ES10337
COBie Implementation Case Study: Broward County Judicial Center

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ES10337 Class Summary

COBie Implementation Case Study: Broward County Judicial Center

A journey into the real world of COBie delivery.

The Broward County Judicial Center in Ft. Lauderdale, Florida, is a successful example of a commercial BIM remodeling project, delivering COBie both during the Design Phase at LOD 300, and at the end of Construction for LOD 500 as-builts.

You will learn about what were the challenges, solutions and opportunities, and takeaways for your next project.

Key Learning Objectives

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

- Take a journey into the real world of COBie delivery
- Learn about a successful example of a BIM remodeling project
- Compare COBie delivery for LOD 300 and LOD 500
- Understand challenges, solutions and opportunities

Back to the Future

Sometimes you may want to take two steps forward

Project Goals

A goal without a plan is just a wish

Project Goals

Setting a goal is the first step in turning the invisible into the visible

CHALLENGES:

Owner-Defined Goals

1. Architect will work with the Owner to confirm selection of maintainable assets to be tracked and matured within the project.

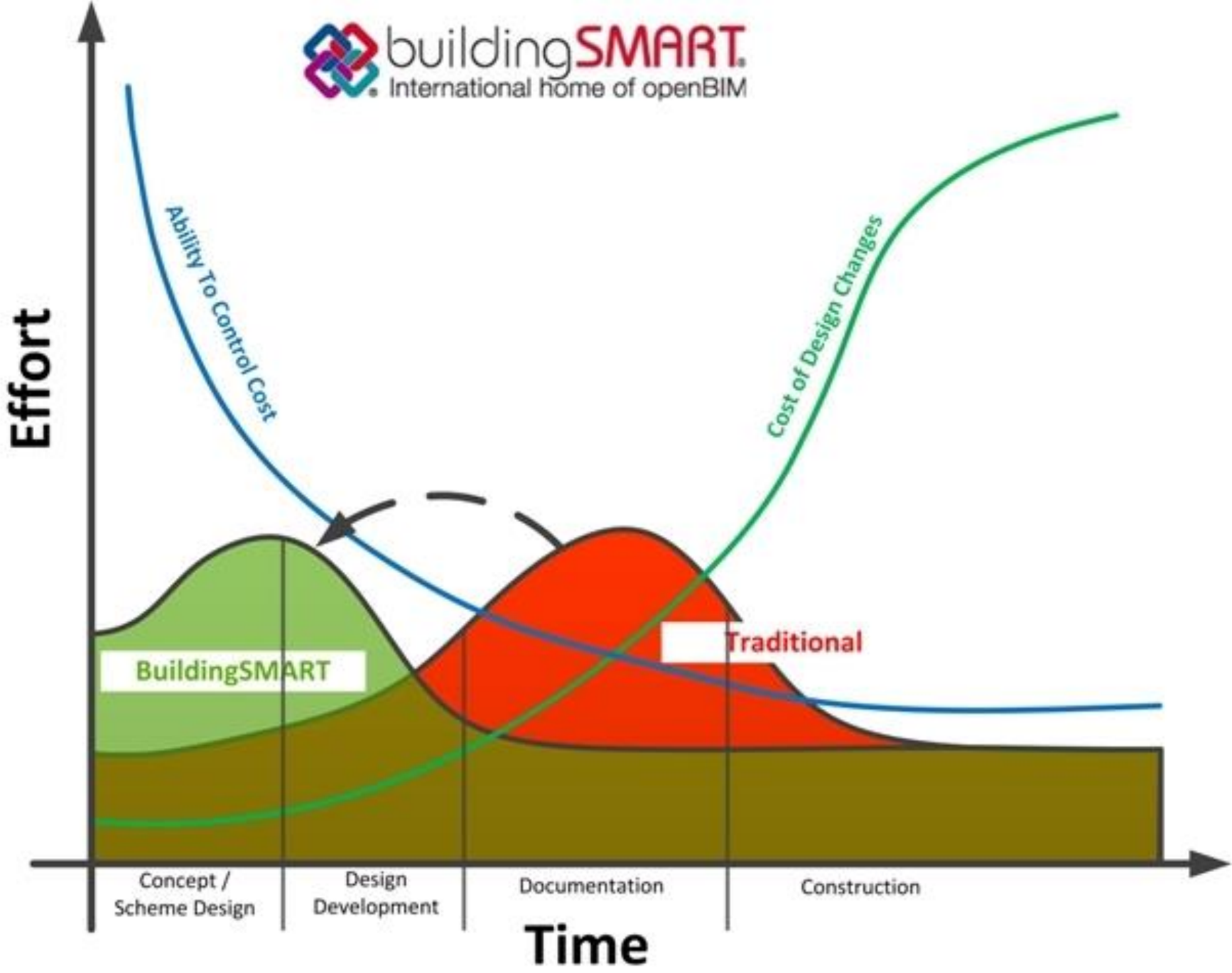
2. Architect to verify that all components anticipated in the model exist and have valid naming.

3. Architect to verify that all components have a proper OmniClass Number/Title.

4. Develop the Data Requirement Schedule (mapping) to reverse engineer the fields required for FM deliverable by adding columns describing the COBie tabs, model component authors, data sources, and Revit parameters.

PLAN AHEAD

MacLeamy Curve . BIM Methodology

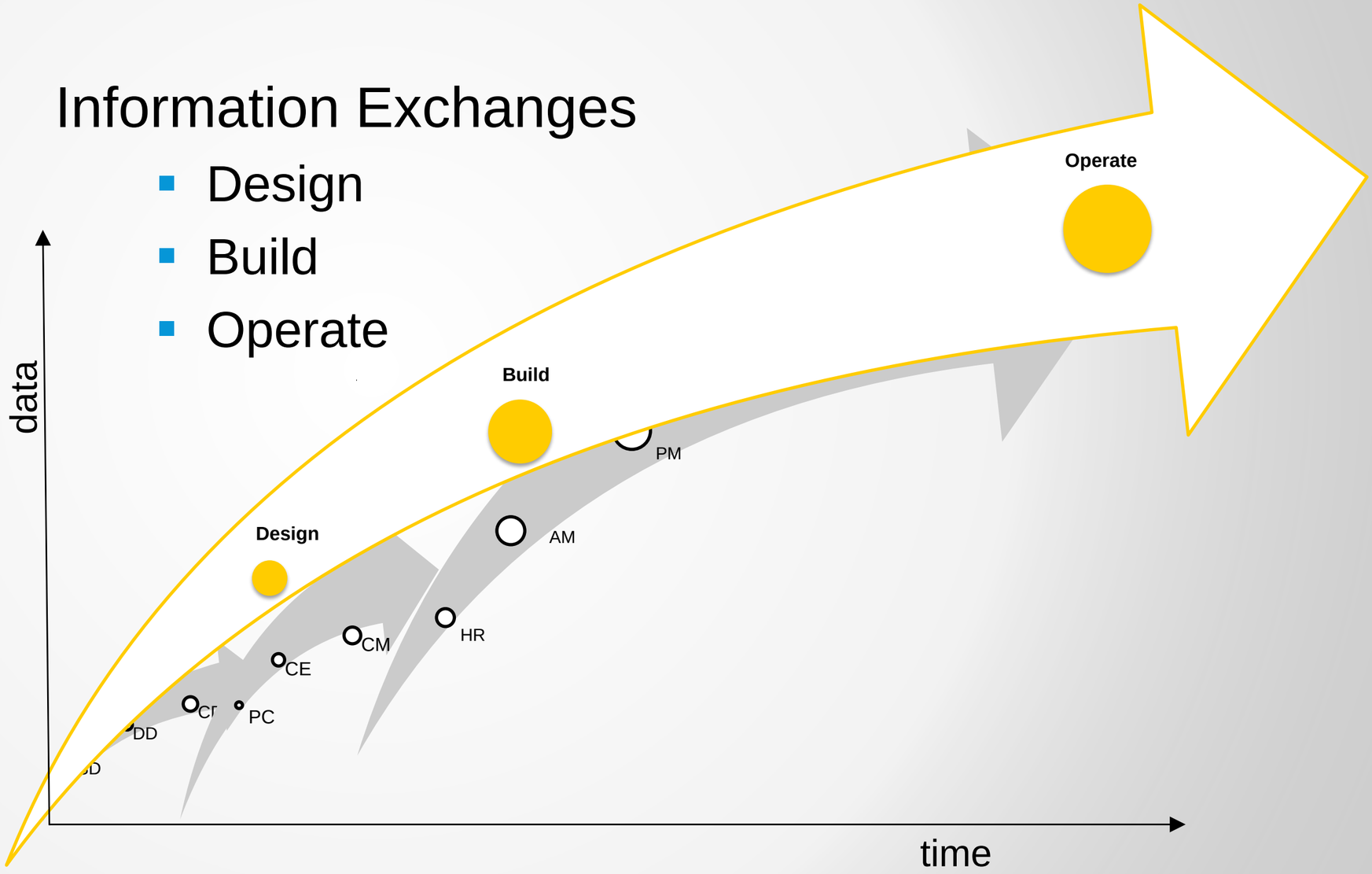


Information Exchange

Design . Build . Operate

Information Exchanges

- Design
- Build
- Operate



Facilities

Composed of . Served By . Described By . Operated By . Constrained By

Level of Development (LOD)

Input . Quantity . Accuracy . Output . Quality . Reliability

LOD

- Input: Quantity & Accuracy of Information
- Output: Quality & Reliability of information

100 Estimate it

200 Specify it

300 Buy it

400 Build it . install it

500 Commission it . Operate it

BIM USES
Maintainable Items . Assets

BIM Uses

- Maintainable items
- Assets

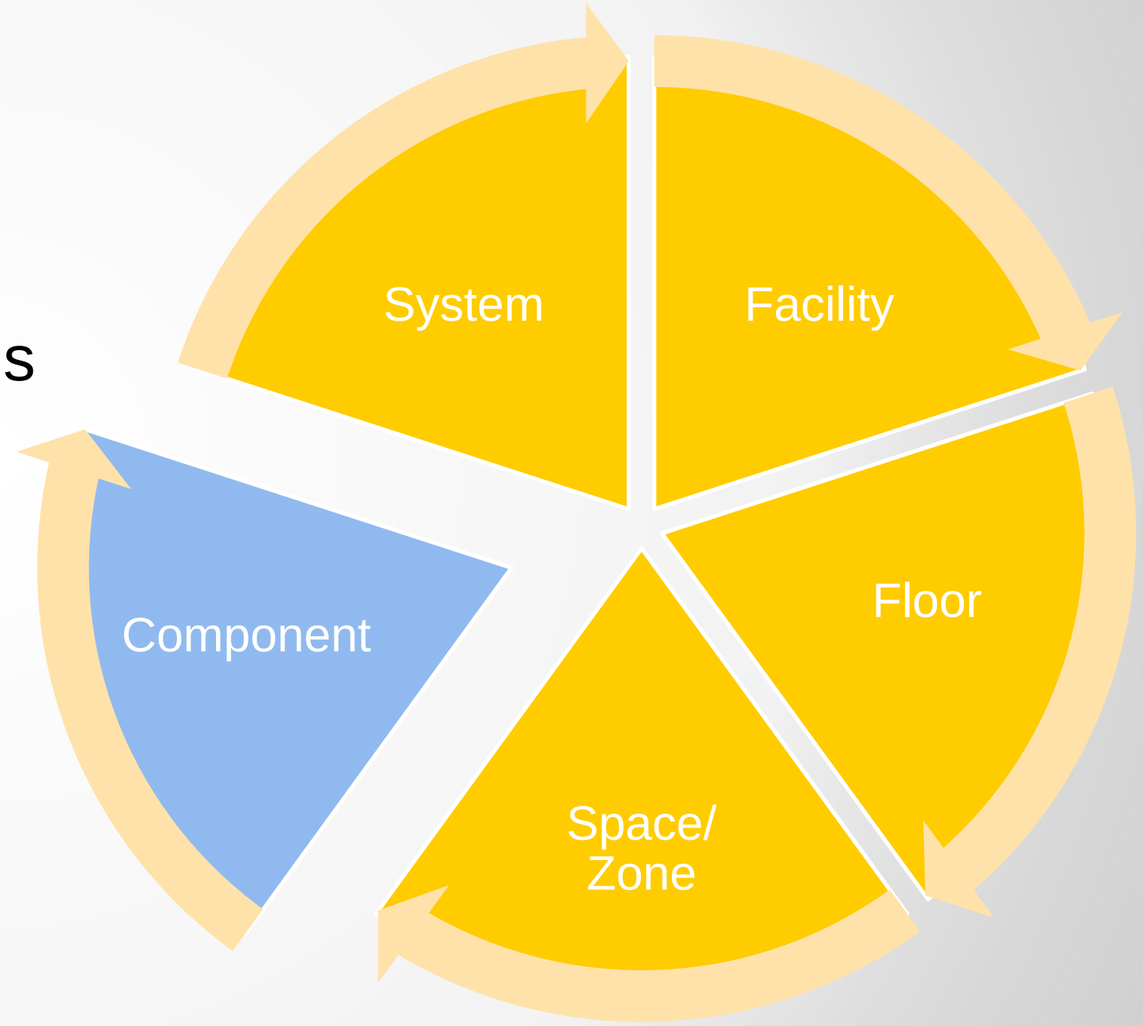
Building (Preventative) Maintenance Scheduling
Building System Analysis
Asset Management
Space Management and Tracking
Disaster Planning
Record Modeling
Site Utilization Planning
Construction System Design
Digital Fabrication
3D Control and Planning
3D Coordination
Design Authoring
Engineering Analysis
Energy Analysis
Structural Analysis
Sustainability (LEED) Evaluation
Code Validation
Programming
Site Analysis
Design Reviews
Phase Planning (4D Modeling)
Cost Estimation
Existing Conditions Modeling

BIM USES

Component . Maintainable Items . Assets

COMPONENT

- Maintainable items
- Assets



COBie STRATEGY

Begin With The End in Mind

- Define the BIM Goals for the Project
- Describe the BIM Uses
- Begin with the End in Mind

Applied Software

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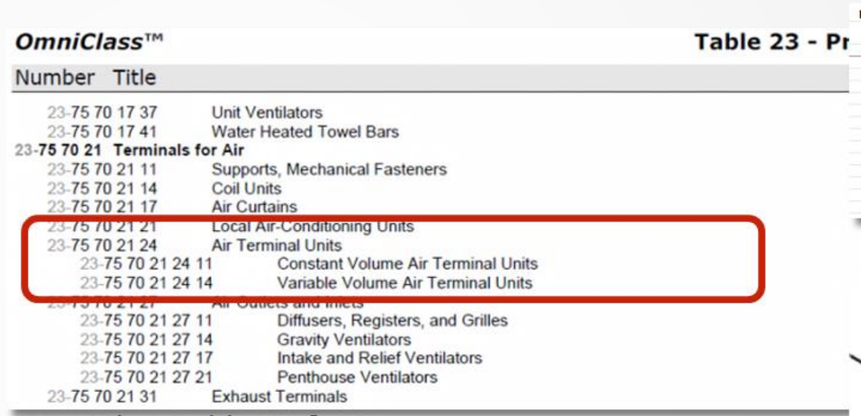
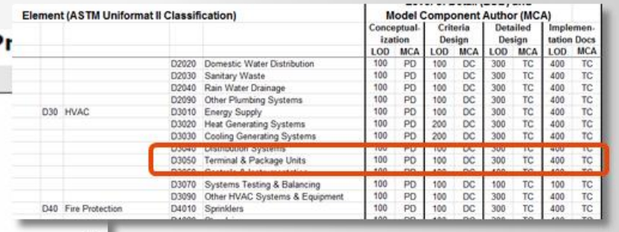
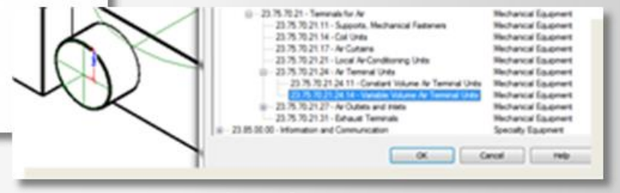


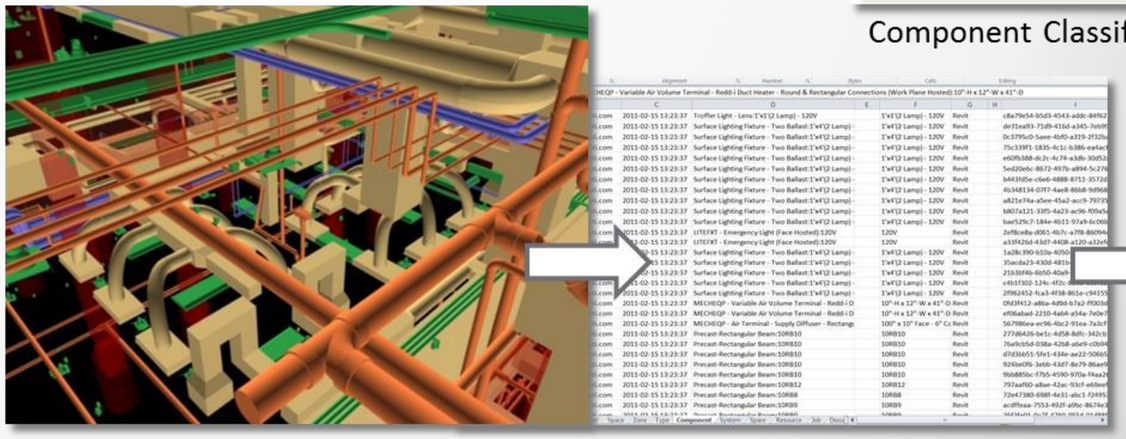
OmniClass Table 13 & 23



Level of Development



Component Classification



FMS

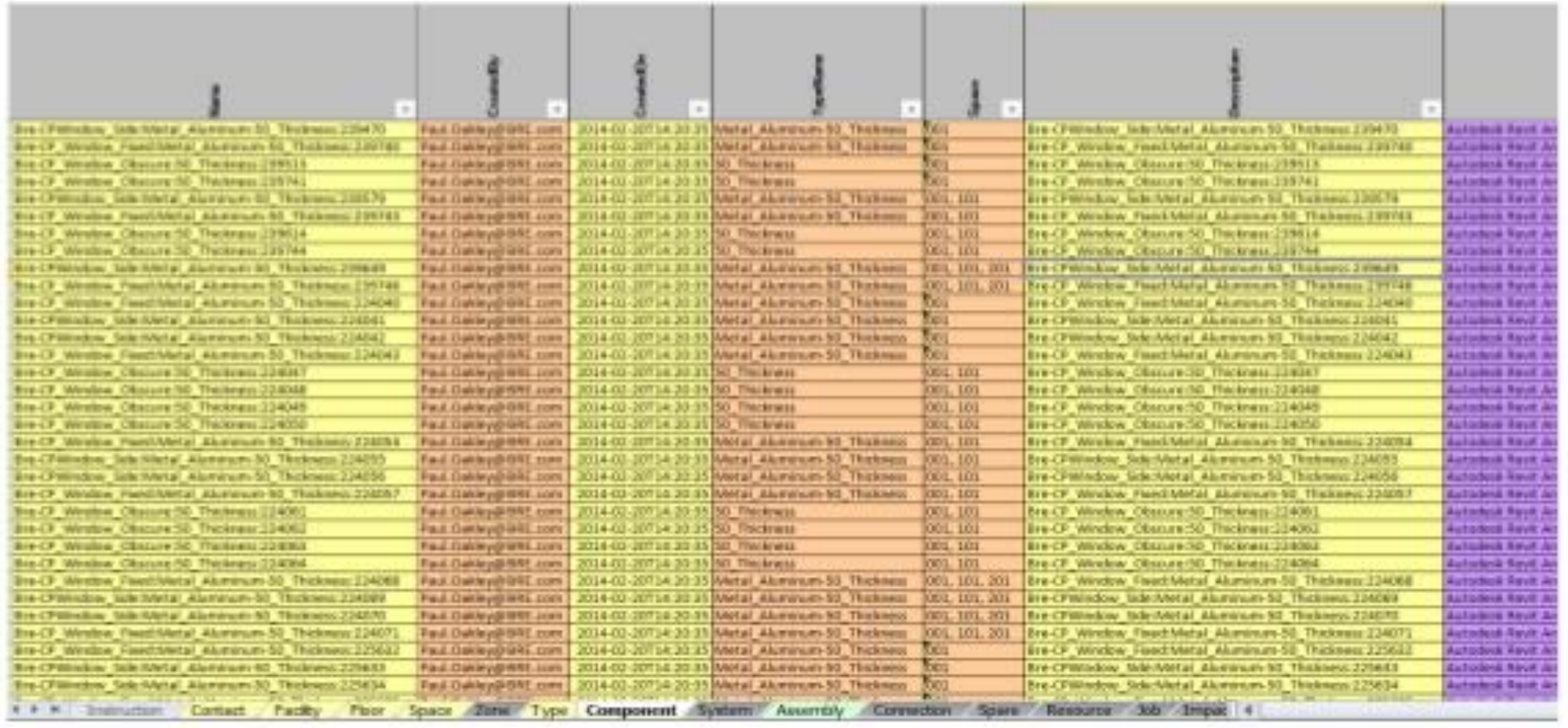
12 Things
You Should Know About COBie

What is COBie?

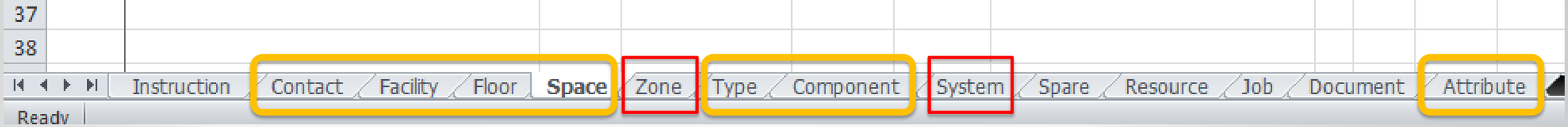
Bill East YouTube
- COBie4Designers
- COBie4Owners
- COBie4Contractors

"COBie is the data information exchange of all managed and maintained assets in a building"

CONSTRUCTION OPERATIONS BUILDING information exchange



12 Things
You Should Know About COBie



COBie Facility Tab

1	ProjectName	SiteName	LinearUnits	AreaUnits	VolumeUnits	CurrencyUnits	AreaMeasurement	ExtSystem	ExtProjectObject	ExtProjectIdentifier	ExtSiteObject	ExtSiteIdentifier	ExtFacilityObject	ExtFacilityIdentifier	Description	ProjectDescription	SiteDescription	Phase
2																		

COBie Floor Tab

1	Name	CreatedBy	CreatedOn	Category	ExtSystem	ExtObject	ExtIdentifier	Description	Elevation	Height
2										
3										

COBie Space Tab

1	Name	CreatedBy	CreatedOn	Category	FloorName	Description	ExtSystem	ExtObject	ExtIdentifier	RoomTag	UsableHeight	GrossArea	NetArea
2													
3													

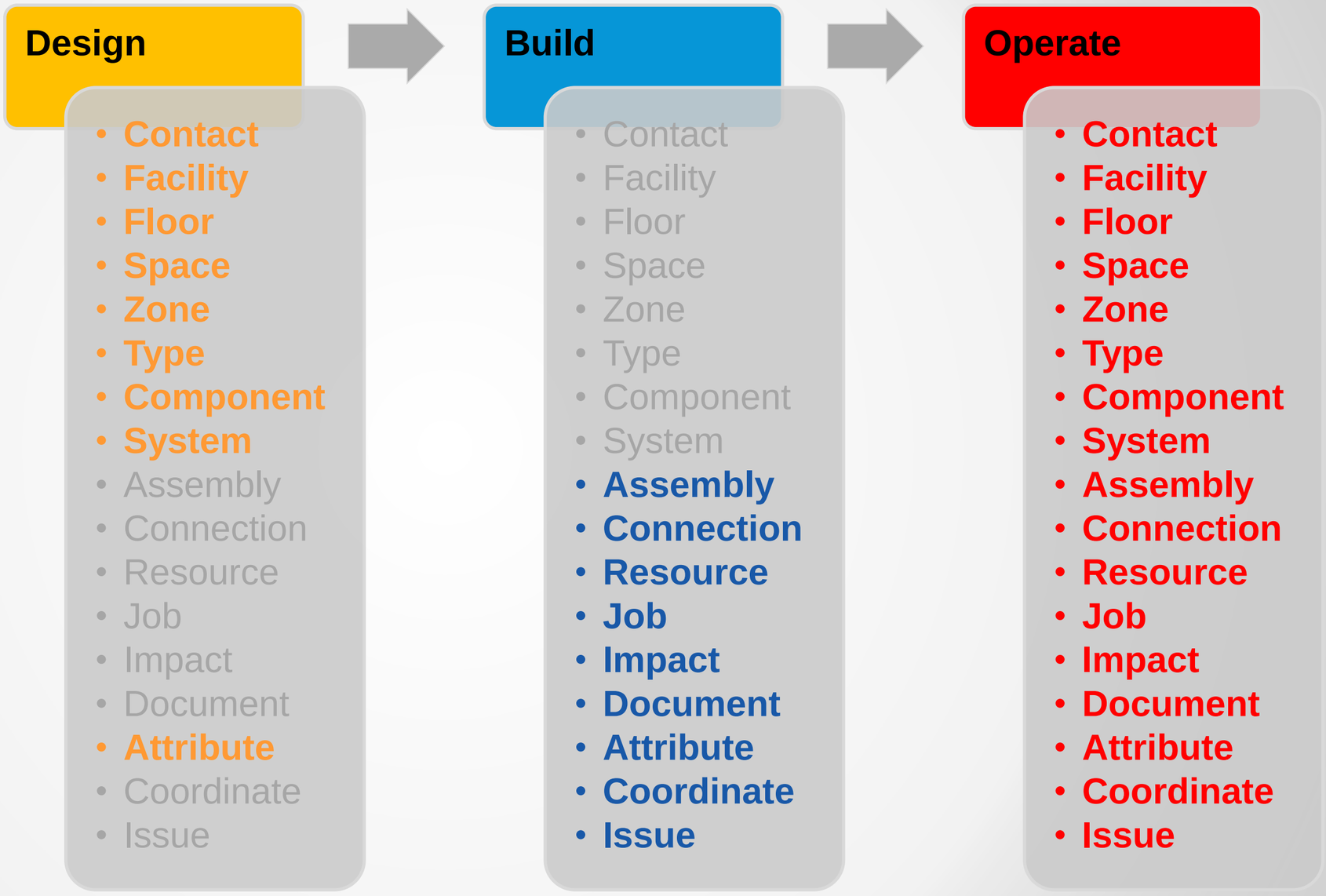
COBie Type Tab

1	Name	CreatedBy	CreatedOn	TypeName	SpaceNames	Description	ExtSystem	ExtObject	ExtIdentifier	SerialNumber	InstallationDate	WarrantyStartDate	TagNumber	BarCode	AssetIdentifier
2															
3															
4															
5															

COBie Component Tab

1	Name	CreatedBy	CreatedOn	TypeName	SpaceNames	Description	ExtSystem	ExtObject	ExtIdentifier	SerialNumber	InstallationDate	WarrantyStartDate	TagNumber	BarCode	AssetIdentifier
2															
3															
4															
5															

12 Things
You Should Know About COBie

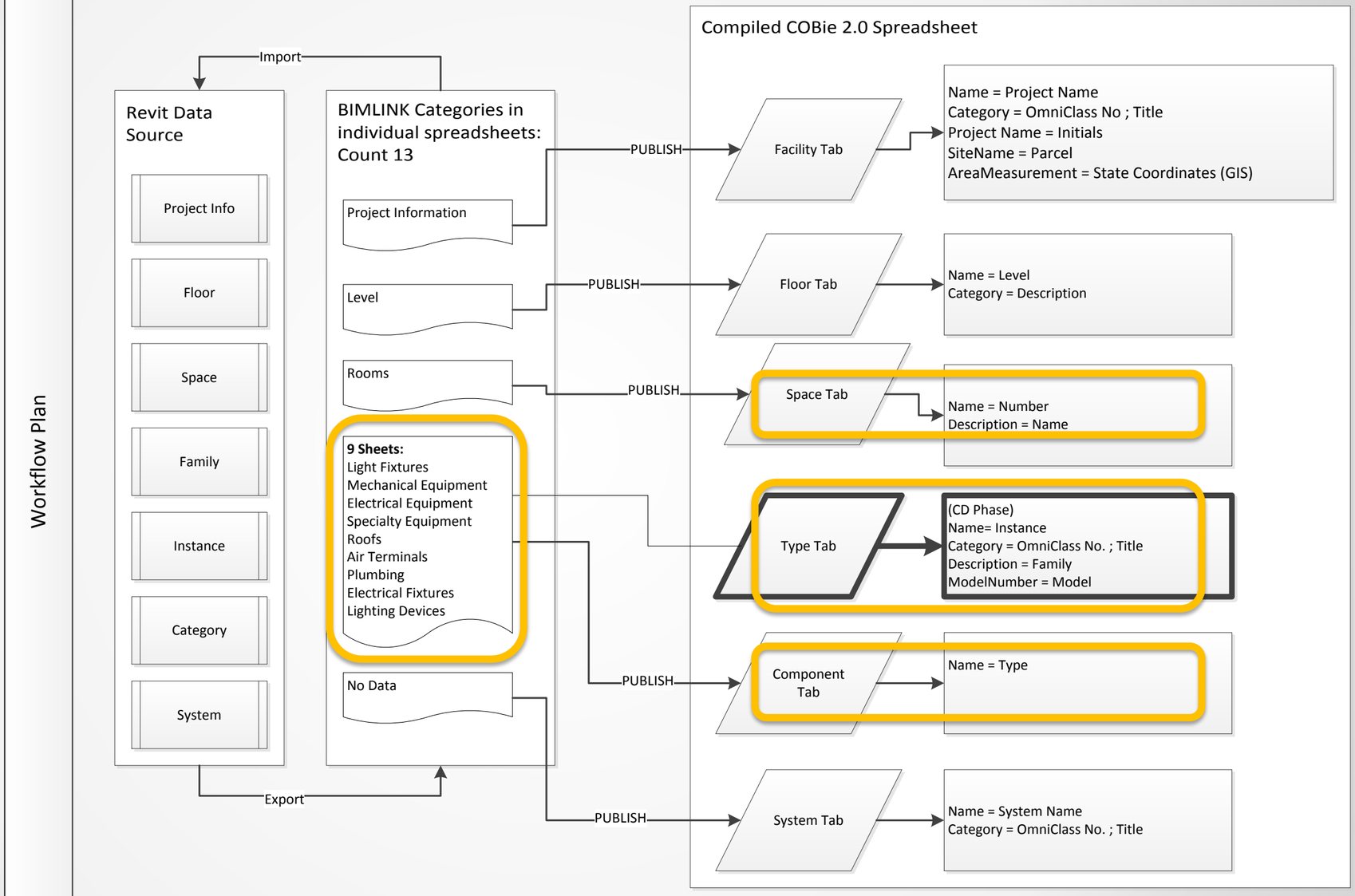


12 Things You Should Know About COBie

BIM to COBie Planning Workflow

Schematic Design Phase / Construction Documents Phase

Workflow Plan



12 Things
You Should Know About COBie

BIM-COBie Mapping

LOD 300 MEP defined

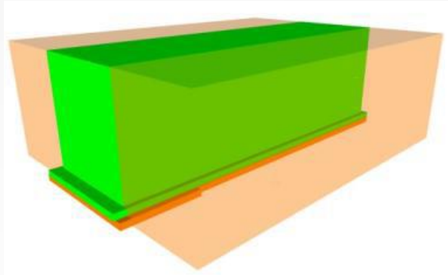
Information Exchange Strategy

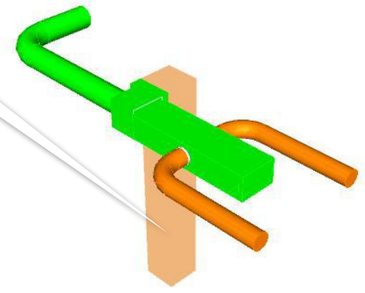
BIM Component Checklist

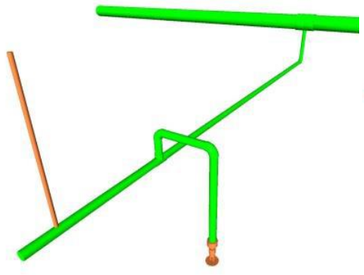
BCJC BIMLink-COBie mapping

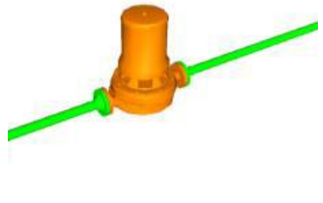
Revit		BIMLink		COBie		Phase			Model Component Author (MCA)				
Model	Category	Exported Spreadsheets	BIMLink Column Name	COBie Column Name	COBie Tab	SD	CD	CA	A	E	CM	Cx	OWNER
ARCH	Project Info	N/A	***	Name	Facility	X			A				
			***	CreatedBy		X			A				
			***	CreatedOn		X			A				
			***	Category		X			A				
			***	ProjectName		X			A				
			***	SiteName		X			A				
			***	LinearUnits		X			A				
			***	AreaUnits		X			A				
			***	VolumeUnits		X			A				
			***	CurrencyUnits							CM		
			***	AreaMeasurement		X			A		CM		
			***	ExtSystem									OWNER
			***	ExtObject									OWNER
			***	ExtIdentifier									OWNER
			***	ExtSiteObject									OWNER
			***	ExtSiteIdentifier									OWNER
			***	ExtFacilityObject									OWNER
			***	ExtFacilityIdentifier									OWNER
			***	Description							CM		
			***	ProjectDescription							CM		
			***	SiteDescription							CM		
			***	Phase							CM		
ARCH	Levels	Levels	Name	Name	Floor	X			A				
			COBieCreatedBy	CreatedBy		X			A				
			COBieCreatedOn	CreatedOn		X			A				
			COBieCategory	Category		X			A				
			RevitExtSystem	ExtSystem							CM		
			RevitExtObject	ExtObject							CM		
			Unique Id	ExtIdentifier							CM		
			COBieDescription	Description							CM		
			Elevation	Elevation		X			A				
			***	Height							CM		
ARCH	Rooms	Rooms	Number	Name	Space	X			A				
			COBieCreatedBy	CreatedBy		X			A				
			COBieCreatedOn	CreatedOn		X			A				
			OMNIClass13Value	Category		X			A				
			Level:Name	FloorName		X			A				
			Name	Description		X			A				
			COBieCategory	FloorName		X			A				
			COBieRoomTag	Description							CM		
			***	ExtSystem							CM		
			***	ExtObject							CM		
			Unique Id	ExtIdentifier							CM		
			Comments	RoomTag			X		A				
			Limit Offset	UsableHeight			X		A				
			***	GrossArea							CM		
			Area	NetArea			X		A		CM		
ARCH	Roofs	Roofs	Family Name	Name	Componen	X			A				

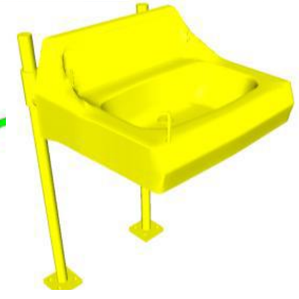
X	23-33 5 15		Heating and Ventilating Units			Type of AHU, without cooling
X	23-33 27 00	Air Humidity Control Equipment				Equipment used in the control of humidity.
?	23-33 31 00	Air Circulators				oducts used for the movement of air circulator or circuit.
?	23-33 31 19		Fans			
X	23-33 33 00	HVAC Fan Coil Units				s consisting of a heating or coil and a fan and controls the ture of air in a space.
X	23-33 37 00	Refrigerant Condensing Units				densers in a refrigeration ere the refrigerant is discharges its heat to the environm
?	23-33 39 00	Air Conditioning Equipment				Equipment for air conditioning purposes.
X	23-33 41 00	HVAC Air Terminals				a branch duct transferred or itioned space.
X	23-33 41 17		Terminal Air Units			
X	23-33 41 17 13			Variable Air Volume Terminal Units		









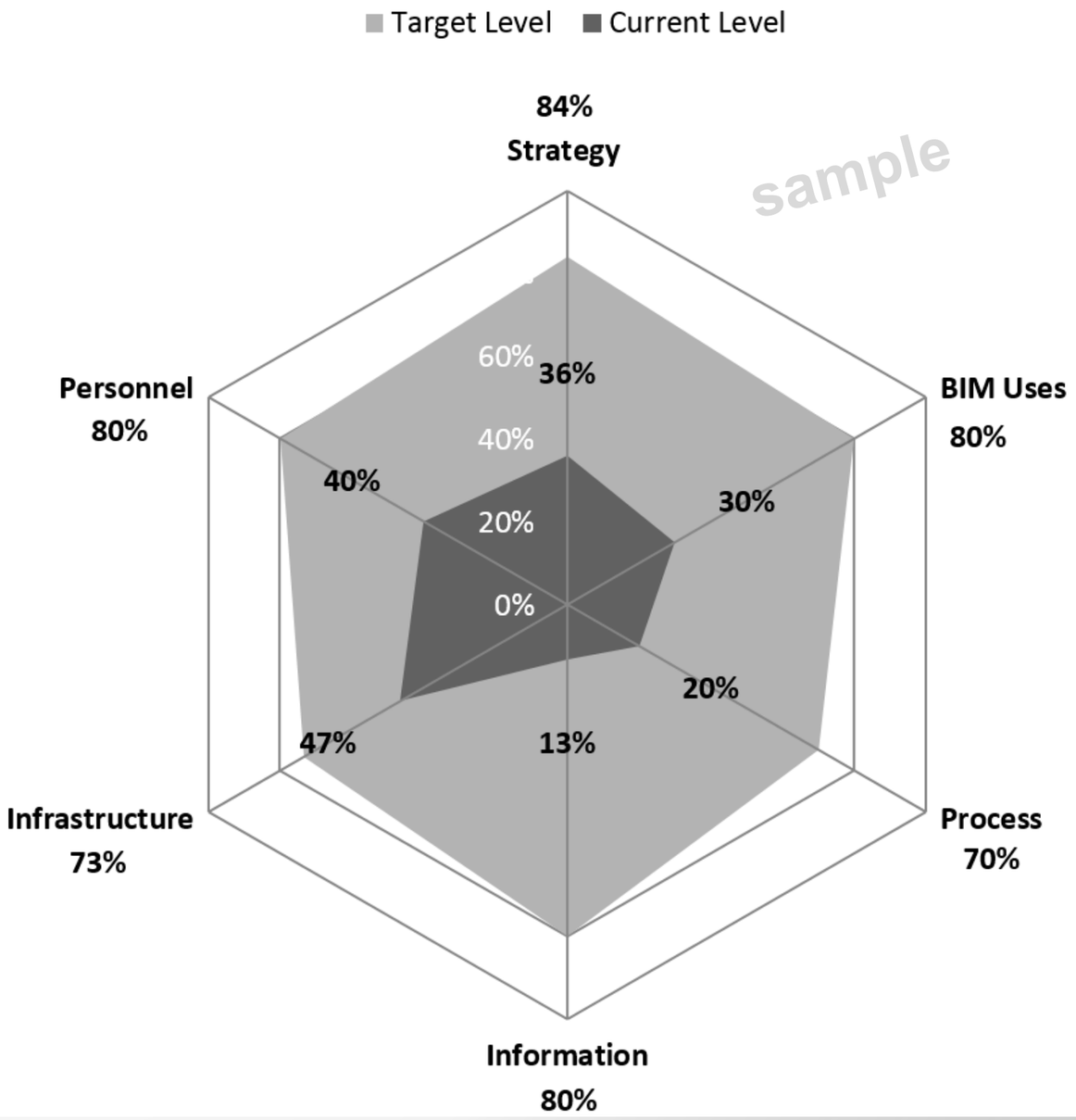


Information Exchange

Complete BIM Component Checklist → **Set Revit Categories to required COBie parameters** → **Set BIMLink Definitions for each Family Type** → **Export spreadsheet stakeholders** → **Import stakeholder spreadsheets to BIMLink** → **Compile COBie Sheets**

12 Things
You Should Know About COBie

BIM Planning Element	Current Level	Target Level	Total Possible
Strategy	**9**	**21**	**25**
Organizational Mission and Goals	2	4	5
BIM Vision and Objectives	2	4	5
Management Support	2	4	5
BIM Champion	1	5	5
BIM Planning Committee	2	4	5
BIM Uses	**3**	**8**	**10**
Project Uses	2	5	5
Operational Uses	1	3	5
Process	**2**	**7**	**10**
Project Processes	1	4	5
Organizational Processes	1	3	5
Information	**2**	**12**	**15**
Model Element Breakdown (MEB)	1	4	5
Level of Development (LOD)	1	4	5
Facility Data	0	4	5
Infrastructure	**7**	**11**	**15**
Software	4	5	5
Hardware	2	3	5
Physical Spaces	1	3	5
Personnel	**10**	**20**	**25**
Roles and Responsibilities	2	4	5
Organizational Hierarchy	2	4	5
Education	2	4	5
Training	2	4	5
Change Readiness	2	4	5
Totals	**33**	**79**	**100**



Broward County BCJC

Broward County Judicial Center

Applied Software

Solutions

BIM Project Execution Plan (PxP)

SECTION B: PROJECT INFORMATION

1) PROJECT OWNER : BROWARD COUNTY
2) PROJECT NAME : BROWARD COUNTY JUDICIAL COMPLEX MIDRISE FULL BUILDING RENOVATION
3) PROJECT ADDRESS : 540 S.E. 3RD AVENUE, FORT LAUDERDALE, FL 33301
4) CONTRACT TYPE : LUMP SUM
5) BRIEF PROJECT DESCRIPTION: FULL INTERIOR RENOVATION & CONSTRUCTION FIT OUT (ALL FOUR FLOORS) OF THE EXISTING MIDRISE BUILDING
6) PROJECT NUMBER : 060-2013-001(SA – Project Number) & RLI M1102907R1 (BC Number)

SECTION C: KEY PROJECT CONTACTS

ORGANIZATION	CONTACT NAME	ROLE	EMAIL ID	PHONE #
• BC	Rob Dennis	Project Manager	rodennis@broward.org	954-357-647
BC	Brian Kraus	Facilities Maint.	bkraus@broward.org	954-357-538
SA	Chirag Thaker	President	chirag.thaker@rdaep.com	954-537-913
•SA	Albino Rios	Project Manager	albino.rios@rdaep.com	954-537-913
SA	Hernan Pagan	BIM Coordinator	hernan.pagan@rdaep.com	954-537-913
S&F	Sri Sritharan	Principal	sri@sfengineers.com	954-938-002
•S&F	Donata Williams	Project Manager	donata@sfengineers.com	954-938-002
S&F	Laura Sotomayor	BIM Coordinator	laura@sfengineers.com	954-938-002
FE	Keith Mote	Project Engineer	kmote@flynnengineering.com	954-522-100
AA	Brian Kitchens	Project Manager	bkitchens@archall.net	954-764-885
SG	Jonathan Burges	LEED Project Manager	jonathan@thespinnakergroupinc.com	754-800-310
SG	Jessica Stanley	LEED Project Manager	jessica@thespinnakergroupinc.com	954-366-827
DG	George San Juan	Principal	gsanjuan@deltag.net	954-527-111
•DG	Steeve Robitaille	HVAC / MEP Project Manager	steeve@deltag.net	954-527-111
DG	Jorge Bahamonde	Fire Protection	JorgeB@deltag.net	954-527-111
DG	Igor Loncarevic	Plumbing	igor@deltag.net	954-527-111
DG	Jermaine Williams	Electrical	jermaine@deltag.net	954-527-111
ASTI	Rabi Sidawi	COBie Consultant	rsidawi@asti.com	404-564-185
PC / GC	Gary Pirtle	Vice President	gary@pirtleconstruction.com	954-343-605
•PC / GC	Jeff Miles	Director of ops.	jeff@pirtleconstruction.com	954-343-546
PC	Elaine Choe	BIM Coordinator	Elaine@pirtleconstruction.com	954-343-605

BIM EXECUTION PLAN

VERSION 3.0 FOR

BROWARD COUNTY JUDICIAL COMPLEX MIDRISE FULL BUILDING RENOVATION

BROWARD COUNTY FLORIDA

SINGER ARCHITECTS
A RUSSELL AND DAWSON COMPANY
915 MIDDLE RIVER DRIVE, SUITE 404
FORT LAUDERDALE, FLORIDA 33304
TEL. 954-537-9136

PIRTLE

DELTA G CONSULTING ENGINEERS, INC.

S&F Engineers, Inc.
2925 W. Cypress Creek Rd., ste. 200
Fort Lauderdale, Florida 33309
p:954.938.0020 f:954.938.0468
e:sfe@sfengineers.com C.A.# 8852
www.sfengineers.com

CONTENT:

Solutions
BIM Project Execution Plan (PxP)

What Assets to Track?

1. Project Info
2. Levels
3. Rooms
4. Light Fixtures
5. Mechanical Equipment
6. Electrical Equipment
7. Specialty Equipment
8. Floors
9. Roofs
10. Electrical Fixtures
11. Lighting Devices
12. Plumbing Fixtures

BROWARD COUNTY JUDICIAL COMPLEX MIDRISE FULL BUILDING RENOVATION

ORGANIZATION DETAILSa

SA – Singer Architects (Architecture) S&F – S & F Engineering (Structure) PC - Pirtle Construction

FE – Flynn Engineering (Civil) SG – Spinnaker Group (LEED Consulting)

DG – Delta G Consulting Engineers (MEP) ASTI – Applied Software (COBIE Consultant)

SECTION D: PROJECT GOALS / BIM USES

ORGANIZATION	USES
SA	Design Authoring, Design Coordination, Drawing Production, Clash Detection & COBie implementation Asset Management, Design Reviews, Space Management & Tracking, Record Modeling, Code Validation, Programming, Design Reviews, Existing Conditions Modeling.
S&F	Design Authoring, Code Validation Design Reviews, Design Coordination, Drawing Production & Clash Detection, Engineering Analysis, Structural Analysis
FE	Drawing Production, Design Reviews
DG	Design Authoring, Design Coordination, Drawing Production, Clash Detection (MEP specific) & COBie implementation, Space Management and Tracking, Engineering Analysis, Code Validation, Programming, Design Reviews, Existing Conditions Modeling.
PC	To be determined by Construction team.

Clash Detection Schedule

Internal Periodic Clash Detection sessions to be held within each phase as needed for coordination between all teams:

To occur as detailed below:

- 100% Schematic Design & Design Development Phase
- 50% Construction Documentation Phase
- Before 100% Construction Documents are issued
- 100% CD
- Bidding/ Permitting

Clash Detection Meeting

- Typically, meetings will be internal coordination sessions between the A/E design & project team.
- Construction team's (GC) attendance, up to permitting phase, is welcome but not mandatory.
- If the County's involvement is needed to resolve any issues, a notification will be provided to the owner for follow up meetings or input.
- Each discipline must submit a clean *.RVT file minimum 3 days before the meeting.

SECTION G: BIM AND FACILITY DATA (COBie) REQUIREMENTS

Refer to attachment:
1. "BCJC BIM Component COBie Checklist – Omniclass Table 23".
2. "BCJC COBie Model Component Author" (Attachment A) for a phase by phase description of COBie items and the responsibilities of each team member.

SECTION H: COLLABORATION PROCESS

Meeting Procedure

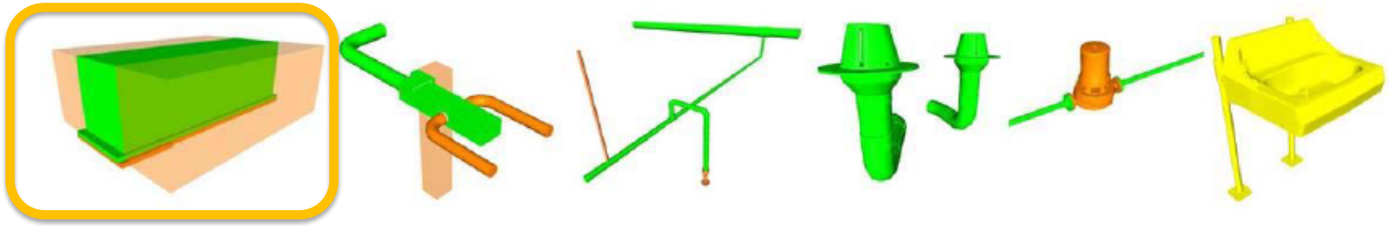
MEETING TYPE	PROJECT STAGE	PARTICIPANT	FREQUENCY	LOCATION
KICK-OFF	Notice to Proceed	Entire Project Team	Once	COUNTY GOV.CNTR
DESIGN COORDINATION	Pre Design/DD/CD	Team Leaders	Weekly	Conference Call
BIM MEETINGS	Pre Design/DD/CD	BIM Managers	Weekly / As required	Conference Call

Note - BIM meetings mainly involve the participation of BIM Managers & Project Managers for coordination. However, the County & other interested parties may join if requested and a physical meeting can be scheduled accordingly and if required.

Model Delivery Schedule (Revit and CAD)

INFORMATION EXCHANGE	DESIGN TEAM	FREQUENCY	DUE DATE	NATIVE FILE TYPE
DESIGN AUTHORING	Architect	Weekly	Friday (By 5 PM)	.RVT & PDF
	Structural Engineer	As Requested & Based on Development		.RVT & PDF
	MEP-FP Engineer	Weekly	Friday (By 5 PM)	.RVT & PDF
	Civil Engineer	As Requested & Based on Development		.DWG
	Landscape Architect	As Requested & Based on Development		.DWG

BROWARD COUNTY JUDICIAL COMPLEX MIDRISE FULL BUILDING RENOVATION



LOD Definitions

Based on Government Services Administration (GSA) Standards

LOD 100

Overall building massing indicative area, height, volume, location, and orientation may be modeled in three dimensions or represented by other data.

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.

LOD 200

Model elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. Non-geometric information may also be attached to Model Elements. Partitions and furniture models shall be included in this phase.

LOD 300

Model Elements are modeled as specific assemblies accurate in terms of quantity, size, shape, location, and orientation. Non-geometric information may also be attached to Model Elements and equivalent to 100% construction documents.

LOD 300 (MEP)

Modeled as design-specified size, shape, spacing, and location of fixtures, equipment, pipe, valves, fittings, and insulation for risers, mains, and branches; approximate allowances for spacing and clearances required for all specified anchors, supports, vibration and seismic control that are utilized in the layout of equipment; actual access/code clearance requirements modeled and equivalent to 100% construction documents.

Facilities Maintenance Coordination	Broward County	Revit, AiM, AssetWorks	2014-2015	
COBie Implementation	Broward County	AiM, AssetWorks	2015	
Construction Management/ COBie	GC	Revit	2015	
3D Coordination / Clash Detection	ALL	Navisworks Manage	2014-2015	
COBIE Export	ALL	COBie Extension Revit add-in	2014-2015	
Construction Administration (RFIs etc)	ALL	BIM 360 Glue & Field	2015	

All Revit models will be converted to Revit 2015 at the end of permitting phase.

SECTION K: MODEL STRUCTURE

FILE NAMING CONVENTION	
ProjectNumber_Discipline_Central_Version.RVT	(Should a file be upgraded to another version of Revit, the original name will remain as is, in order to preserve links & file references.)
Architecture Model	0602013001_ARCH_CENTRAL_2014.RVT
Furniture Model	0602013001_FURN_CENTRAL_2014.RVT
Structure Model	0602013001_STRUC_CENTRAL_2014.RVT
Mechanical Model (HVAC)	0602013001_MECH_CENTRAL_2014.RVT
Electrical Model	0602013001_ELEC_CENTRAL_2014.RVT
Plumbing Model	0602013001_PLUM_CENTRAL_2014.RVT
Fire Protection Model	0602013001_FIRE PROTECTION_CENTRAL_2014.RVT
LOD 350/400/500 models	TBD BY GC

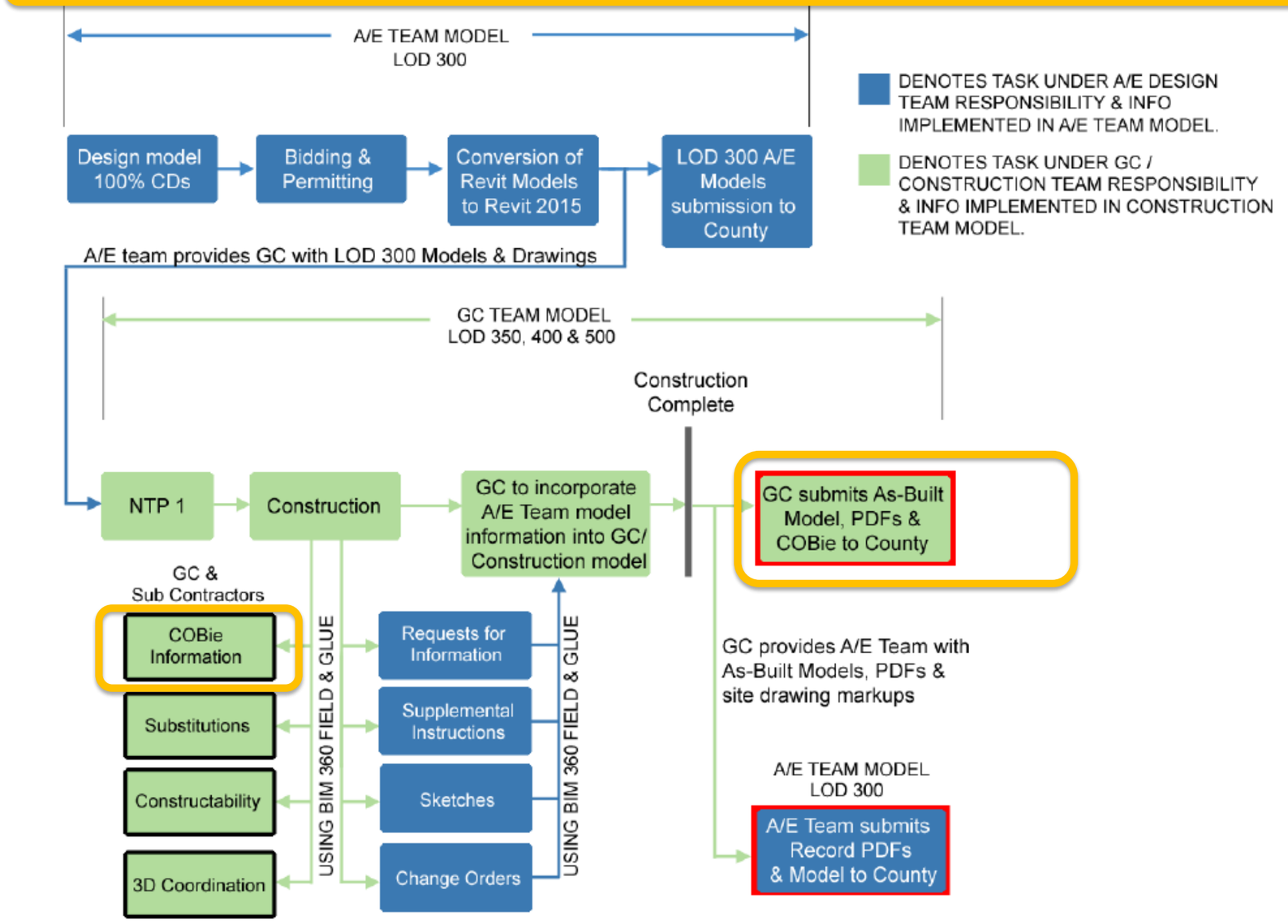
Project Units

The model unit system is Imperial

Tolerance in Revit will be set to 1/16” and the dimension styles will round to the appropriate increment depending on the scale.

BROWARD COUNTY JUDICIAL COMPLEX MIDRISE FULL BUILDING RENOVATION

SECTION M: REVIT MODEL OWNERSHIP & COBIE RESPONSIBILITY SEQUENCE/ STRATEGY



Solutions
BIM Project Execution Plan (PxP)

Construction Phase Guidelines

1. Model Sharing
2. LOD can vary by element
3. Mandate BIM 360 Glue and BIM 360 Field
4. Prequalify Subcontractors based on BIM Proficiency
5. Supplemental Instructions shall be incorporated into the BIM models
6. Coordination meetings
7. COBie delivery
8. Record vs. As-built models

4. Latest Revit models shall be provided to the GC after permits are approved and at issuance of NTP1 to GC, for development of the LOD 350/400/500 models (shop drawings) as defined by BIM forum and as required by County.
5. Not all items may need to be developed to LOD 350/400. GC shall coordinate with County and develop MEP-FP, Architectural & Structural items to LOD level required for each discipline as directed by County.
6. Once construction begins, the GC shall be responsible for all LOD 350/400/500 Revit model developments and any changes to COBie data based on field verification, constructability, final product selection & installation.
7. The GC shall use BIM 360 Field & Glue for the gathering of COBie field data from Construction Manager/ Superintendent and all sub-contractors in order to integrate all information into the BIM models throughout construction.
8. GC shall review subcontractors BIM proficiency and qualifications.
9. For instances where drawing modifications are required from A/E team to provide sketches, Supplemental Instructions, etc. This information shall be implemented into the Revit models via use of BIM 360 Field & Glue Collaboration. The A/E team will also submit PDFs of all changes to the GC.
10. Construction team (GC) shall be responsible to provide a location and access for the upload/ download of the latest Revit models by A/E teams / sub-contractors to add information, answer RFI's, etc. Construction team (GC) shall keep daily backups of all models Should the GC give ownership of the same model to multiple subcontractors, the GC shall be responsible for organizing and merging all new information into one model including but not limited to: shop drawing sheets, views, updated Revit components, COBie information, etc.
11. The construction team shall schedule virtual coordination meetings as necessary for coordination with Owner and/or A/E team.
12. At the end of construction phase, the GC shall provide COBie deliverables to the Owner for Facilities Maintenance (FM)/ Operations & Maintenance (O&M) as required by the County.
13. At the end of construction phase, the GC shall provide as-built full size drawings and PDFs and transfer the latest Revit models to the A/E team for Review.
14. The A/E team will review as-built information relevant to the development of record drawings and produce a record model & PDFs for delivery to owner.
15. The GC shall also deliver a construction model (LOD 350, 400, 500) to the Owner for FM / O&M use at end of construction.

COBie

Process . Best Practices . Workflow

COBie Process

1. Confirm selection of maintainable assets to be tracked and matured within the project.
2. Verify that all components anticipated in the model exist and have valid naming.
3. Verify that all components have a proper OmniClass Number and Title.
4. Provide Level of Development (LOD) per model component author (MCA) and project phase coordinated with each component and space Object via OmniClass
5. Export spreadsheet to stakeholders
6. Import stakeholder spreadsheets to BIMLink
7. Single category export to BIMLink, map Sheet to COBie Template TAB

BIM-COBie Best practices

- Assign the proper Revit Category to each component
- Assign the proper Component Family Name and Type Name
- Eliminate the use of Revit in-place families
- Minimize the use of Model Groups

COBie Workflow

1. Populating the BIM Component Checklist
2. Identify Revit Categories and Family Types to be tracked
3. Map Revit data to COBie spreadsheet tabs
4. Assign OmniClass table 23 codes to component and system families
5. Assign OmniClass table 13 space types to rooms
6. Create & Maintain BIMLink Links for Exporting Revit data to Excel Spreadsheets
7. Edit/Add information to the Excel spreadsheets
8. Import, Update & Export COBie data to/from Revit via BIMLink to Excel
9. Map BIMLink data to COBie spreadsheet tabs

Model Review
Autodesk Revit

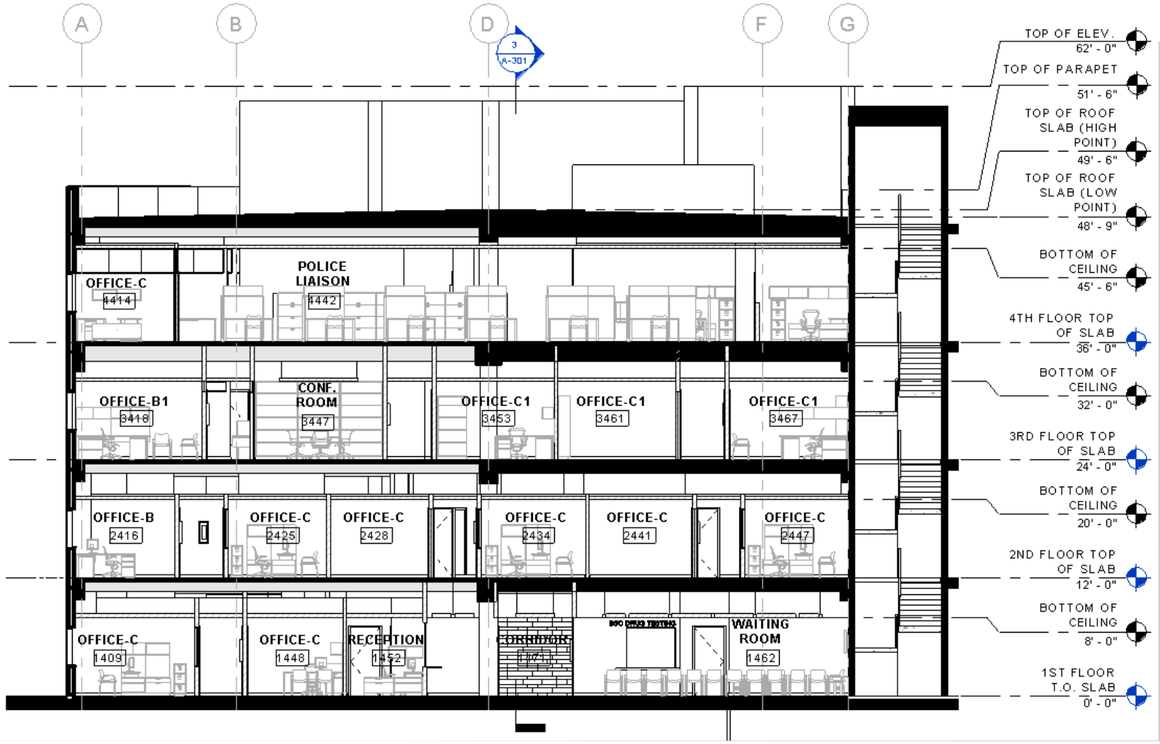
Conclusion

Family component level of development is appropriate for 100% SD Phase. **Omniclass COBie design data exists for most model elements** identified in the BIM Component Check List, as approved by the owner.

The BIM Component Checklist which is represented in the **COBie2-ComponentsToSchedule** is NOT utilized in this phase. This issue remains to be discussed, as it may be substituted by another tool.

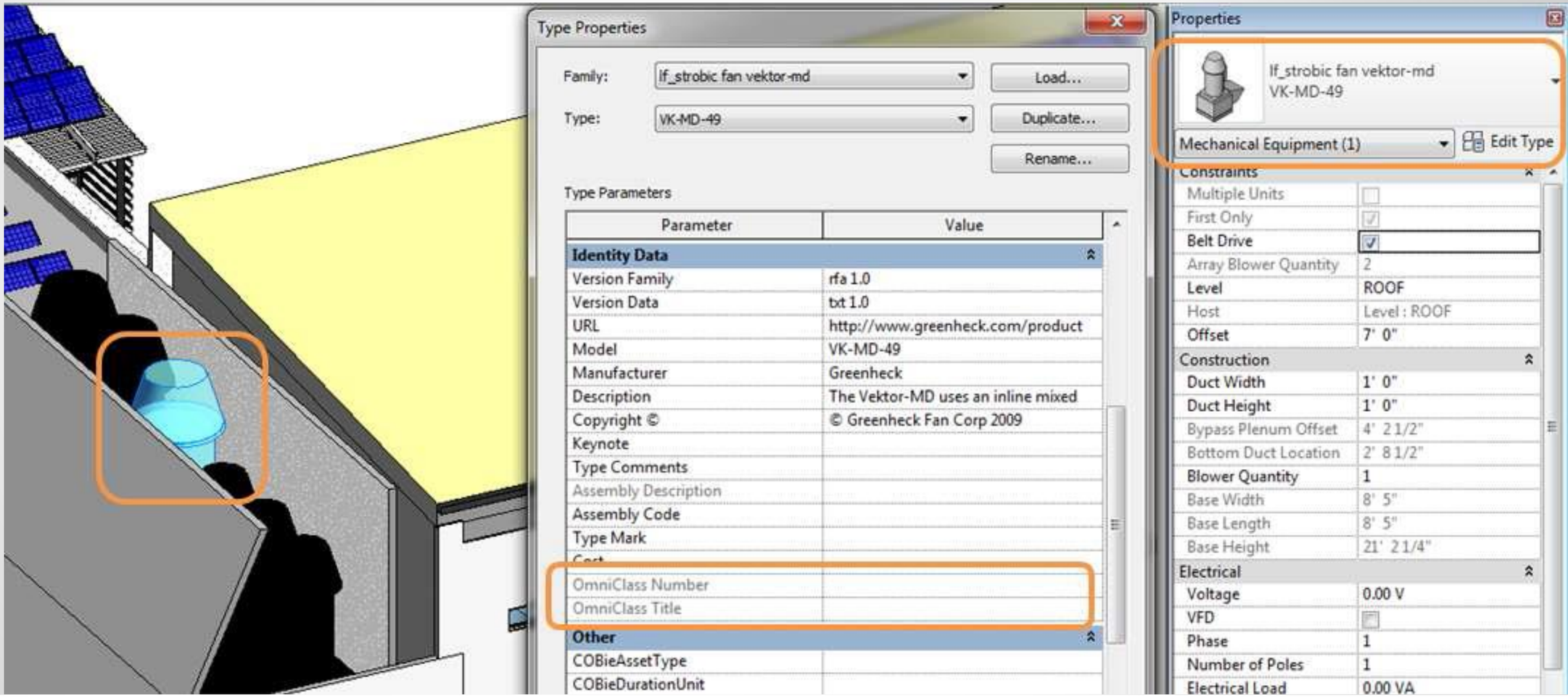
We have found some Revit families in the BIM with no family **category**, unidentified family name or **type** name. **Groups** have improved greatly especially in regards to system furniture. Some Revit families and **materials** have **unassigned Uniformat Assembly Codes** and most have **unassigned OmniClass codes**. Some elements do not have an associated material or are not associated with a **manufacturer**. In the case of **Rooms**, we have found that some rooms are unplaced, or redundant. Some rooms have invalid **volume** information, ceiling heights not defined, **planned area**, associated **floor finish**, **style**, **department** or **occupancy**. Modeling for Existing conditions has improved. The inability of Revit to schedule "groups" has been replaced by the use of "placeholder" families to schedule system furniture cubicle types, is a great improvement.

- 0602013011_ARCH_CENTRAL_2014.RVT
- 0602013011_STRUC_CENTRAL_2014.RVT
- 0602013011_MECH_CENTRAL_2014.RVT
- 0602013011_ELEC_CENTRAL_2014.RVT
- 0602013011_PLUM_CENTRAL_2014.RVT
- 0602013011_FIREPROTECTION_CENTRAL_2014.RVT
- 0602013011_FURN_CENTRAL_2014.RVT



What about Omniclass?
For Autodesk Revit

LOD 150. Define Uniformat II Classification as assemblies
LOD 200. Generate cost estimates based on assemblies
LOD 250. Define CSI Master-Spec Material classification
LOD 250. Generate cost estimates to be based on count and material take-offs
LOD 300. Define Omniclass Classification for Asset Tracking



BIM Proficiency @ 100% SD's

8 BIM Proficiencies

BIM Proficiency Score

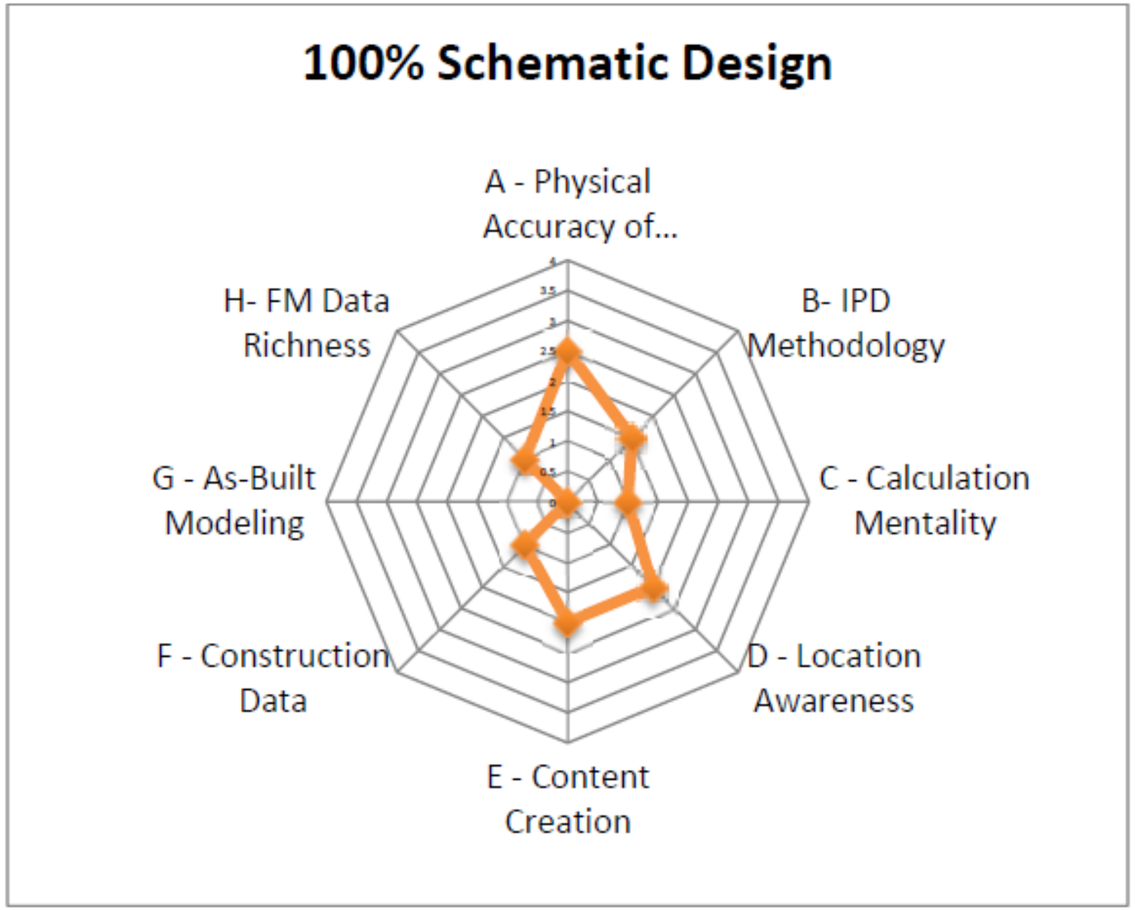


Figure 1 – BCJC BIM Proficiency Diagram at 100% SD Phase BIM Peer Review

A - Physical Accuracy of Model	2.5
B- IPD Methodology	1.5
C - Calculation Mentality	1
D - Location Awareness	2
E - Content Creation	2
F - Construction Data	1
G - As-Built Modeling	0
H- FM Data Richness	1

Max Score of 4 at each	**11**

Figure 2 - BCJC BIM Proficiency Score

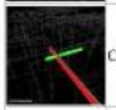
Clash Detection

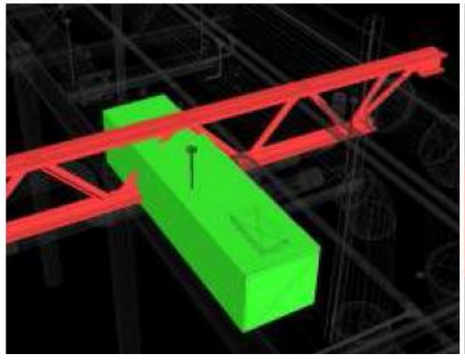
Autodesk Navisworks Manage

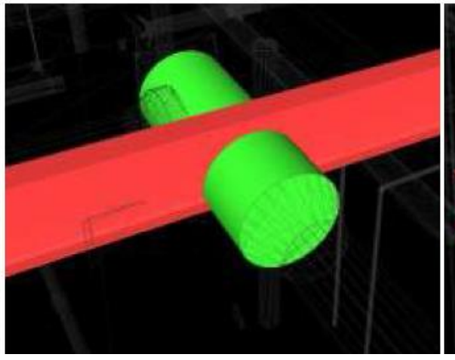
Autodesk Navisworks

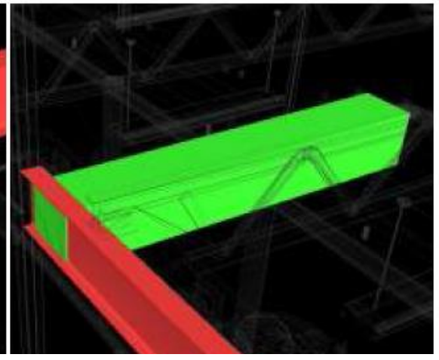
Clash Report

BCJC Structural Framing vs. Ducts	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status
	0.08ft	62	62	0	0	0	0	Hard	OK

						Item 1			Item 2		
Image	Clash Name	Status	Distance	Grid Location	Date Found	Item ID	Category Name	Element Type	Item ID	Category Name	Element Type
	Clash1	New	-0.48	D.2-5 : FOUNDATION PLAN	2014/5/16 13:57.12	*Element ID*: 261987	Structural Framing	W16X36	*Element ID*: 842341	Ducts	Taps / Short Radius
	Clash2	New	-0.47	F-9.2 : FOUNDATION PLAN	2014/5/16 13:57.12	*Element ID*: 268771	Structural Framing	W16X26	*Element ID*: 911805	Ducts	Taps / Short Radius







BCJC Clash Detection Matrix

Clash Detection Results - by Category	NO. OF CLASHES - MHT REPORTS							
	28.05.2014	29.05.2014	04.06.2014	09.06.2014	10.06.2014	12.06.2014	17.06.2014	19.06.2014
MECH vs. ELEC_LIGHT FIXTURES_PANELS_EQUIP	101	97	9	5	93	93	5	5
MECH vs. ARCH_CEILINGS	464	490	489	276	436	136	137	137
MECH+PLUM vs. ELEC	101	99	9	5	95	95	6	6

BIM Peer Review @ 100% SD's

Autodesk BIM 360 Glue

Visualization
BIM 360 Glue

Corrective Strategies

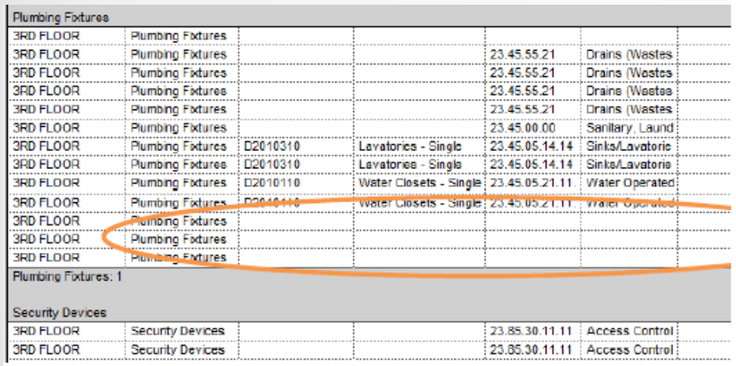
Autodesk Revit

Recommendations on corrective strategies

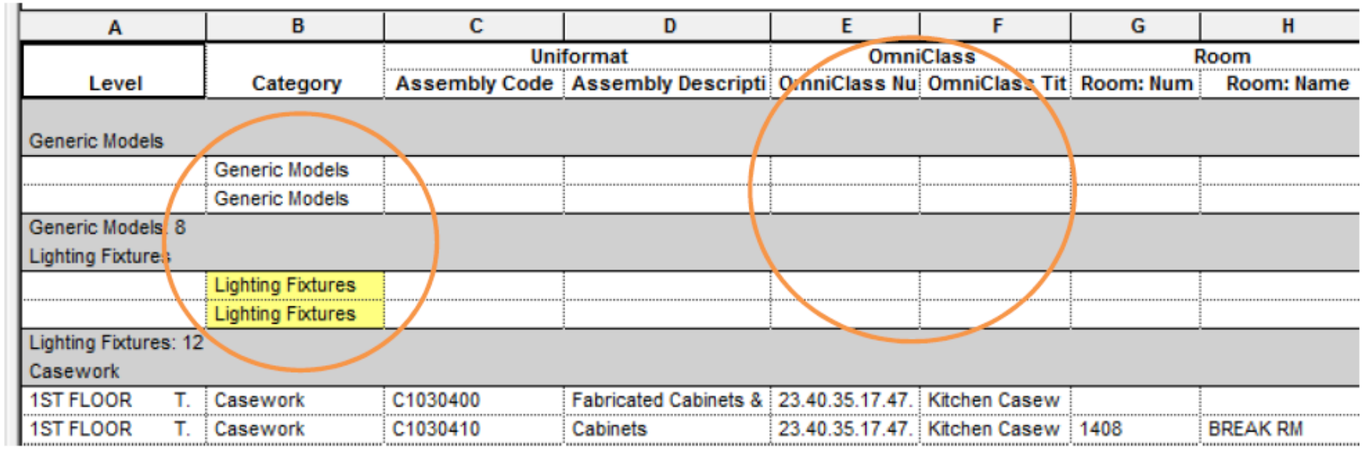
Care should be taken to avoid the following practices:

1. Linking unnecessary CAD files (FP, Mech, Plum, Arch)
2. Rooms without valid boundaries
3. Room names with lower case Text
4. Duplicate Elements (such as Structural elements, Doors, Plumbing Fixtures, Furniture, etc.)
5. Components without an OmniClass classification
6. Components not associated with a room
7. Use of Generic Models

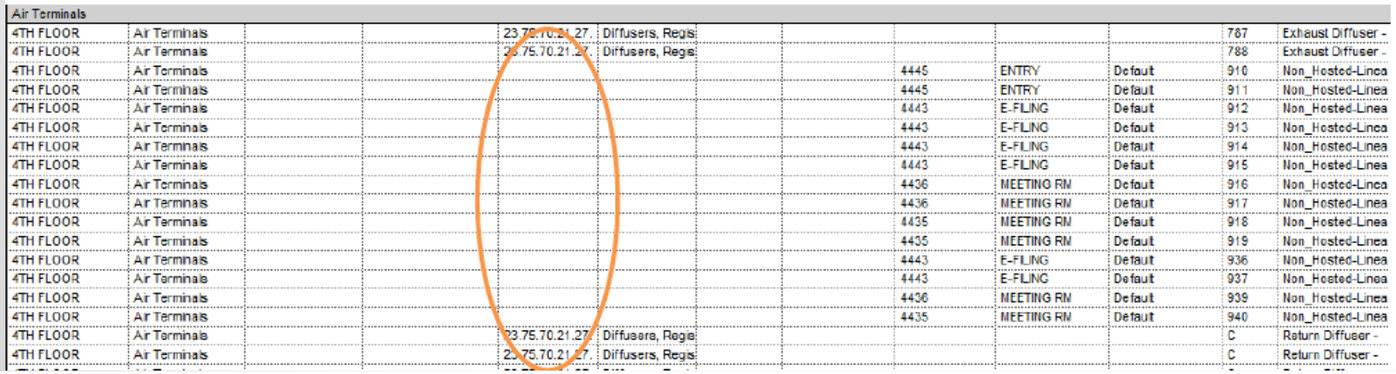
Sample Revit Schedules showing areas where improvement can be made



Plumbing Fixtures					
3RD FLOOR	Plumbing Fixtures			23.45.55.21	Drains (Wastes
3RD FLOOR	Plumbing Fixtures			23.45.55.21	Drains (Wastes
3RD FLOOR	Plumbing Fixtures			23.45.55.21	Drains (Wastes
3RD FLOOR	Plumbing Fixtures			23.45.55.21	Drains (Wastes
3RD FLOOR	Plumbing Fixtures			23.45.00.00	Sanitary Laund
3RD FLOOR	Plumbing Fixtures	D2010310	Lavatories - Single	23.45.05.14.14	Sinks/Lavatorie
3RD FLOOR	Plumbing Fixtures	D2010310	Lavatories - Single	23.45.05.14.14	Sinks/Lavatorie
3RD FLOOR	Plumbing Fixtures	D2010110	Water Closets - Single	23.45.05.21.11	Water Operated
3RD FLOOR	Plumbing Fixtures	D2010110	Water Closets - Single	23.45.05.21.11	Water Operated
3RD FLOOR	Plumbing Fixtures				
3RD FLOOR	Plumbing Fixtures				
3RD FLOOR	Plumbing Fixtures				
Plumbing Fixtures: 1					
Security Devices					
3RD FLOOR	Security Devices			23.85.30.11.11	Access Control
3RD FLOOR	Security Devices			23.85.30.11.11	Access Control

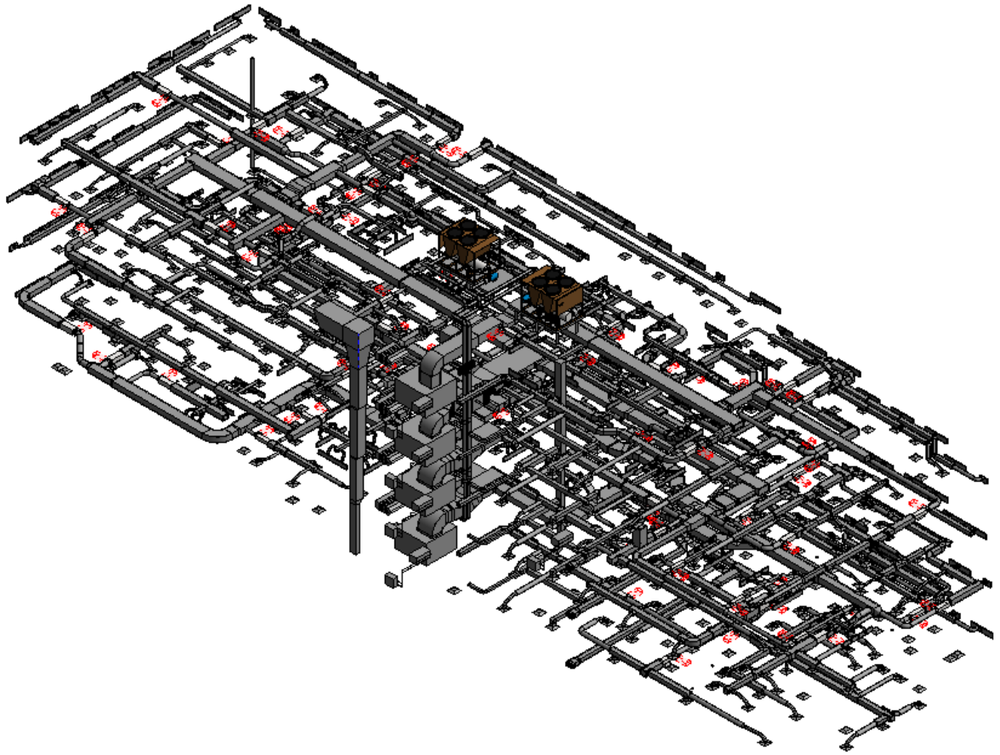


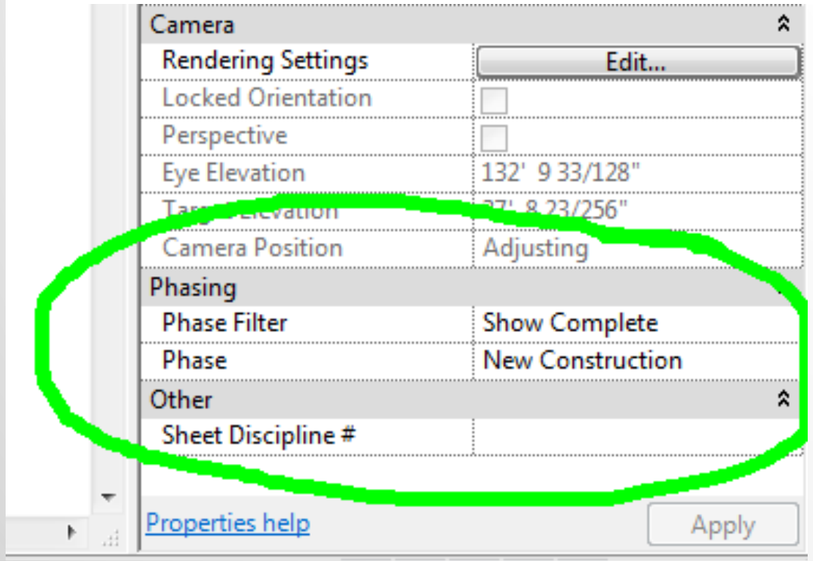
A	B	C	D	E	F	G	H
		Uniformat		OmniClass		Room	
Level	Category	Assembly Code	Assembly Descripti	OmniClass Nu	OmniClass Tit	Room: Num	Room: Name
Generic Models							
	Generic Models						
	Generic Models						
Generic Models: 8							
Lighting Fixtures							
	Lighting Fixtures						
	Lighting Fixtures						
Lighting Fixtures: 12							
Casework							
1ST FLOOR T.	Casework	C1030400	Fabricated Cabinets &	23.40.35.17.47.	Kitchen Casew		
1ST FLOOR T.	Casework	C1030410	Cabinets	23.40.35.17.47.	Kitchen Casew	1408	BREAK RM



Air Terminals										
4TH FLOOR	Air Terminals			23.75.70.21.27.	Diffusers, Regis				787	Exhaust Diffuser -
4TH FLOOR	Air Terminals			23.75.70.21.27.	Diffusers, Regis				788	Exhaust Diffuser -
4TH FLOOR	Air Terminals					4445	ENTRY	Default	910	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4445	ENTRY	Default	911	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	912	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	913	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	914	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	915	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4436	MEETING RM	Default	916	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4436	MEETING RM	Default	917	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4435	MEETING RM	Default	918	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4435	MEETING RM	Default	919	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	936	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4443	E-FILING	Default	937	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4436	MEETING RM	Default	939	Non_Hosted-Linea
4TH FLOOR	Air Terminals					4435	MEETING RM	Default	940	Non_Hosted-Linea
4TH FLOOR	Air Terminals			23.75.70.21.27.	Diffusers, Regis				C	Return Diffuser -
4TH FLOOR	Air Terminals			23.75.70.21.27.	Diffusers, Regis				C	Return Diffuser -

COBie 2.4
For Autodesk Revit





COBIE EXPORT SETUP INSTRUCTIONS

Before you Start
- Detach & Save as Central File
- Create a 3D View
- Merge Phase 2 & 3 (Use combine with next)
- Merge Phase Existing & Phase 1 (Use combine with previous)

COBie Extension Contacts
- Import Contacts from XML
- Change contact information
- Export as XML File
- Save & Close

COBie Extension Settings
- Import Settings from XML
- Check "United States" Check "Global Unique Identifier (GUID)"
- Uncheck “append Arch or MEP to each”
- **“Component in system” checkbox must be checked or file will be**
- **invalid-"Each component listed in its own row"**
- Mark element ID./Family _Type_Type Mark
- Check items to track by Room or Spaces
- Check all applicable items to track
- Save & Export Settings to XML File

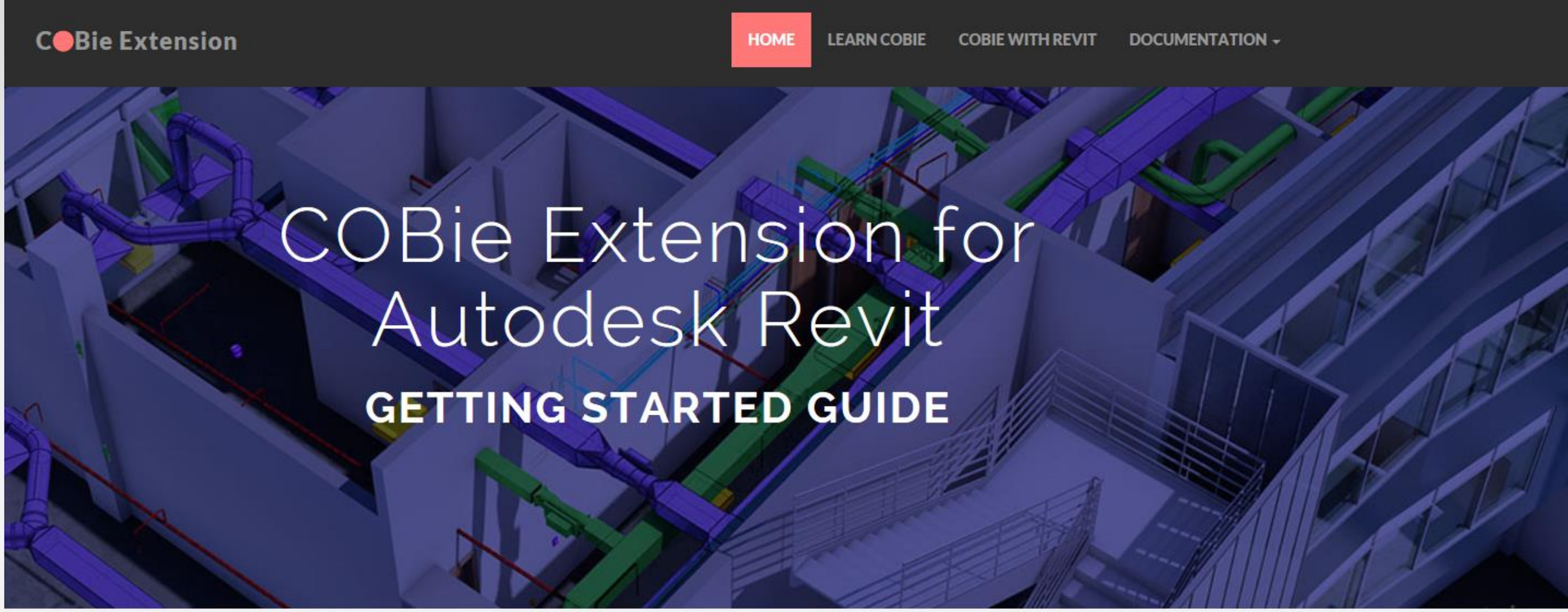
COBie Extension Modify
- Select elements to be exported
- Select: ‘Ungroup & set parameter’
- Batch modify other fields to be exported
- Ungroup and set parameters
- Select to update “all” parameters (first run)
- Select “Blank” or “all” if **any** items updated
- Export & Uncheck coordinates

Autodesk Building Solutions YouTube

[COBie Toolkit for Autodesk Revit]

Rich Mitrenga
T.J. Meehan

COBie 2.4 For Autodesk Revit



About COBie

Learn the basics about the COBie data exchange standard, including information about deliverables and the overall worksheet structure.

Learn More »

COBie with Revit

Discover how specific Autodesk Revit features align with the COBie data exchange format and what considerations should be made prior to exporting data from a model.

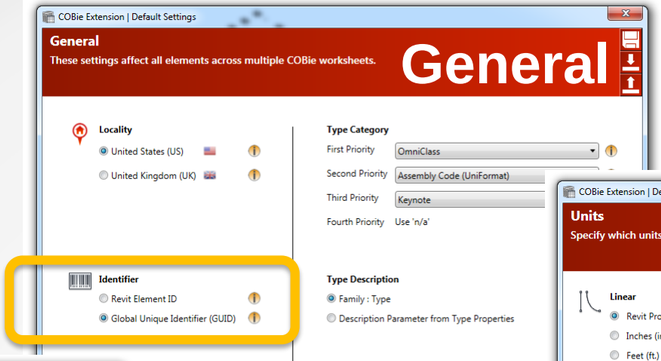
Learn More »

Documentation

Procedurally outlines how to setup, configure, utilize, and export COBie data from Revit Models using the COBie Extension for Autodesk Revit.

Learn More »

COBie 2.4
For Autodesk Revit



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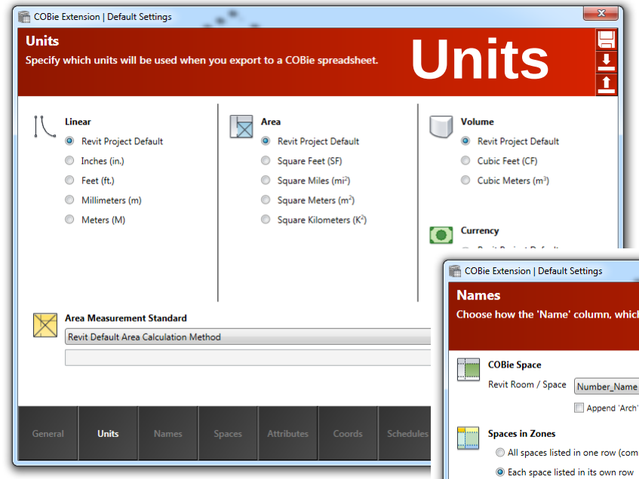
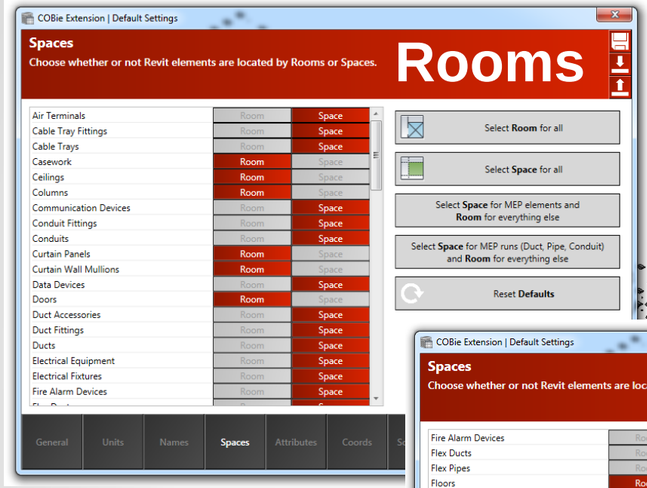
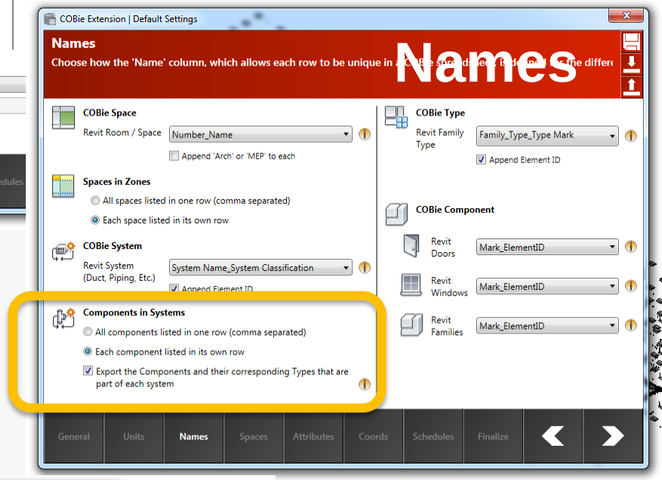
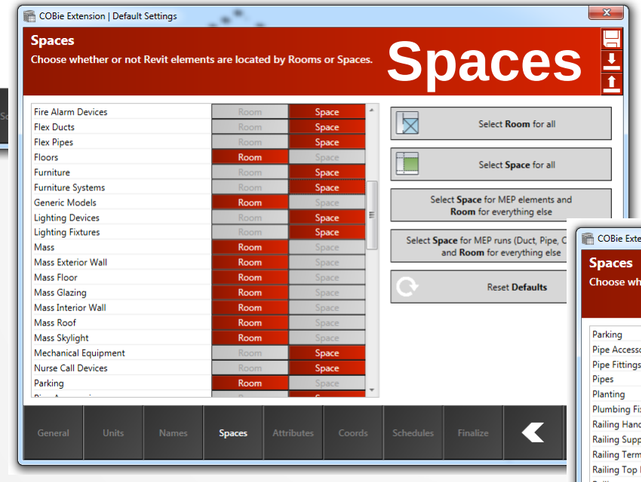
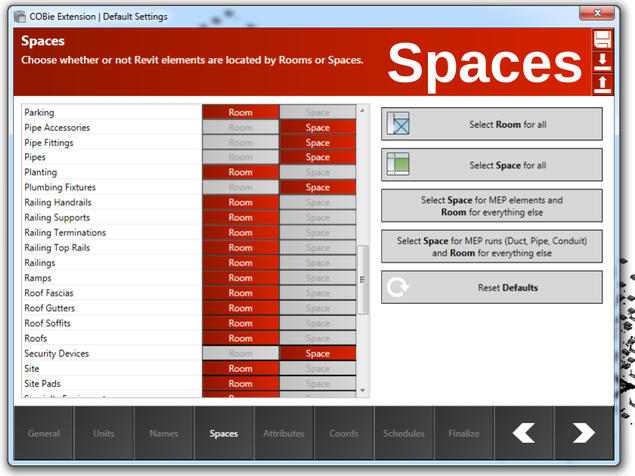


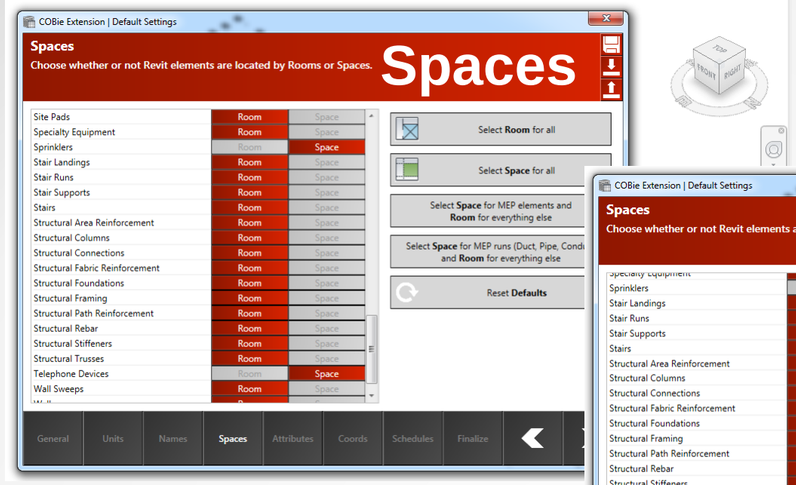


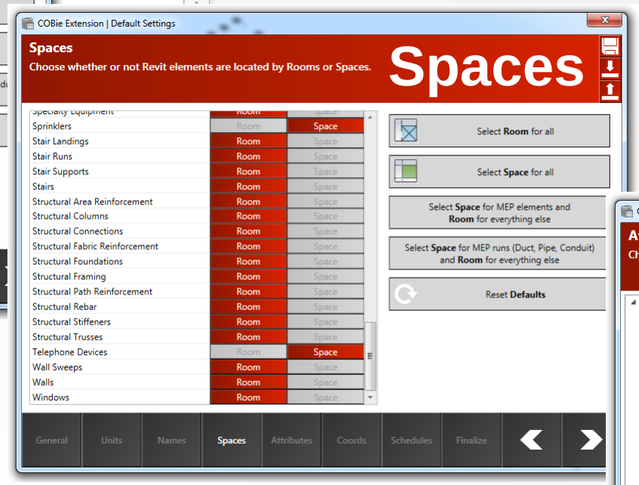


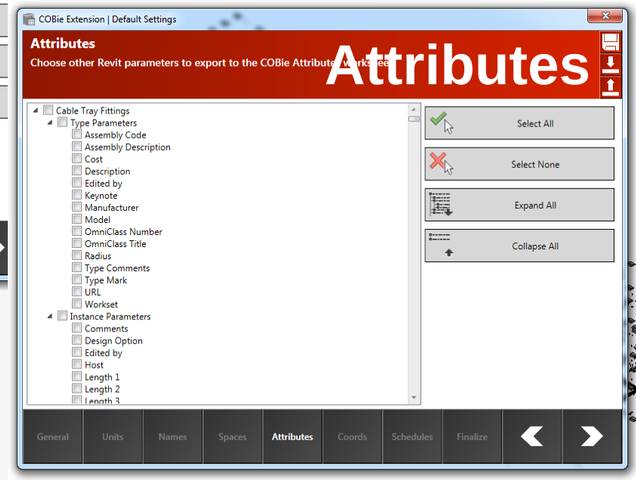




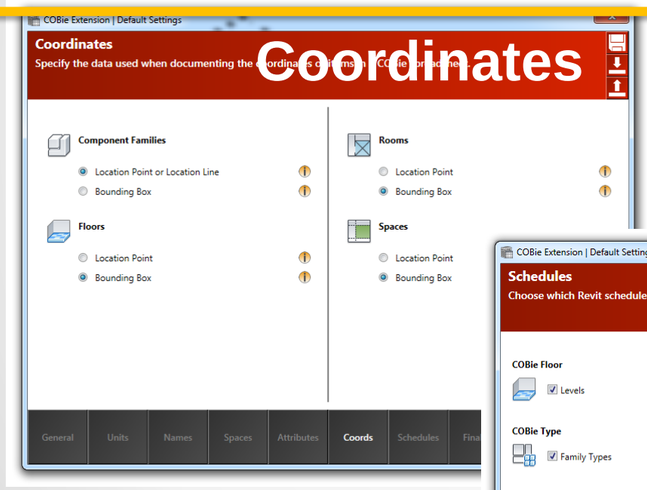
COBie 2.4
For Autodesk Revit

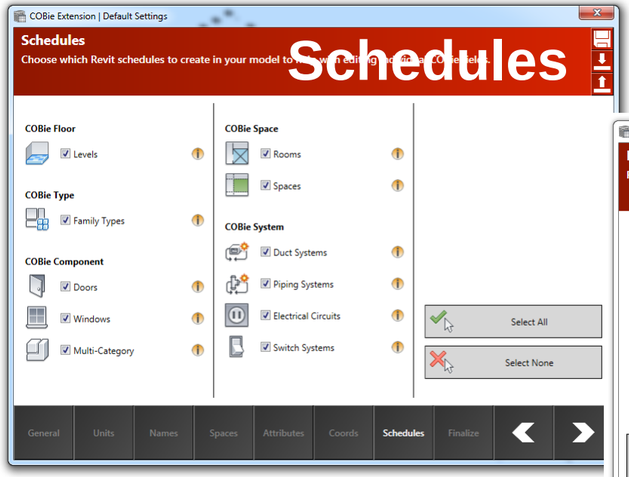


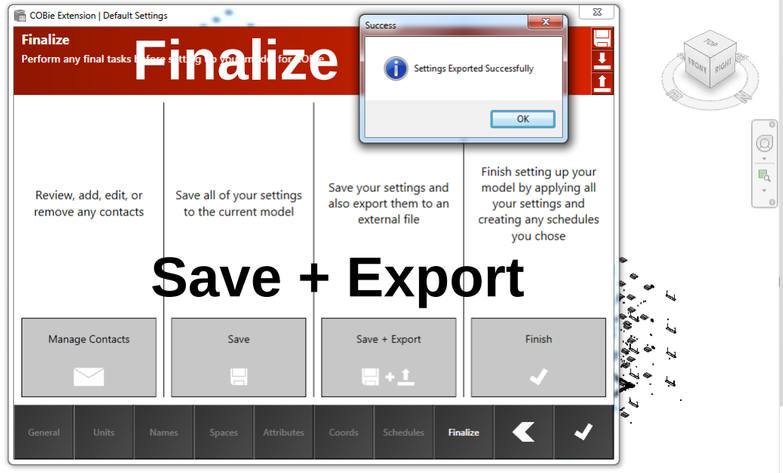




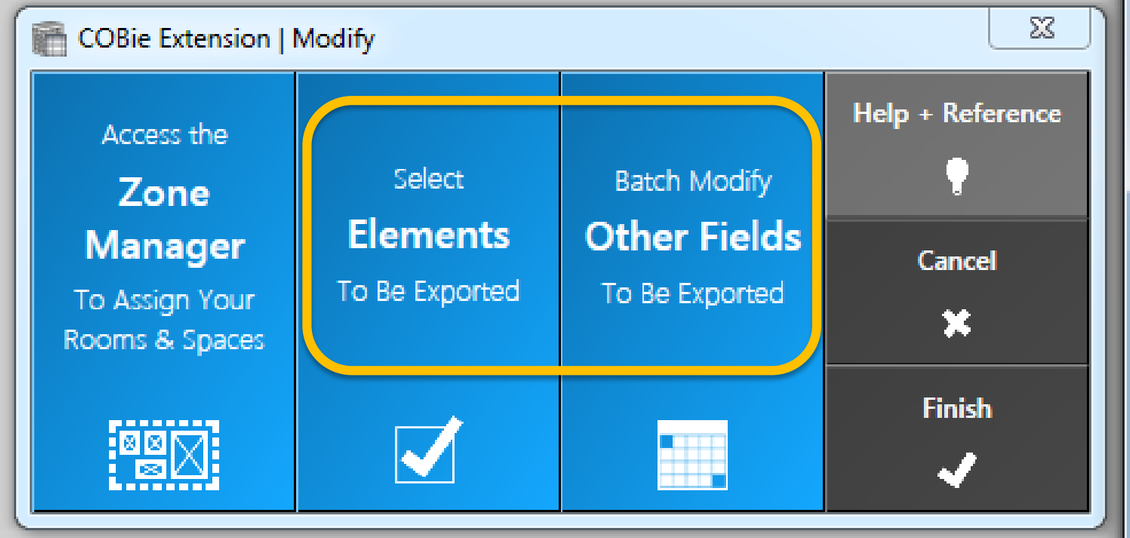
Do Not Use Coordinates

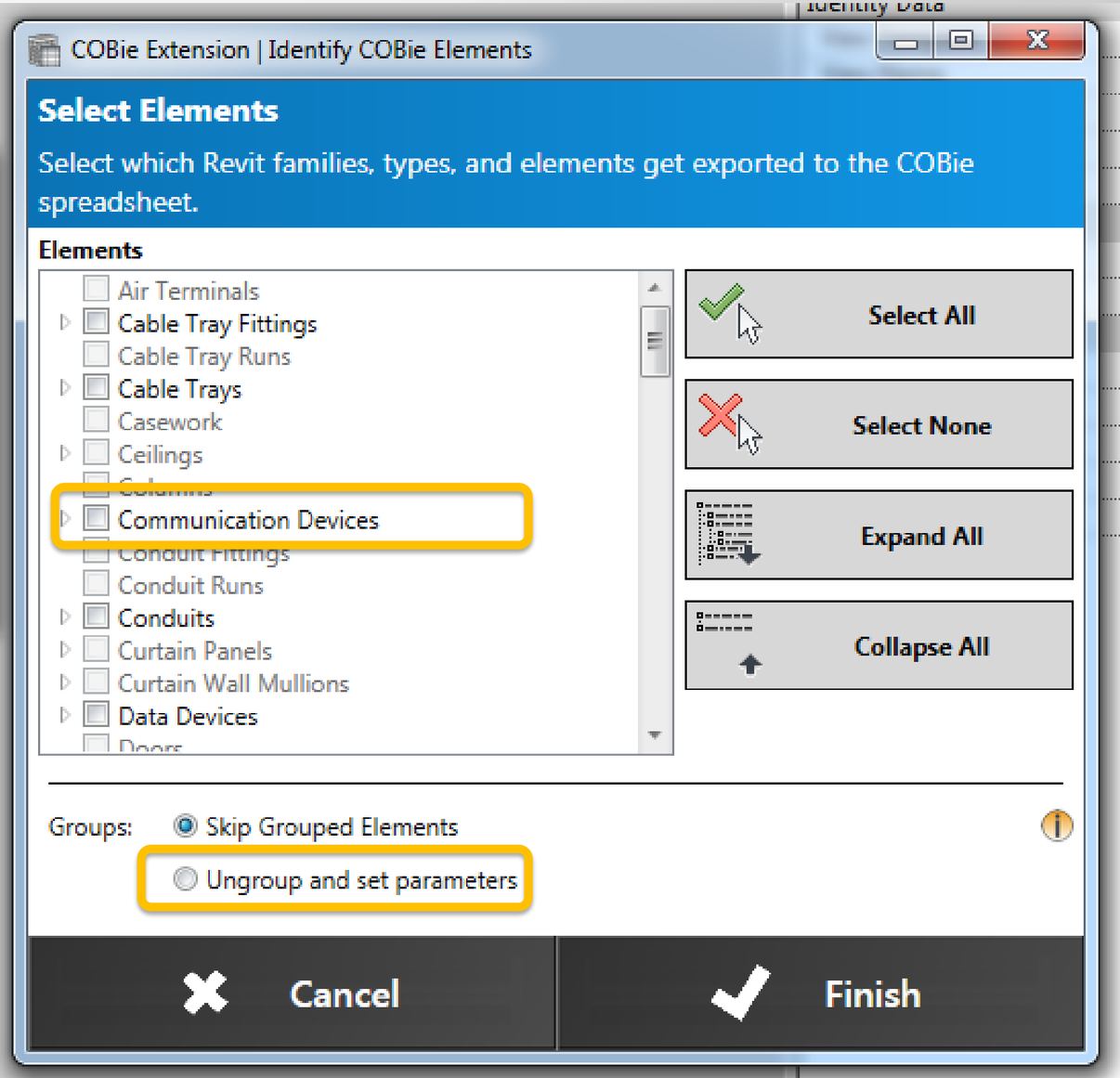






COBie 2.4
For Autodesk Revit





COBie 2.4
For Autodesk Revit

General

- Use COBie 2.4 formatted spreadsheet
- Use the BIM Project Execution Plan (PxP)
- Does NOT import data back into Revit
- Does NOT read linked files
- Does NOT work with Design Options
- Does NOT work with Phasing
- Integration with Broward County FM System: What FM System does Broward County use (Assetworks AiM)?
- Is AiM compatible with COBie 2.4?
- Owner's Expectations for COBie: Track Assets for O&M

BCJC

- BIM Uses defined by Broward County
- Model Component Author (MCA)
- Who will lead each discipline?
- Transfer Data Custodian role from Singer Architects to Pirtle Const. for at 100% CD
- Early Participation of all stakeholders
- Pirtle Construction role in COBie
  - Do you have a BIM/COBie process?
  - Will there be another as-built model LOD 400-500?
  - What data will be gathered and tracked?
  - How will data embed into as-built model?
- Delta-G 's role (MEP Engineer)

Best Practices

- Delete redundant rooms and spaces
- Do not export to COBie coordinates tab
- Do not append (_MEP) to space names
- Attribute tab contain the custom parameters
- Do not use COBie zones & system tabs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