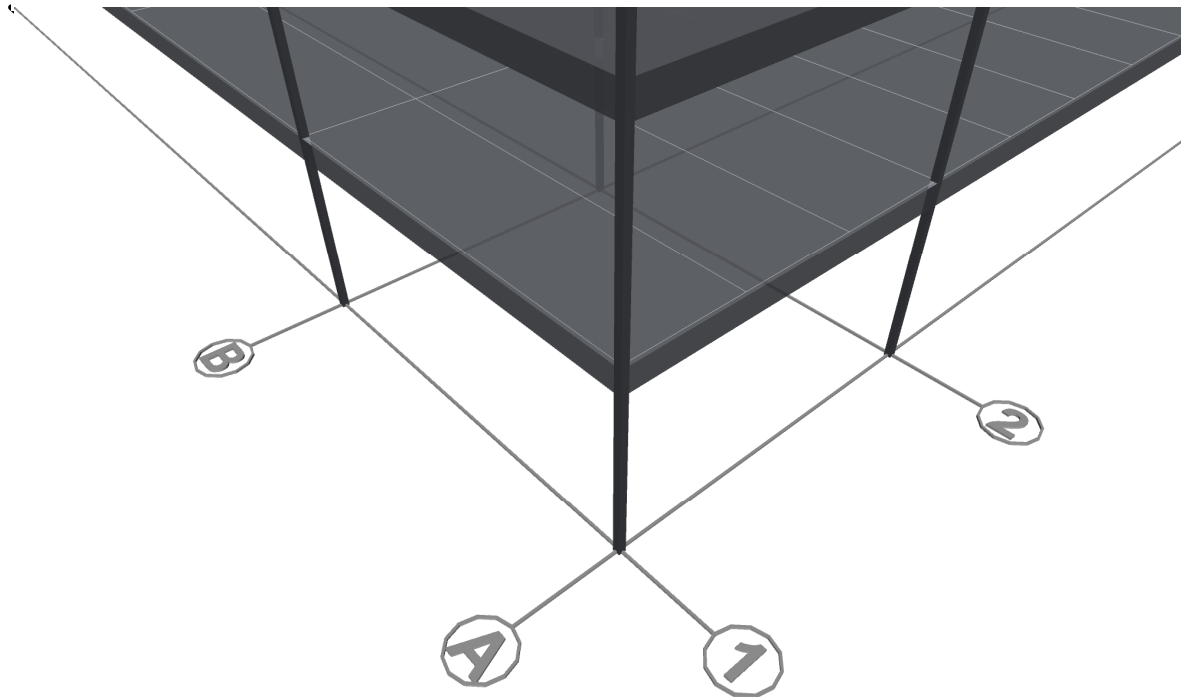
LOD 100  
Conceptual





# LOD Definitions

LOD 100      → LOD 200  
Conceptual    Generic  
Placeholders

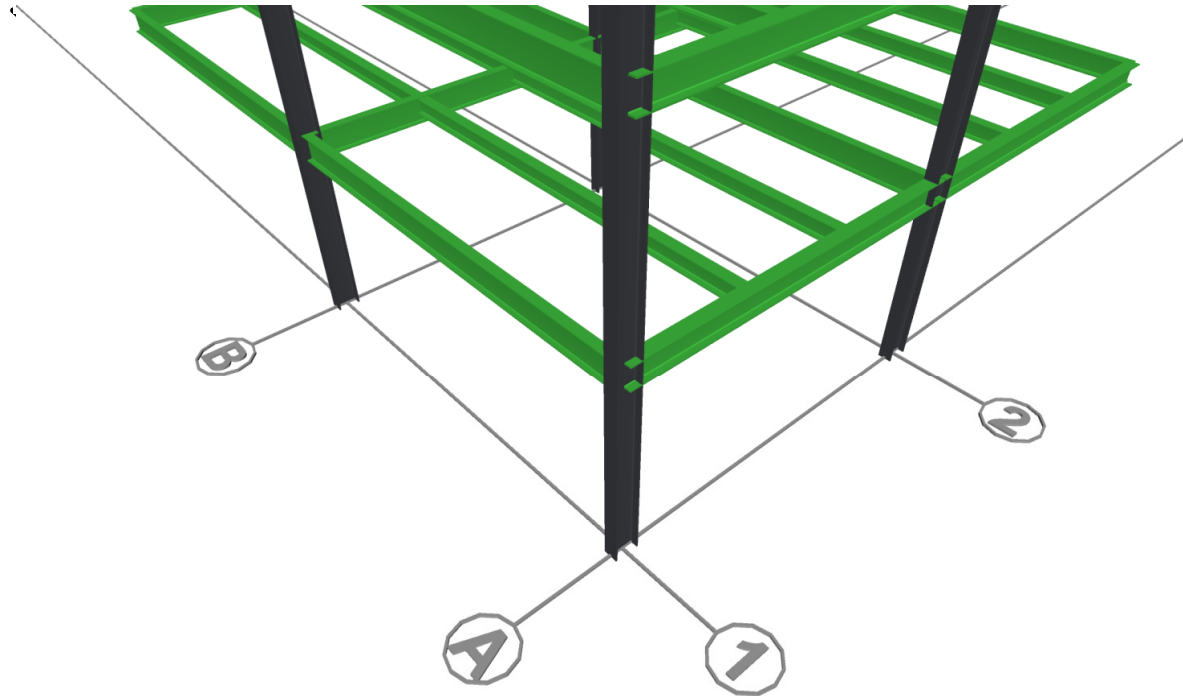


# LOD Definitions

LOD 100  
Conceptual

→ LOD 200  
Generic  
Placeholders

→ LOD 300  
Specific  
Assemblies



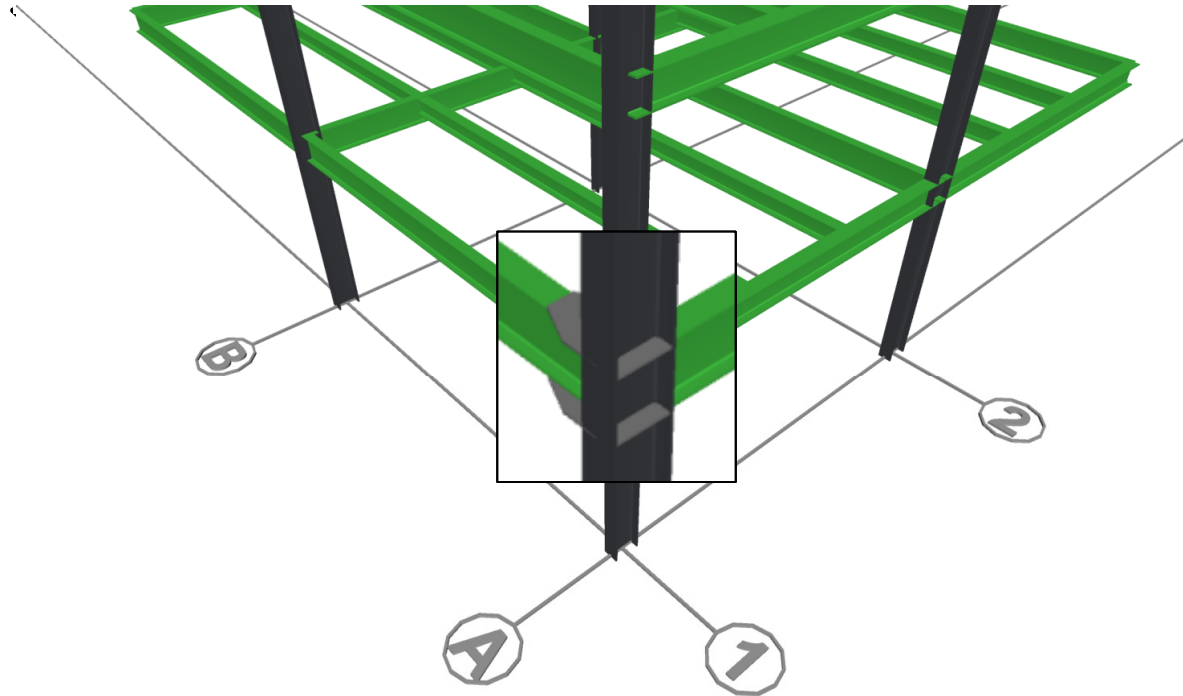
# LOD Definitions

LOD 100  
Conceptual

→ LOD 200  
Generic  
Placeholders

→ LOD 300  
Specific  
Assemblies

→ LOD 400  
Details



# Level of Development vs. Level of Detail

Level of **Detail** – What it looks like

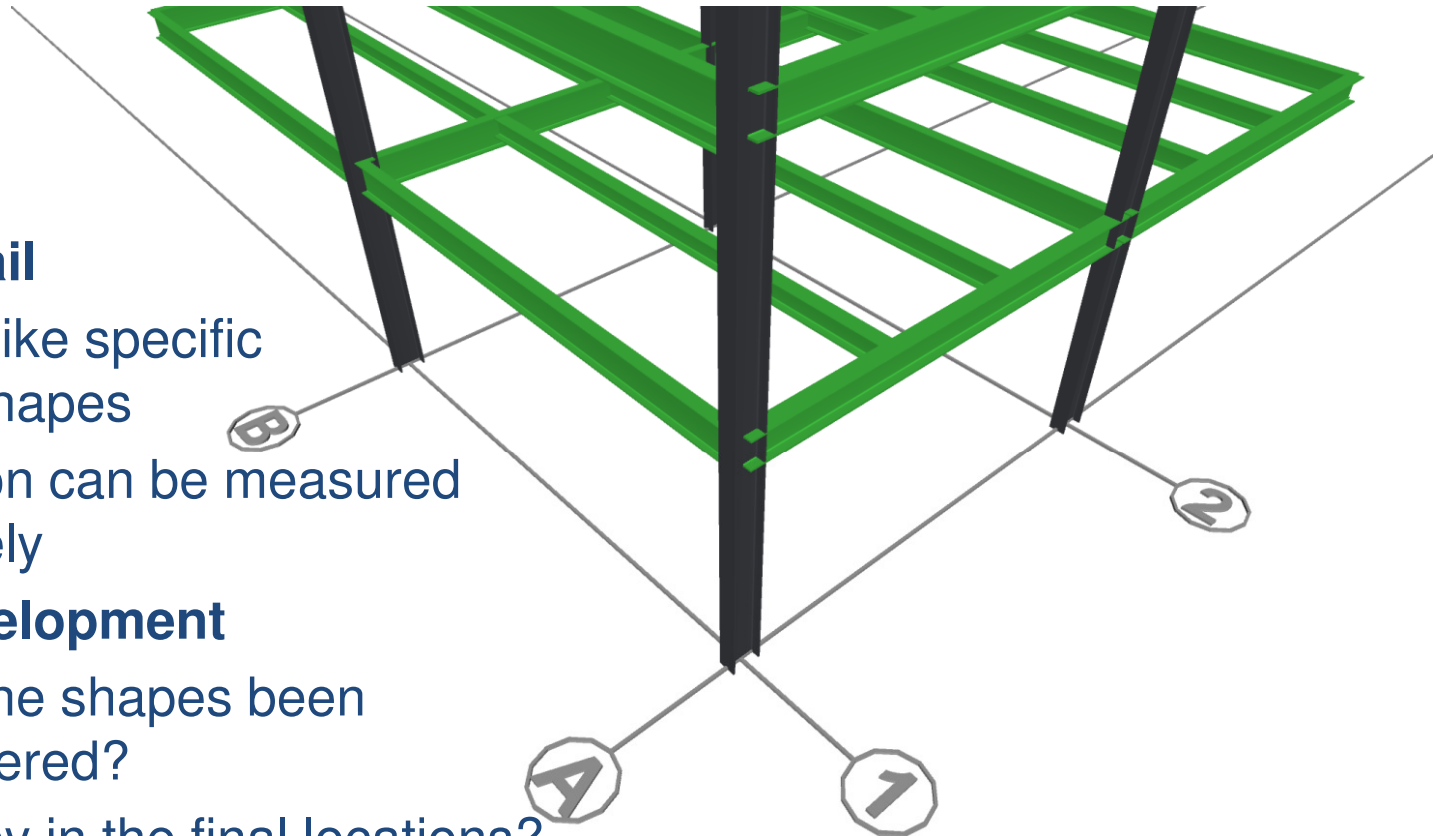
Level of **Development** – How much it's been thought through

## Level of **Detail**

- Looks like specific steel shapes
- Location can be measured precisely

## Level of **Development**

- Have the shapes been engineered?
- Are they in the final locations?



# AIA / AGC BIMForum LOD Specification



Level of Development Specification  
Version: 2013

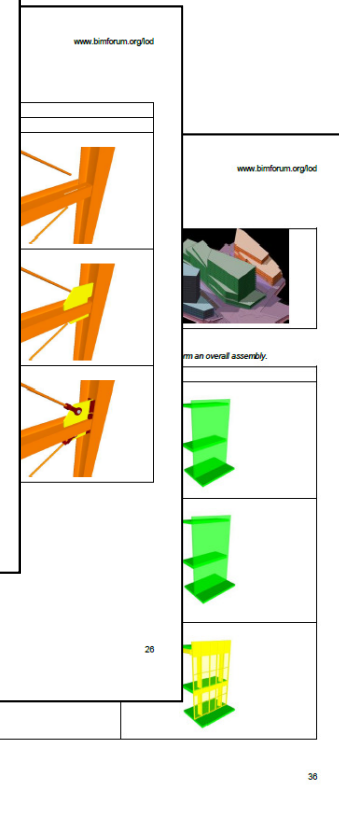
www.bimforum.org/lo

D2010.60 – Plumbing Fixtures

100	See <a href="#">200</a>	
200	Schematic layout with approximate size, shape, and location of fixtures; carrier and wall width requirements modeled; design performance parameters as defined in the BIMVP to be associated with model elements as non-graphic information.	
300	Modeled as design-specified size, shape, spacing, and location of fixtures; approximate allowances for spacing and clearances required for all specified supports that are to be utilized in the layout of all fixtures; actual access/clearance requirements modeled.	
350	Modeled as actual construction elements size, shape, spacing, and location/connections of fixtures/carriers; actual size, shape, spacing, and clearances required for all supports that are utilized in the layout of all fixtures.	
400	See <a href="#">D2010.10</a>	

D2010.90 – Domestic Water Distribution Supplementary Components  
Includes expansion fittings, meters, gages, valves, hangers, supports, heat tracing, vibration and seismic controls.  
These components are typically modeled as part of other assemblies listed in the tables above. Do not assign this Uniformal classification unless a supplementary component is modeled independently of another assembly.

70



[www.bimforum.org/lo](http://www.bimforum.org/lo)



# AIA / AGC BIMForum LOD Specification



- It's a dictionary
- The project team writes the story

[www.bimforum.org/lod](http://www.bimforum.org/lod)

# Clarifications

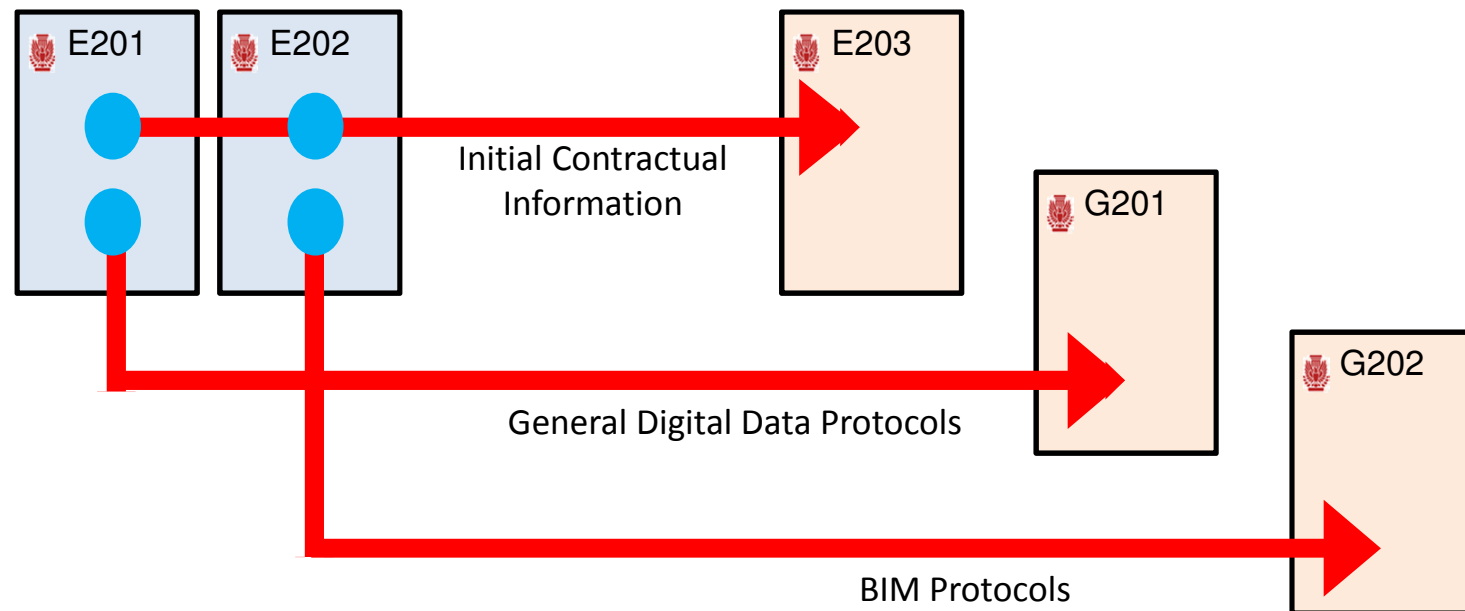
- LOD does not equate to a design phase
- There's no such thing as an LOD ### model

§ 3.3 Model Element Table					Schematic Design			Design Development			Foundation Permit			Steel Tower Package			Construction Documents				
Model Elements Utilizing CSI UniFormat™					LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes		
A SUBSTRUCTURE	A10 Foundations	A1010 Standard Foundations	A1010.1	Standard Foundations																	
			A1010.2	Foundation Walls	NM			200	E		300	E					300	E			
			A1010.3	Perimeter Drainage	NM			200	E		200	E					300	E			
			A1010.4	Perimeter Insulation	NM			100	A		200	E					100	A			
			A1020	Special Foundations																	
			A1020.1	Pile Foundations	NM			200	E		300	E					300	E			
			A1020.2	Grade Beams	NM			200	E		300	E					300	E			
			A1030	Slab on Grade																	
			A1030.1	Standard Slabs on Grade																	
			A1030.6	Under-Slab Drainage	NM			200	E		300	E					300	E			
B SHELL	B10 Superstructure	B1010 Floor Construction	B1010.1	Floor Construction																	
			B1010.2	Upper Floor Framing	100			200	E					300	E		300	E			
			B1010.9	Fireproofing	100			100	A					100	E		100	A			
			B1020	Roof Construction																	
			B1020.2	Roof Framing	100			200	E					300	E		300	E			
			B1020.9	Fireproofing	100			100	A					100	E		100	A			
	B20 Exterior Enclosure	B2010 Exterior Walls	B2010	Exterior Walls	200	A		300	A								300	S			
			B2020	Exterior Windows	200	A		200	A								300	S			
			B2030	Exterior Doors	200	A		200	A								300	S			
	B30 Roofing	B3010	Roof Coverings	200	A		200	A									300	GC			
C INTERIORS	C10 Interior Construction	C1010 Partitions	C1010	Partitions	200			300	A								300	A			
			C1020	Interior Doors	200			200	A								300	A			
			C1030	Fittings	100			200	A								200	A			
	C20 Stairs	C2010 Stair Construction	C2010	Stair Construction	100			200	A								200	S			
			C2020	Stair Finishes	NM			NM	A								100	A			
	C30 Interior Finishes	C3010 Wall Finishes	C3010	Wall Finishes	NM			NM	A								100	A			
			C3020	Floor Finishes	NM			NM	A								100	A			
			C3030	Ceiling Finishes	NM			NM	A								100	A			

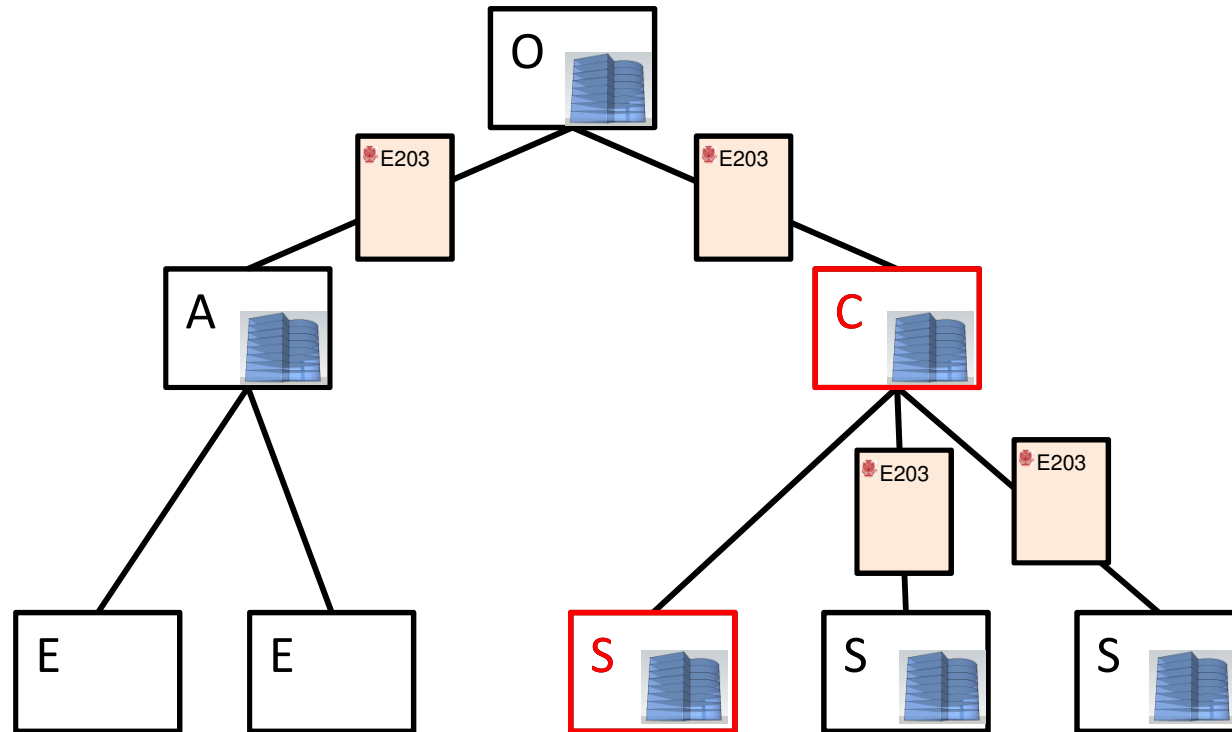
# HOW DO WE AGREE TO IT?

## AIA DOCUMENTS

# AIA Digital Practice Documents



# E203 Flowdown







# E203 – 2013 Article 4 BIM

- ✓ Establishes BIM expectations
  - ✓ Internal use only without sharing expectation vs. sharing with other Project Participants with expectation of reliance

## ARTICLE 4 BUILDING INFORMATION MODELING PROTOCOLS

§ 4.1 If the Parties indicate in Section 3.1 that Building Information Modeling will be used on the Project, specify below the extent to which the Parties intend to utilize Building Information Modeling and identify the provisions of this Article 4 governing such use:

-  ☐ The Parties shall utilize Building Information Modeling on the Project for the sole purpose of fulfilling the obligations set forth in the Agreement without an expectation that the Model will be relied upon by the other Project Participants. Unless otherwise agreed in writing, any use of, transmission of, or reliance on the Model is at the receiving Party's sole risk. The remaining sections of this Article 4 shall have no force or effect.
-  ☐ The Parties shall develop, share, use and rely upon the Model in accordance with Sections 4.2 through 4.10 of this Exhibit.

# E203 – 2013 Article 4 (Cont.)

## ✓ Identify anticipated BIM uses

**§ 4.2 Anticipated Building Information Modeling Scope.** Indicate below the portions of the Project for which Modeling will be used and the anticipated Project Participant responsible for that Modeling.



**Project Portion for Modeling**

**Responsible Project Participant**



**§ 4.3 Anticipated Model Authorized Uses.** Indicate below the anticipated Authorized Uses of the Model for the Project, which Authorized Uses will be agreed upon by the Project Participants and further described for each LOD in G202–2013.

**§ 4.4 Ancillary Modeling Activities.** Indicate additional Modeling activities agreed upon by the Parties, but not to be included in AIA Document G202–2013, if any.

*(Describe any Modeling activities, such as renderings, animations, performance simulations, or other similar use, including the anticipated amount and scope of any such Modeling activities.)*

# WHAT'S IT GOOD FOR?

# What's it Good for?

In general:

- Define models – deliverables, milestones, information exchanges
- Define Authorized Uses - enables reliance

# What's it Good for?

## Specific:

- Mapping firm standards – defines *your* “business as usual”
- Defining information exchanges in a BxP
- Scoping modeling effort
- Focusing the modeling effort
- Developing a baseline design schedule
- Defining use-case milestones
- Setting milestones based on standard workflow
- Determining workflow based on milestone dates
- Defining a design/build bridging package
- Defining a design architect – executive architect handoff package



# Take-Aways

- LOD is a language.
- LOD allows us to specify milestones, deliverables, information exchanges, etc. with a high degree of clarity.
- LOD allows us to use models for transmitting information reliably and safely.

# Just to clarify...

DETAIL = How much information has been modeled

DEVELOPMENT = The degree to which a modeled element and attached information has been thought through

# Just to clarify...

DETAIL = How much information has been modeled

DEVELOPMENT = The degree to which *project team members may rely on the information when using the model*

# Just to clarify...

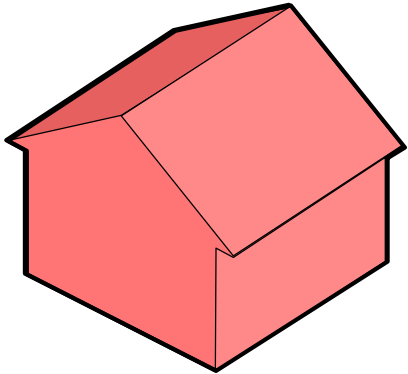
DETAIL = Input

DEVELOPMENT = Reliability

*How does this affect  
implementation of  
the LOD concept...?*

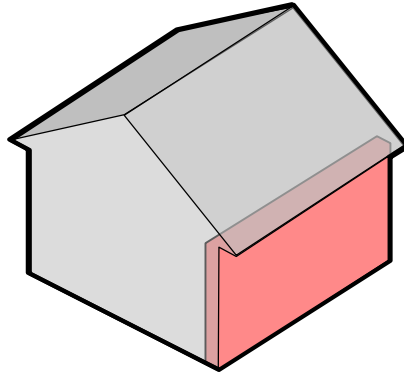
# The LOD “Language”

LOD 100  
MASSING



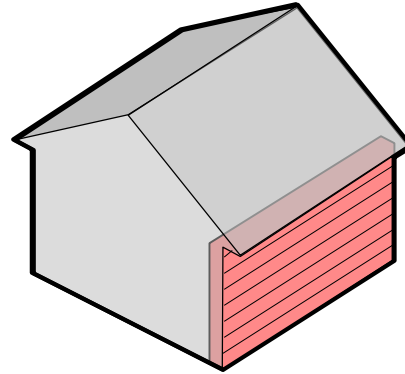
“ESTIMATE IT”

LOD 200  
GENERIC  
ASSEMBLIES



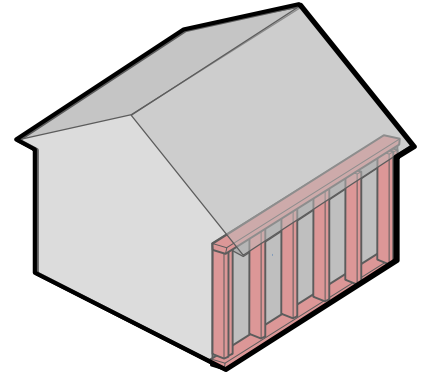
“SPECIFY IT”

LOD 300  
SPECIFIED  
ASSEMBLIES



“BID IT”

LOD 400  
DETAILED  
COMPONENTS



“BUILD IT”



# An Example of LOD

**100** = Cost assumption or simple object (*light fixture*)

**200** = Generic type (*pendant*)

**300** = Design specified, lamping/lumens, *preferred* model

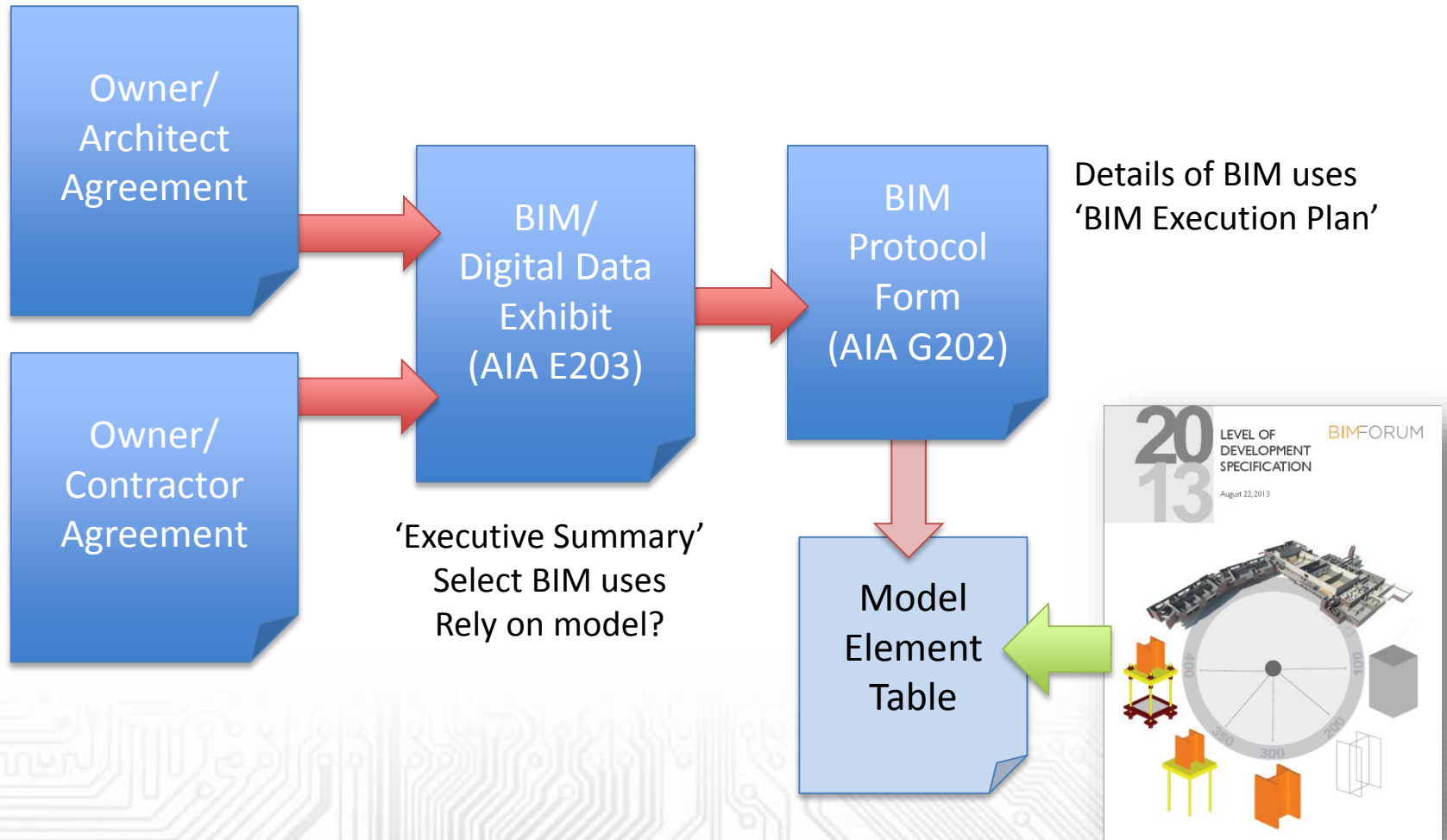
**350** = Actual model, Nuvo Lighting 60-590

**400** = All mounting/installation detail





# How do you use the LOD Spec?



# PRACTICAL EXAMPLES





**US Army Corps  
of Engineers®**



US Army Corps  
of Engineers®

## Minimum Modeling Matrix (M3)

Document Release: 20120913

			DESIGN MODEL (CONSTRUCTION DOCUMENTS)	RECORD MODEL (AS-BUILTS)	FOR AGENCY OR CO NOT A CONTRA
Level	Element ID	LOD	GRADE (CD)	GRADE (AB)	Primary Discipline (This will allow design team to identify discipline specific areas of content)
Level 2	<u>Furnishings</u>	•	•	•	Interiors
Level 3	Fixed Furnishings	•	•	•	Interiors
Level 4	Fixed Art	100	B	B+	Interiors
Level 4	Window Treatments	200	B	B+	Interiors
Level 4	Casework	300	A	A+	Interiors
Level 4	Fixed Multiple Seating	200	A	A+	Interiors
Level 4	Other Fixed Furnishings	200	A	A+	Interiors

# HOK's Minimum Modeling

## Architecture

	<b>Schematic Design or Concept Design</b>	<b>Design Development or Developed Design</b>	<b>Construction Doc's or Technical Design</b>
Shared coordinates	Establish survey point, shared coordinates	Verify coordinates with deliverables	Verify coordinates with deliverables
Levels	Finish floors, roof, parapets	Interstitial levels, loading docks	Coordinate levels with structural model
Toposurface	--	TBD	TBD
Area measurement	Gross areas	Net areas as required	Net areas as required
Rooms	LOD200 Establish link w/ dRofus	LOD200	LOD200
Walls, interior	LOD200	LOD300 Finalize types & fire rating	LOD300
Walls, exterior	LOD100	LOD200	LOD300
Windows	LOD200	LOD200	LOD300
Doors	LOD100	LOD200	LOD300
Louvers	--	LOD200	LOD300
Ceilings	--	LOD200	LOD300
Stairs	LOD100	LOD200	LOD300

D	CD		
Final	50%	90%	Final

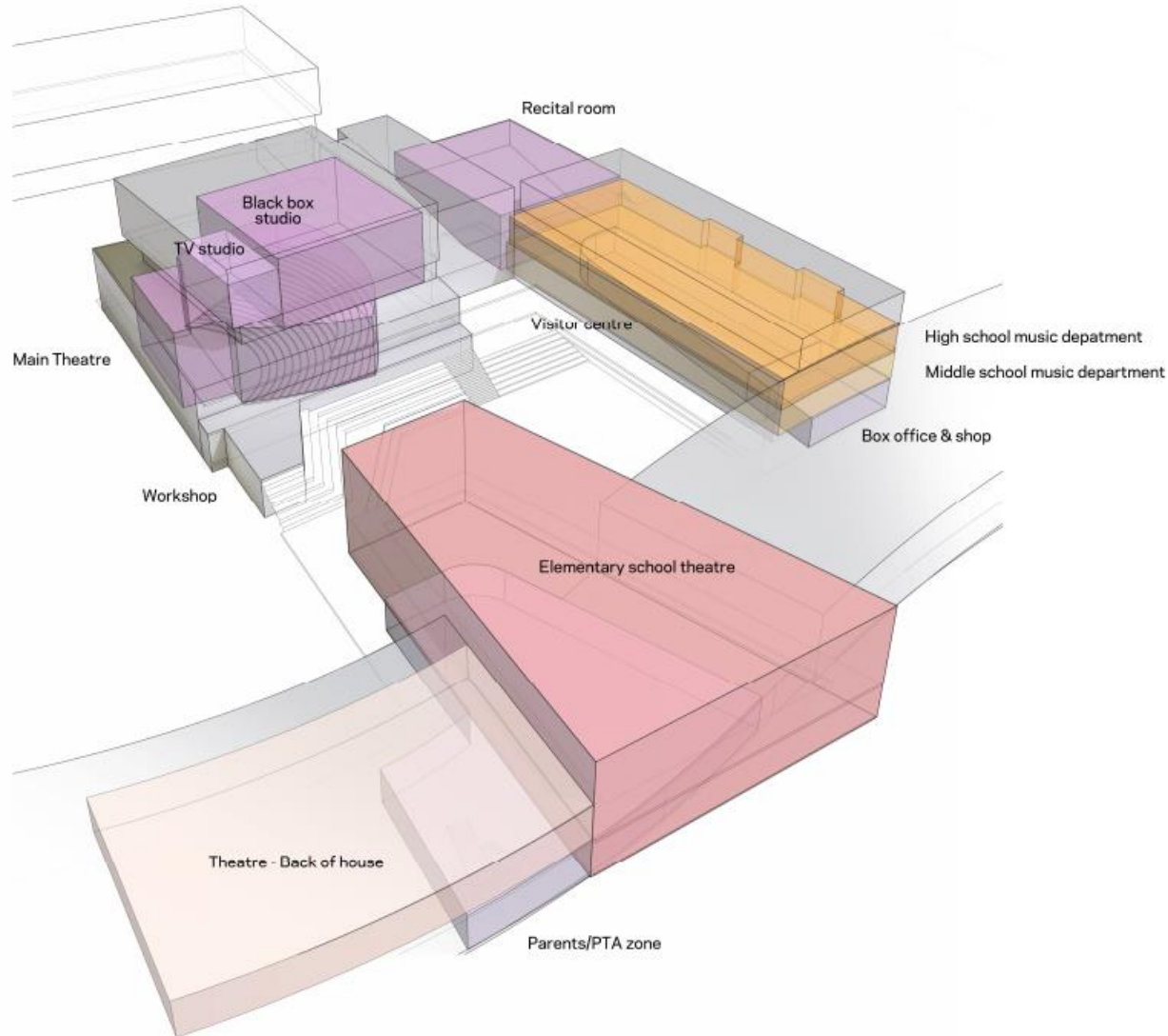
●	●	●	●
●	●	●	●
○	○	●	●

○	●	●	●
○	●	●	●
○	●	●	●
○	●	●	●
○	●	●	●
○	●	●	●
○	●	●	●
○	●	●	●

## Notes

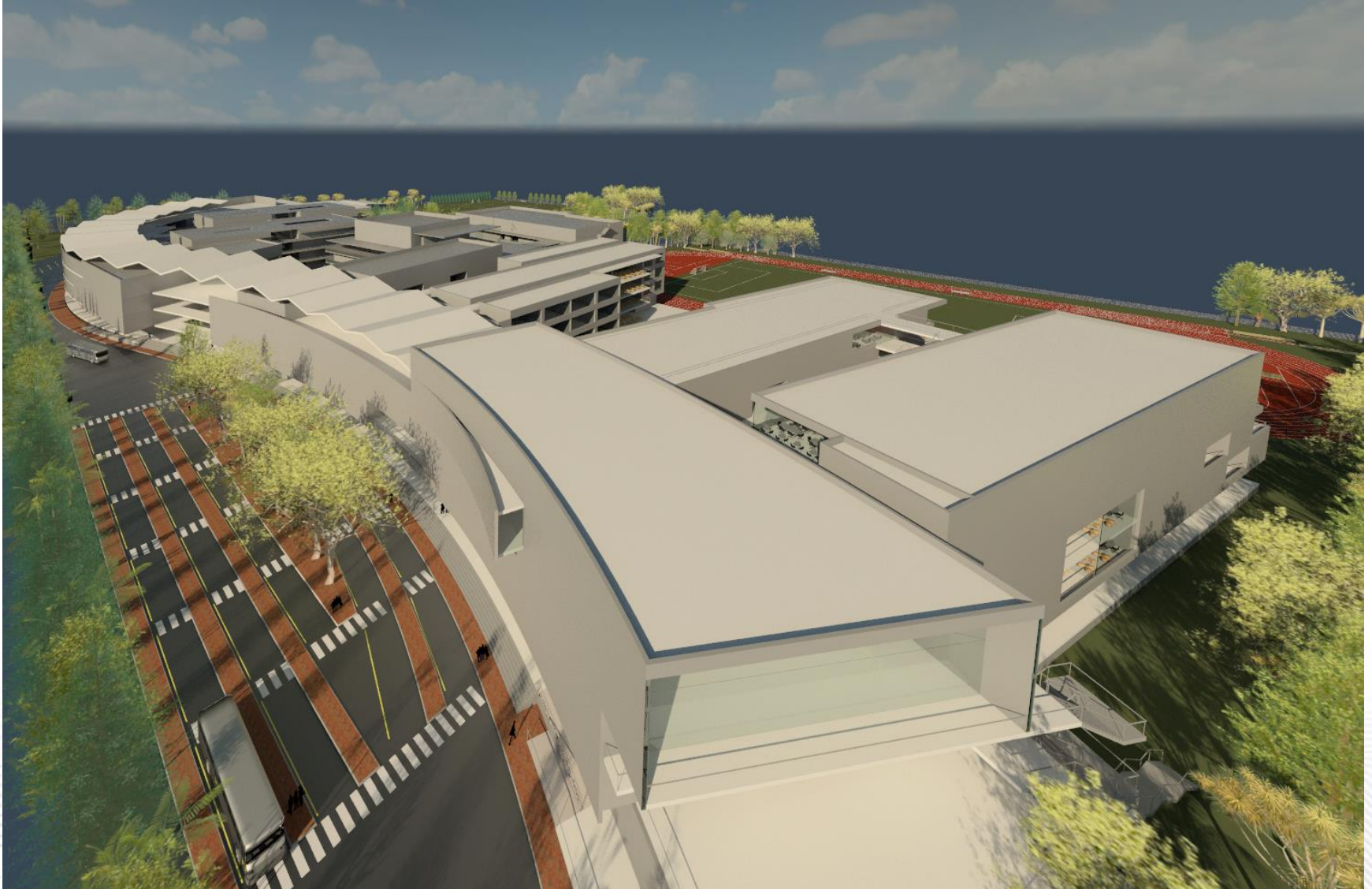
Project Notes - general & material related		○	○	●	●	●
Exterior Enclosure Notes		○	○	●	●	●
Design Criteria - loads, movements, energy, fire ratings & separations		○	○	●	●	●
Key Notes						
Coordinate Keynotes with Master Keynote Listing Sheets				●	●	●

# HOK's Minimum Modeling





# HOK's Minimum Modeling



# Applying LOD

Schematic Design Model

LOD 200

LOD 100

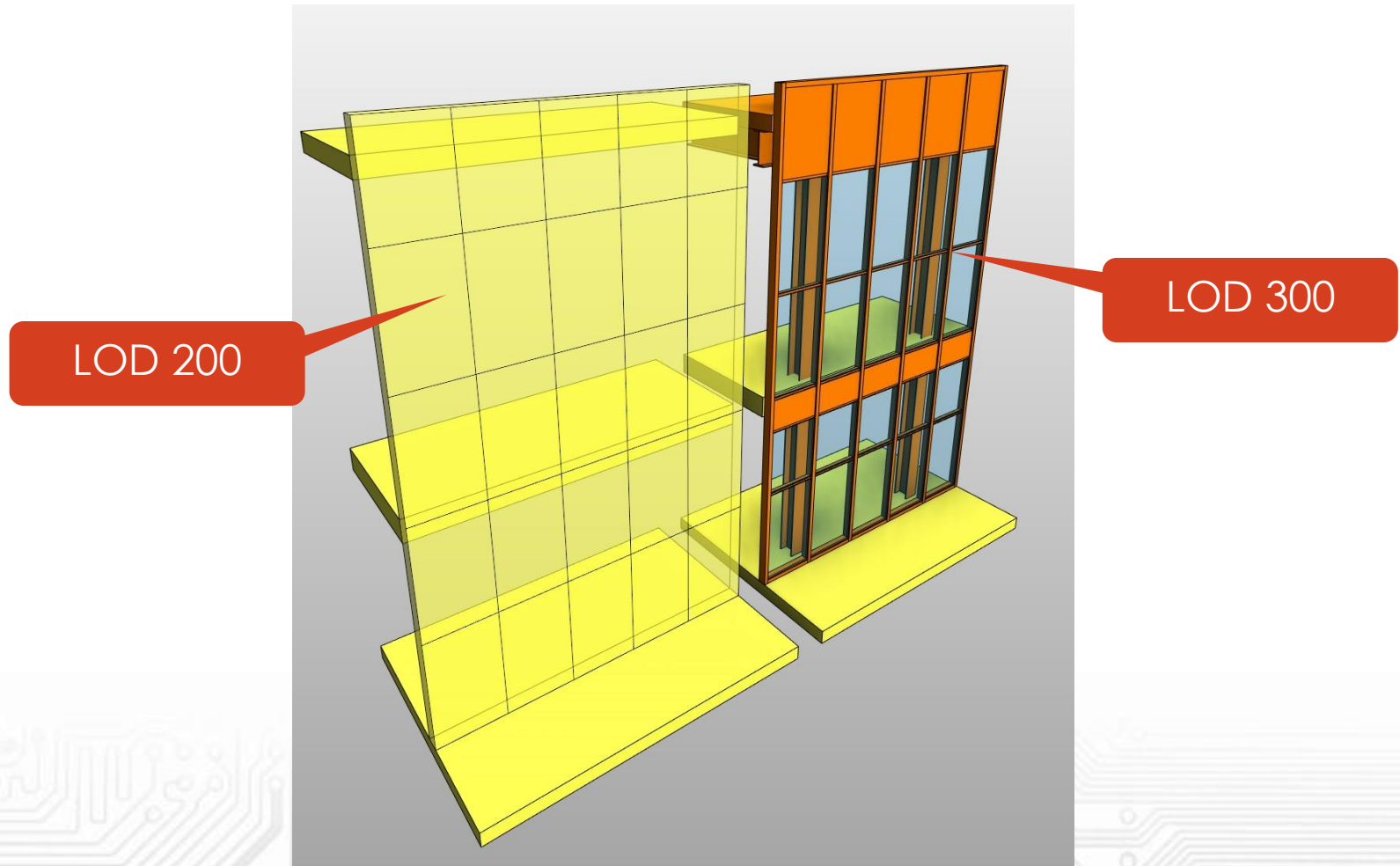
LOD 350

LOD 300

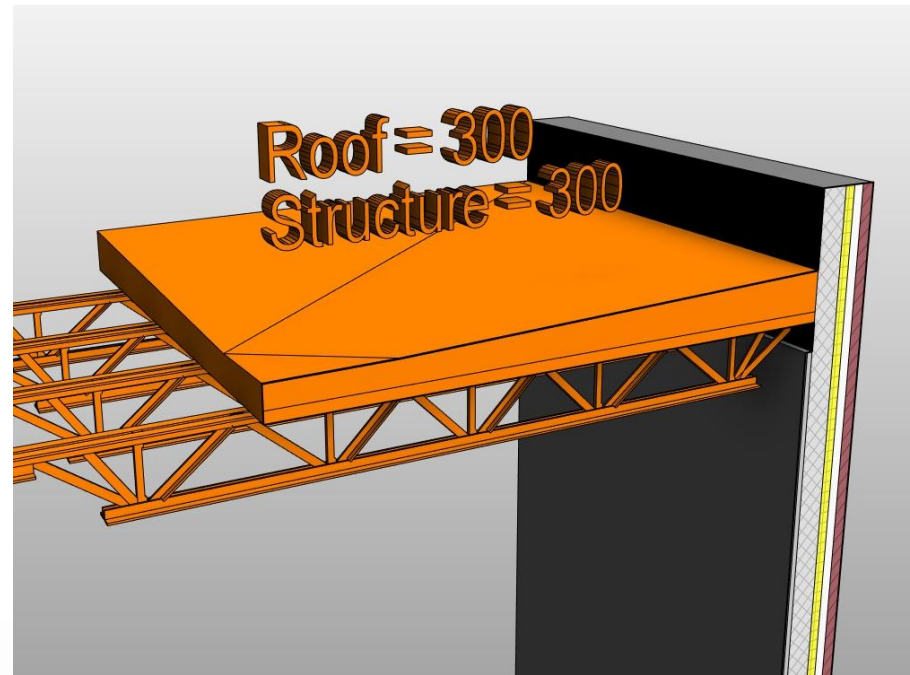
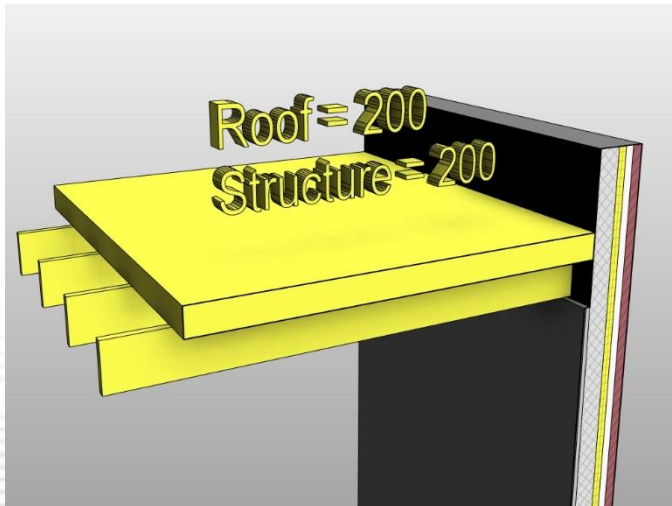
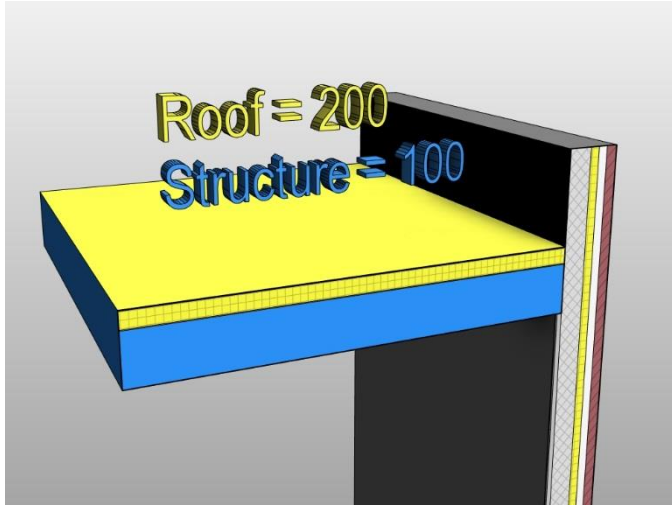
Construction Document Model



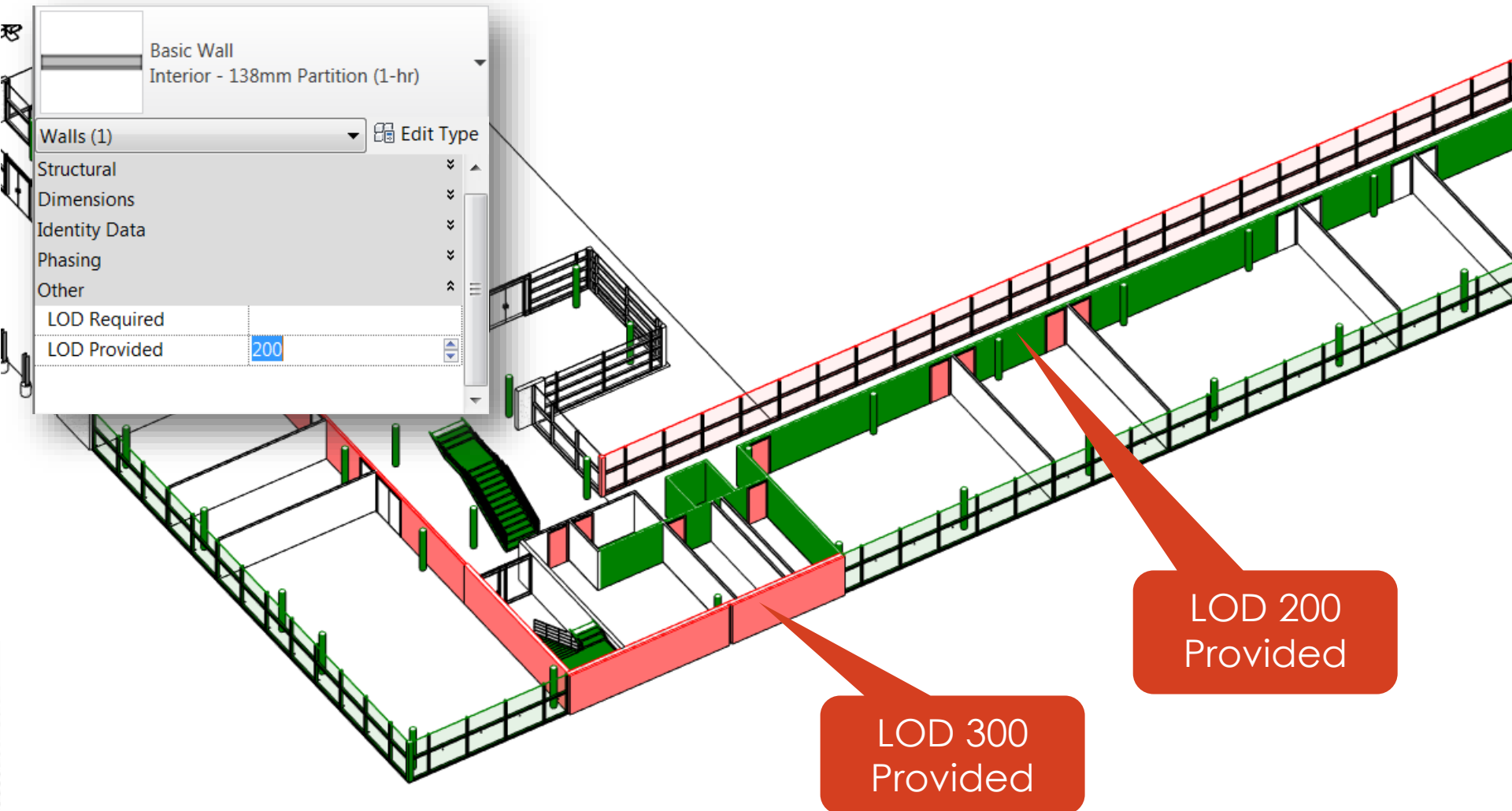
# Applying LOD



# Applying LOD



# Visual Quality Control

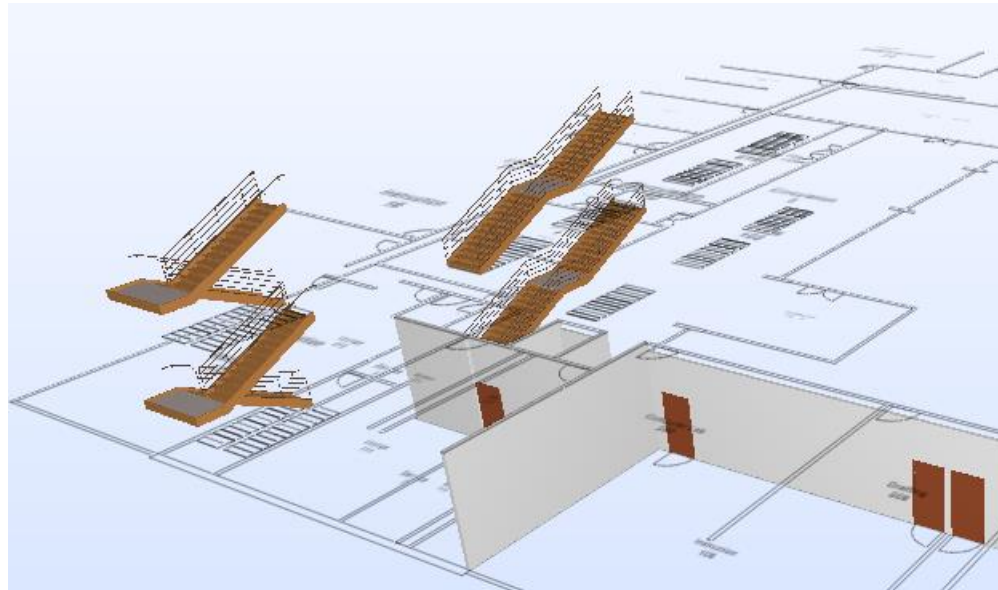


# Verifying LOD

- An organization principle
  - Walls, doors...
  - Unifomat, Omniclass...
- Two measurable parameters:
  - LOD Required
  - LOD Provided

LOD Required  $\leq$  LOD Provided

# Verifying LOD

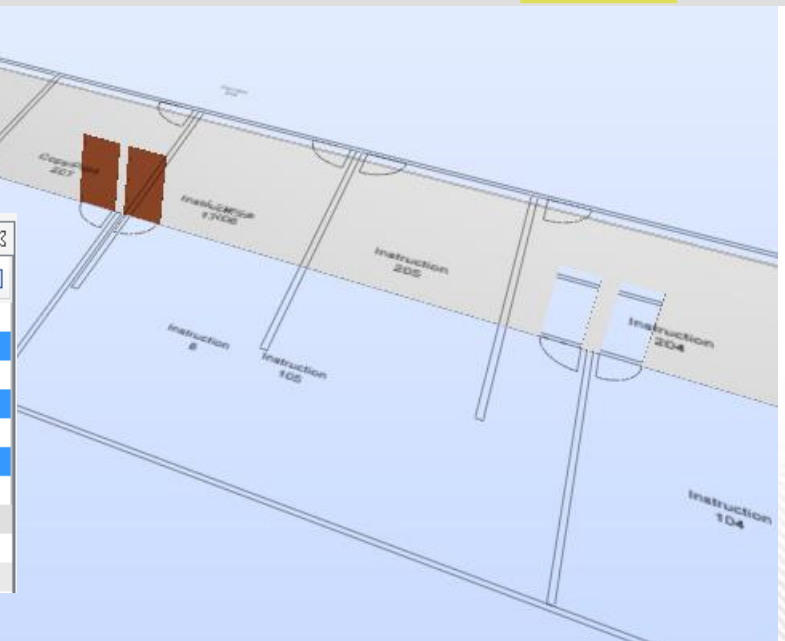


Disciplines		
	Any	
	Architectural	
	Air Conditioning	
	Building Services	
	Electrical	
	Heat	
	Structural	
	Ventilation	

Allowed Property Values		
Component	Property	Allowed Value
	Other.LOD Provided	300
	Other.LOD Provided	200
	Other.LOD Provided	300

Results		
No Filtering Automatic		
Results		
No Other.LOD Provided Value [0/3]		
Unknown Other.LOD Provided Values in Door Components [0/1]		
300		
Unknown Other.LOD Provided Values in Stair Components [0/1]		
200		
Unknown Other.LOD Provided Values in Wall Components [0/1]		
200		





# Implementation Considerations

- Setting & managing expectations
- Aligning with your design methods
- Avoid redundant modeling
  - Address separation of complex assemblies

# Objectives

- Value & ROI
- Project Examples
- Design Workflows
- Project Schedule



# Incentive to Participate

## Project Team

- Quantify difference between firm's Standard of Care & project scope
  - Add service for additional work
- Reduce over-modeling & parallel modeling by project team
- Drives increased collaboration
- Clearly identifies design liability
- Owner asks them to

# What about the Architect?

- Track Internal Standards
  - QA/QC for Project & BIM managers
  - Reduce over-development of models
- Model Completeness
  - What is completed? What still needs development?
  - Designer/Engineer added/leaves, which system is complete?
  - Manager wants to view progress, estimate time remaining
- Differentiate BIM abilities from competition
- Less liability for the model, Specified-Use Approach

# Why does the owner care?

- Describe owner requirements
- Effective handovers
- Clearly identifies where information is
- Reduce over-modeling & parallel modeling
- Schedule improvements
- Communication



# Project Examples

Standard 100% SD			Standard 100% DD			Standard 100% CD			Use Case QTO		
Date			Date			Date			Date		
LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes
N/M	E		200	X	A/E	300	X	E	300	E	
200	A		200	A		300	X	A	300	A	
D 30 40 4	X	Chiller	D 30 40 5	X	Cont	D 30 40 5	X	Cont	D 30 40 5	X	Cont
D 40 30 2	X	Fire E	D 40 30 2	X	Fire E	D 40 30 2	X	Fire E	D 40 30 2	X	Fire E
D 50 20 1	10	X	D 50 20 1	10	X	D 50 20 1	10	X	D 50 20 1	10	X
D 50 20 1	20	X	D 50 20 1	20	X	D 50 20 1	20	X	D 50 20 1	20	X
D 50 20 2	10	X	D 50 20 2	10	X	D 50 20 2	10	X	D 50 20 2	10	X
D 50 20 2	20	X	D 50 20 2	20	X	D 50 20 2	20	X	D 50 20 2	20	X
D 50 20 2	30	X	D 50 20 2	30	X	D 50 20 2	30	X	D 50 20 2	30	X
		X			X			X			X
		X			X			X			X
D 50 30 3	X	Telephone Systems	D 50 30 3	X	Telephone Systems	D 50 30 3	X	Telephone Systems	D 50 30 3	X	Telephone Systems
D 50 30 7	X	Fire Alarm Systems	D 50 30 7	X	Fire Alarm Systems	D 50 30 7	X	Fire Alarm Systems	D 50 30 7	X	Fire Alarm Systems
D 50 30 8	X	Security & Detection Systems	D 50 30 8	X	Security & Detection Systems	D 50 30 8	X	Security & Detection Systems	D 50 30 8	X	Security & Detection Systems
D 50 90 2	X	Emergency Light & Power Systems	D 50 90 2	X	Emergency Light & Power Systems	D 50 90 2	X	Emergency Light & Power Systems	D 50 90 2	X	Emergency Light & Power Systems
E 10 10 9	X	Other Commercial Equipment	E 10 10 9	X	Other Commercial Equipment	E 10 10 9	X	Other Commercial Equipment	E 10 10 9	X	Other Commercial Equipment
E 10 20 5	X	Audio-visual Equipment	E 10 20 5	X	Audio-visual Equipment	E 10 20 5	X	Audio-visual Equipment	E 10 20 5	X	Audio-visual Equipment
E 10 20 8	10	X	E 10 20 8	10	X	E 10 20 8	10	X	E 10 20 8	10	X
E 10 20 9	X	Other Institutional Equipment	E 10 20 9	X	Other Institutional Equipment	E 10 20 9	X	Other Institutional Equipment	E 10 20 9	X	Other Institutional Equipment
E 10 90 3	20	X	E 10 90 3	20	X	E 10 90 3	20	X	E 10 90 3	20	X
E 10 90 6	X	Window Washing Equipment	E 10 90 6	X	Window Washing Equipment	E 10 90 6	X	Window Washing Equipment	E 10 90 6	X	Window Washing Equipment
E 20 10 1	X	Fixed Artwork	E 20 10 1	X	Fixed Artwork	E 20 10 1	X	Fixed Artwork	E 20 10 1	X	Fixed Artwork
E 20 10 2	X	Fixed Casework	E 20 10 2	X	Fixed Casework	E 20 10 2	X	Fixed Casework	E 20 10 2	X	Fixed Casework
E 20 10 3	10	X	E 20 10 3	10	X	E 20 10 3	10	X	E 20 10 3	10	X
E 20 20 2	X	Furniture & Accessories	E 20 20 2	X	Furniture & Accessories	E 20 20 2	X	Furniture & Accessories	E 20 20 2	X	Furniture & Accessories
F 20 10 1	X	Building Interior Demolition	F 20 10 1	X	Building Interior Demolition	F 20 10 1	X	Building Interior Demolition	F 20 10 1	X	Building Interior Demolition

## DBB Project – QTO for bidding process

# Project Examples

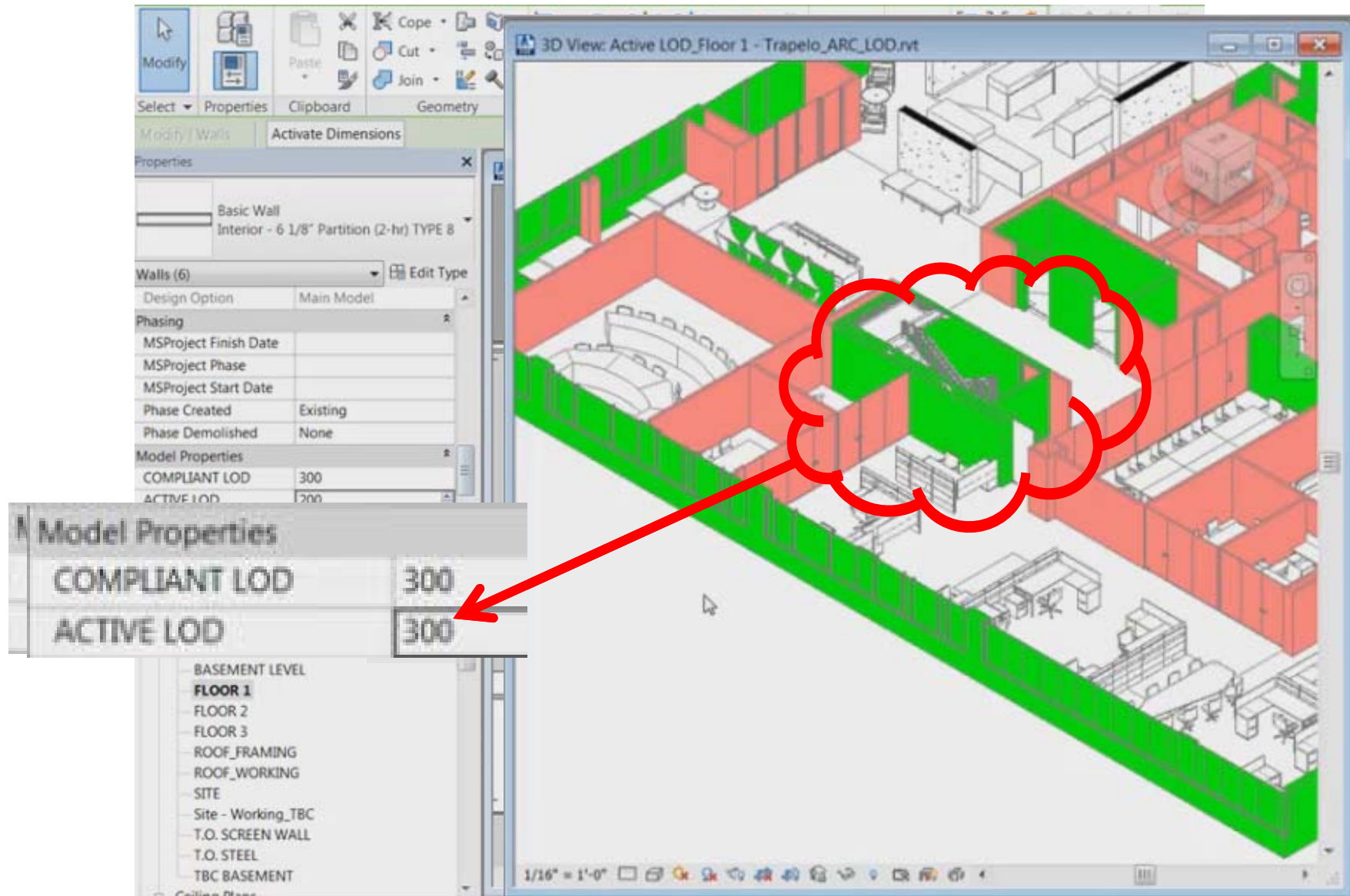
Use Case												Standard												Use Case												Use Case											
Coordination												100% CD												Coordination												As-Built											
DC Foundations												Bldg. Permit												CC Core & Shell																							
10/26/2012												2/25/2013												5/26/2013																							
LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes	LOD	ME	A	Notes
A	10	10	3	X			Perimeter Drainage																																								
A	10	10	3	10	X		Footings - Drains	300	X	E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
A	10	10	4	10	X		Perimeter Insulation - Rigid					100		A		100		A		100		A		100		A		100		H		100		H		100		H		100		H		100		H	
A	10	20	1	10	X		Piles - CIP	300		E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
A	10	20	2	10	X		Grade Beams - CIP	300		E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
A	10	30	1	10	X		SOG - Reinforced	300		E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
A	10	30	1	10	X		Reinforcing	300		E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
A	10	30	5	10	X		Piles & Bases	300		E		300		H		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
B	10	10	2	50	X		Columns - Steel	200		E		300		E		300		E		300		E		300		E		400	X	AS		300		AS		300		AS		300		AS		300		AS	
B	10	10	3	50	X		Beams - Steel	200		E		300		E		300		E		300		E		300		E		400	X	AS		300		AS		300		AS		300		AS		300		AS	
B	10	10	3	70	X		Deck - Metal	200		A/E		300		E		300		E		300		E		300		E		400	X	AS		300		AS		300		AS		300		AS		300		AS	
B	10	10	9	10	X		Steel Beam Fireproofing					100		A		100		A		100		A		100		A		100		H		100		H		100		H		100		H		100		H	
B	10	10	9	20	X		Steel Column Fireproofing					100		A		100		A		100		A		100		A		100		H		100		H		100		H		100		H		100		H	
B	10	20	1	50	X		Columns - Steel	200		E		300		E		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
B	10	20	2	30	X		Beams - Steel	200		E		300		E		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
B	10	20	2	60	X		Deck - Metal	200		A/E		300		E		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
B	10	20	8		X		Canopies	200		E		300		E		300		E		300		E		300		E		300		H		300		H		300		H		300		H		300		H	
B	10	20	9	10	X		Steel Beam Fireproofing	100		A		100		A		100		A		100		A		100		A		100		H		100		H		100		H		100		H		100		H	
B	10	20	9	20	X		Steel Column Fireproofing	100		A		100		A		100		A		100		A		100		A		100		H		100		H		100		H		100		H		100		H	
B	20	10	1	60	X		Ext. Wall - Stone Veneer w/ Stud	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	1	75	X		Ext. Wall - Metal Siding Panels	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	1	90	X		Ext. Wall - EIFS	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	1	95	X		Ext. Wall - Insulated Metal Panel System	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	2		X		Parapets	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	3		X		Exterior Louvers, Screens & Fencing	200		A		300		A		300		A		300		A		300		A		300		H		500		x		500		x		500		x		500		x	
B	20	10	6		X		Exterior Soffits	200		A		300		X		300		X		300		X		300		X		300		H		500		x		500		x		500		x		500		x	
B	20	10	7		X		Exterior Column Covers	200		A		300		X		300		X		300		X		300		X		300		H		500		x		500		x		500		x		500		x	

Package release milestones  
 • Using LOD to document what is reliable in the model when

## Design Assist – Coordination and As-Built



# In-Model Workflow



# In-Model Workflow

## Advantages

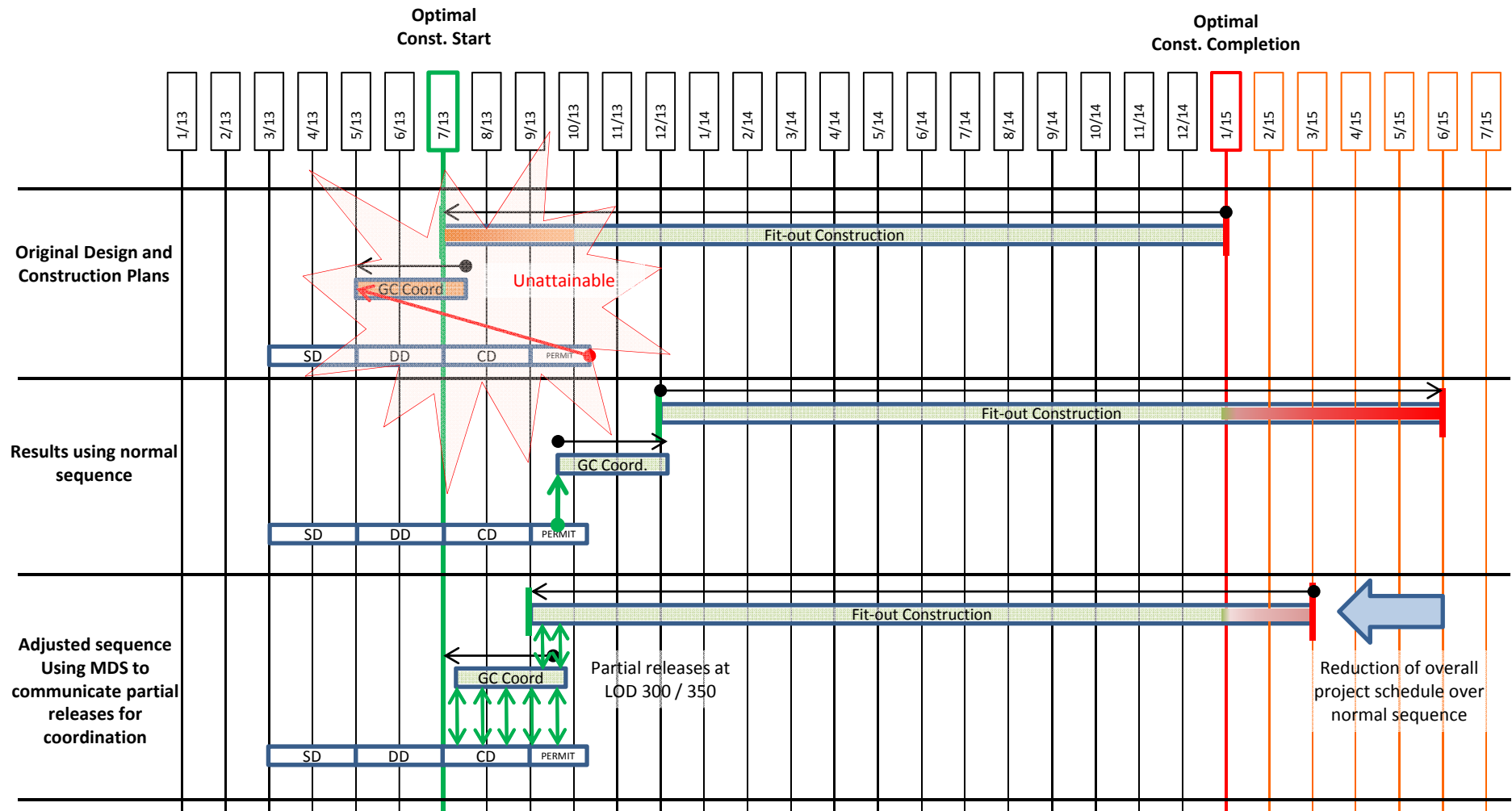
- QA/QC
- Reduce over-modeling & parallel modeling
- Model Completeness
- Clearly identifies design liability
- Communication



Image courtesy of: Abel Cornwell - Autodesk



# Schedules



# Take-Aways

- Minimal impact on workflow
- Value & ROI for your firm & the owner
- Improve your project communication

## Call to Action

- Try the AIA G202 & E203 on a project
- Document your firms LOD for delivery milestones and use it for internal QA/QC
- Introduce a client to the process and the benefits