Εφαρμογές του BIM στον Αρχιτεκτονικό Σχεδιασμό

Όλγα Βενετσιάνου

Δρ. Αρχιτέκτων - Μηχανικός

2026

Όλγα Βενετσιάνου

Αρχιτέκτων - Μηχανικός ΕΜΠ

Π.Μ.Σ «Ψηφιακές Μορφές Τέχνης» ΑΣΚΤ

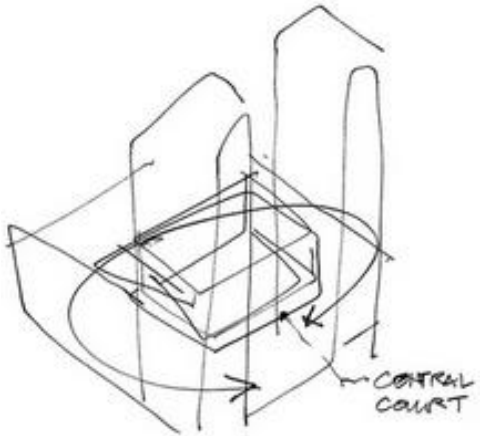
Διδάκτωρ Τμήματος Αρχ. Μηχ. Πανεπιστημίου Θεσσαλίας

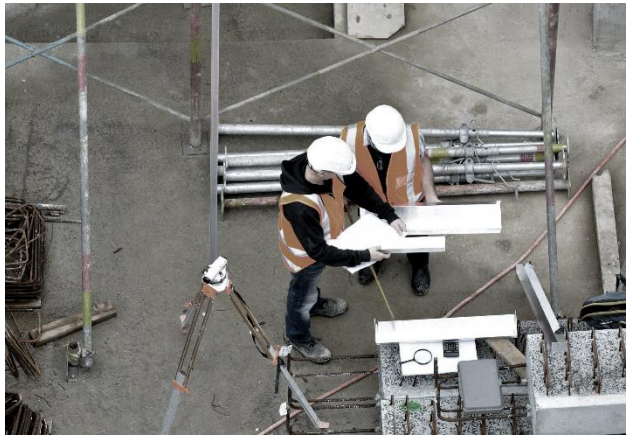
Εκπρόσωπος ΤΕΕ και ΣΑΔΑΣ-ΠΕΑ στο BIM workgroup του Συμβουλίου Αρχιτεκτόνων της Ευρώπης (Architects' Council of Europe)

www.olgavenetsianou.info

LinkedIn

1. BIM – Βασικές Έννοιες

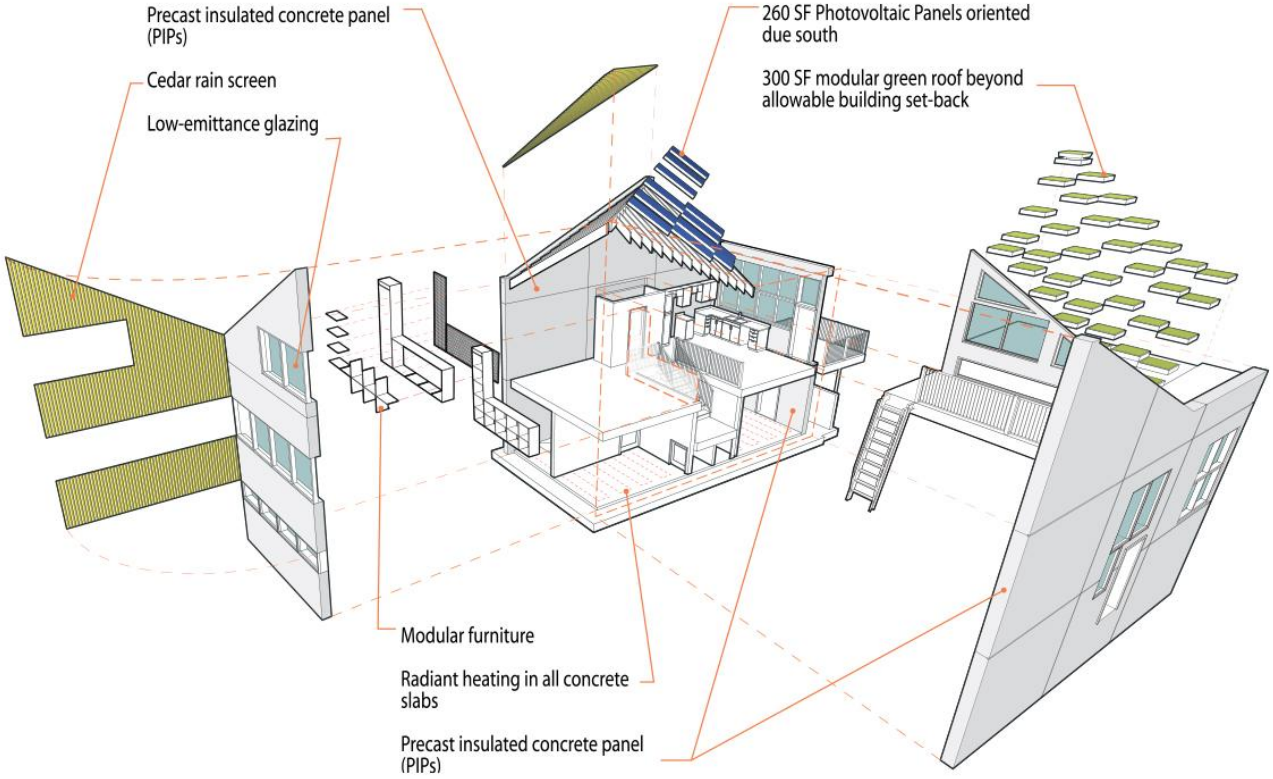




Κεντρική ιδέα / σχεδίαση / κατασκευή

Cattedrale di Santa Maria del Fiore, Filippo Brunelleschi (τρούλος) 1296--1436

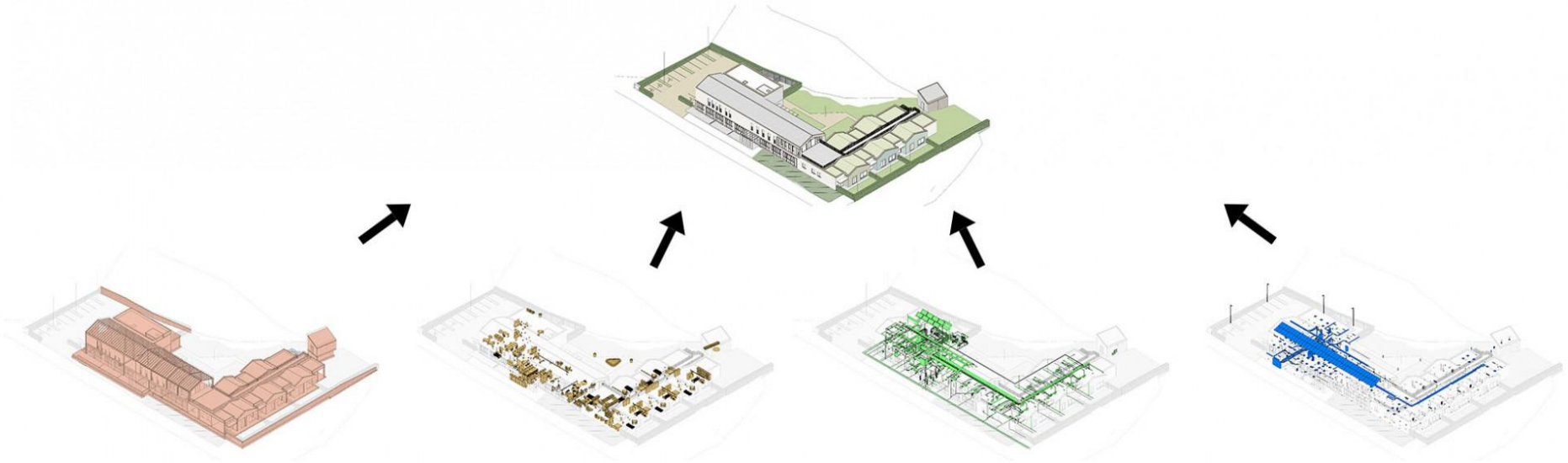
Μελέτη σε ψηφιακό 3d μοντέλο



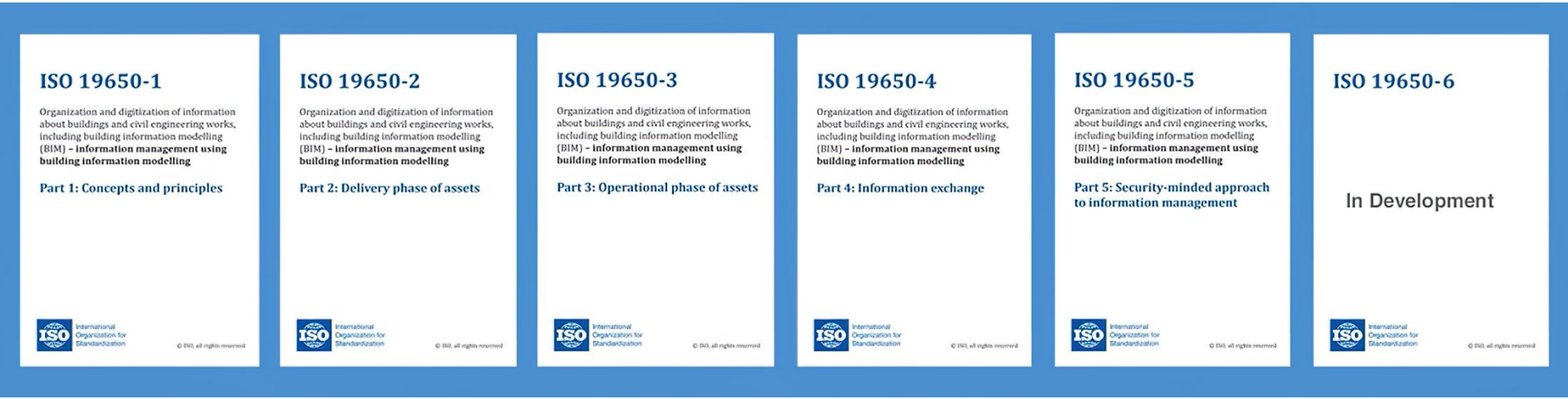
Πηγή: Garber, R. (2009), Optimisation Stories: The Impact of Building Information Modelling on Contemporary Design Practice. Archit Design, 79: 6-13. https://doi.org/10.1002/ad.842

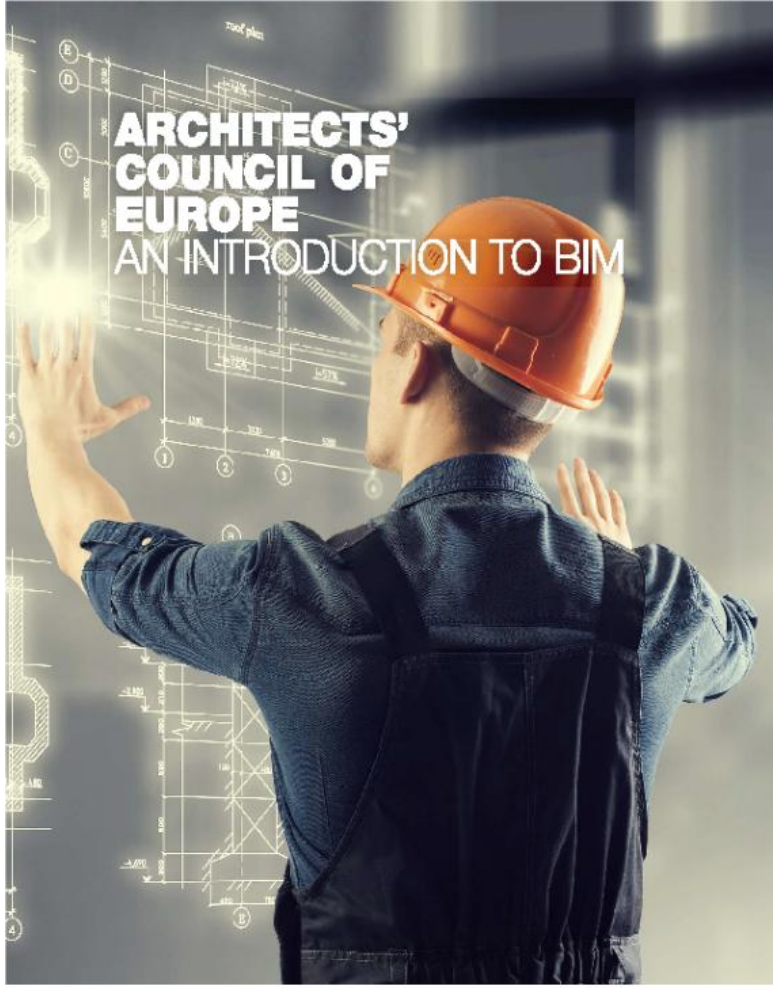
Διαχείριση της πληροφορίας σε όλες τις φάσεις του κύκλου ζωής ενός κτιρίου

Federated model



BIM execution plan

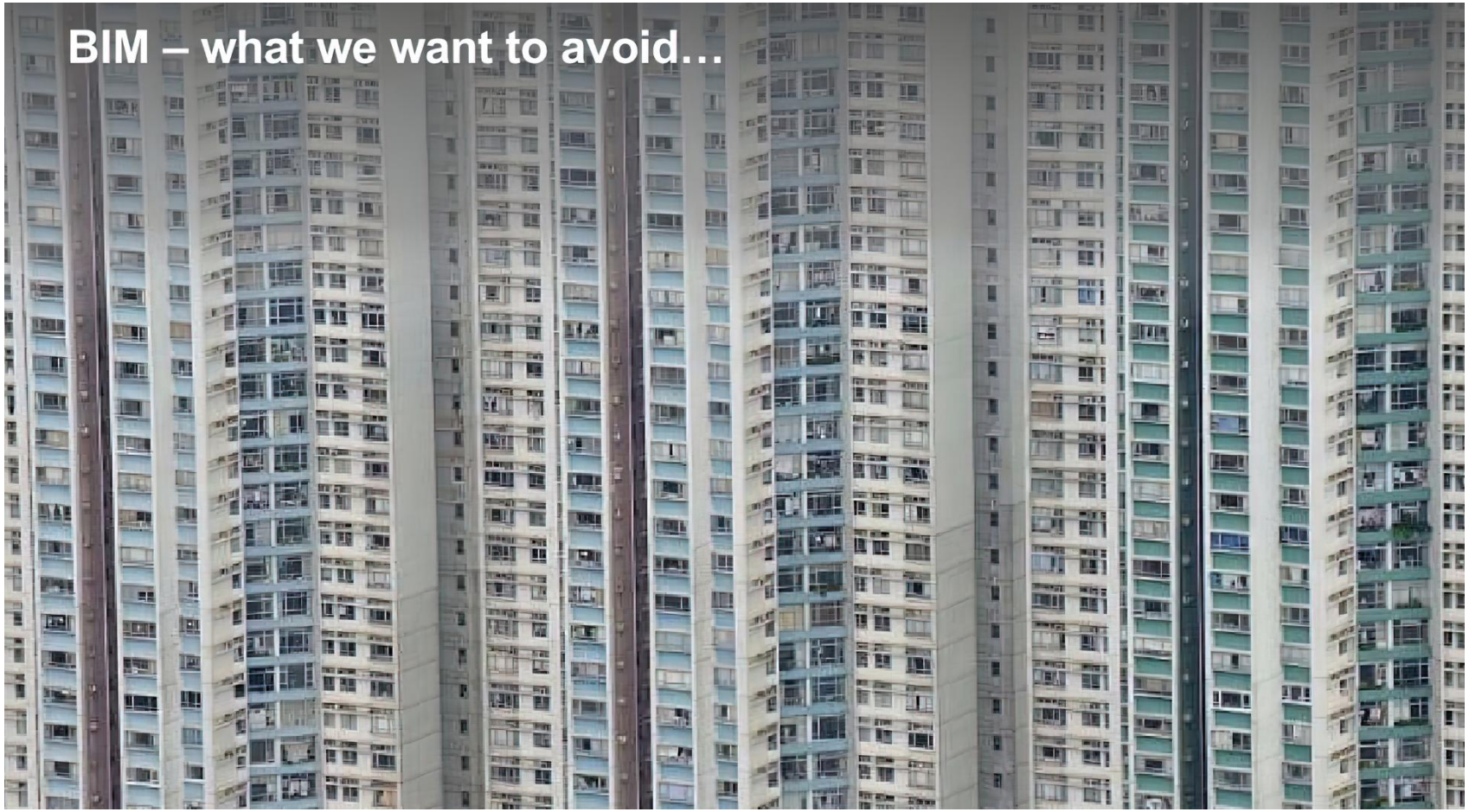




ARCHITECTS' COUNCIL OF EUROPE
CONSEIL DES ARCHITECTES D'EUROPE

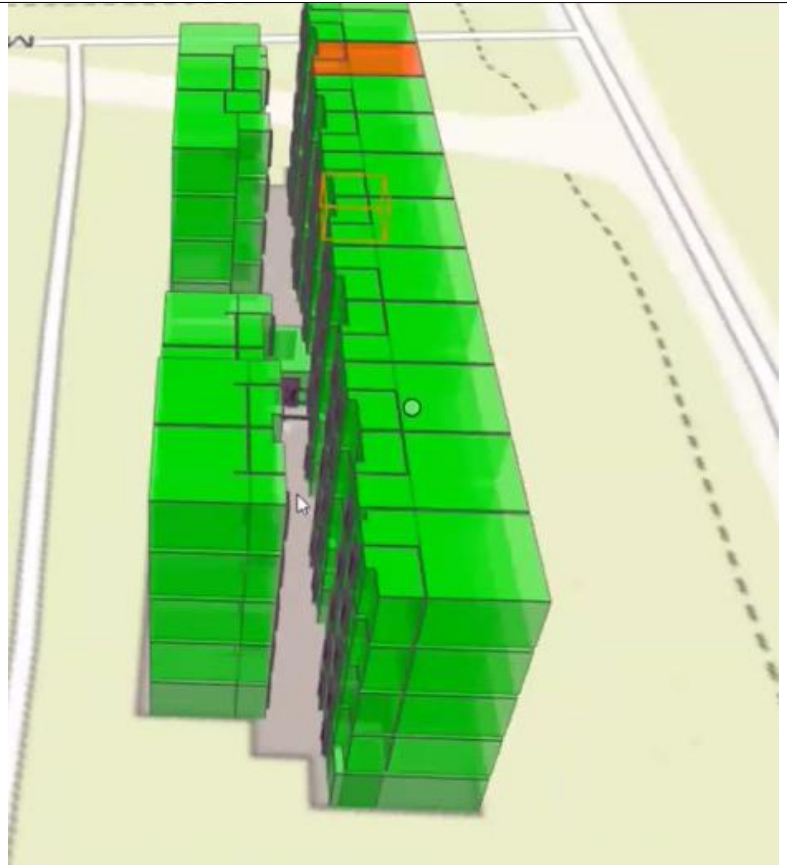
CONTENTS

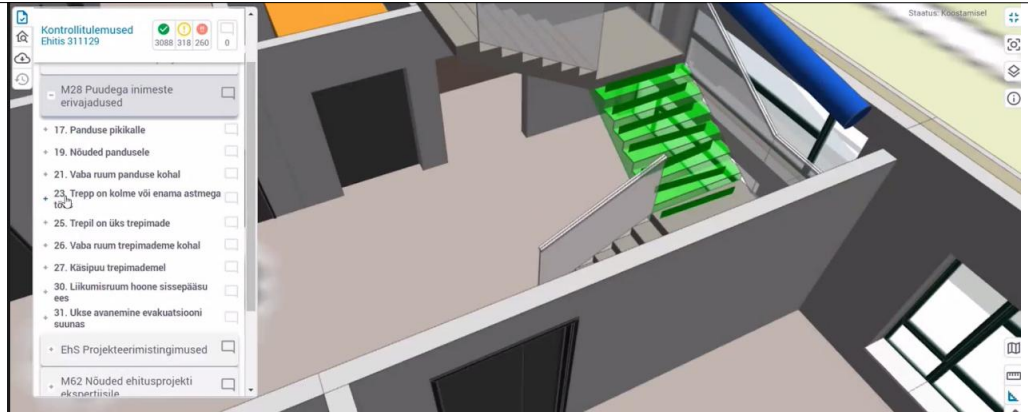
Πηγή: παρουσίαση K.Henning Simensen, M.M Raeder, ACE BIM Workgroup, 15-04-2015

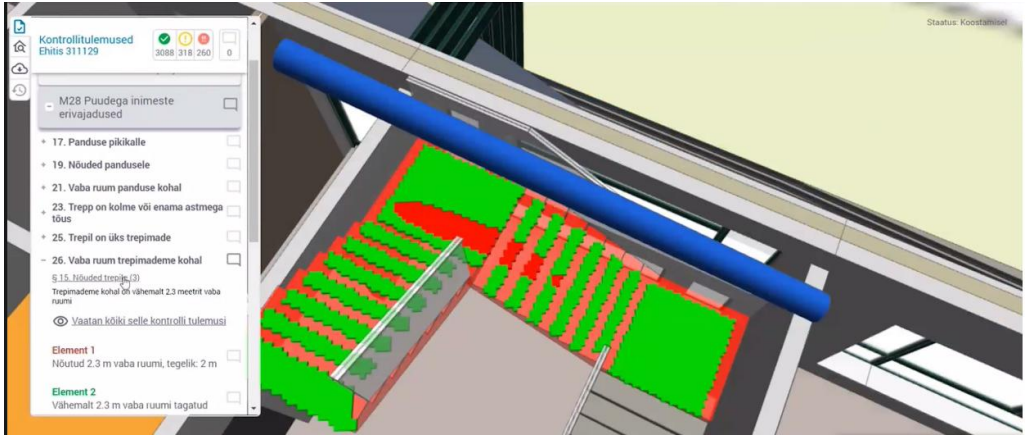


Πηγή: παρουσίαση K.Henning Simensen, M.M Raeder, ACE BIM Workgroup, 15-04-2015

Έλεγχος / Αδειοδότηση με BIM, Εσθονία

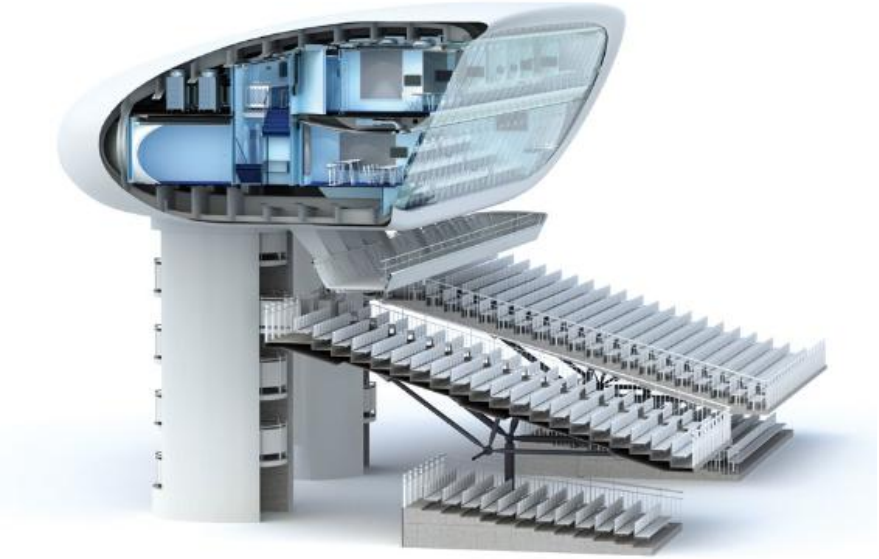


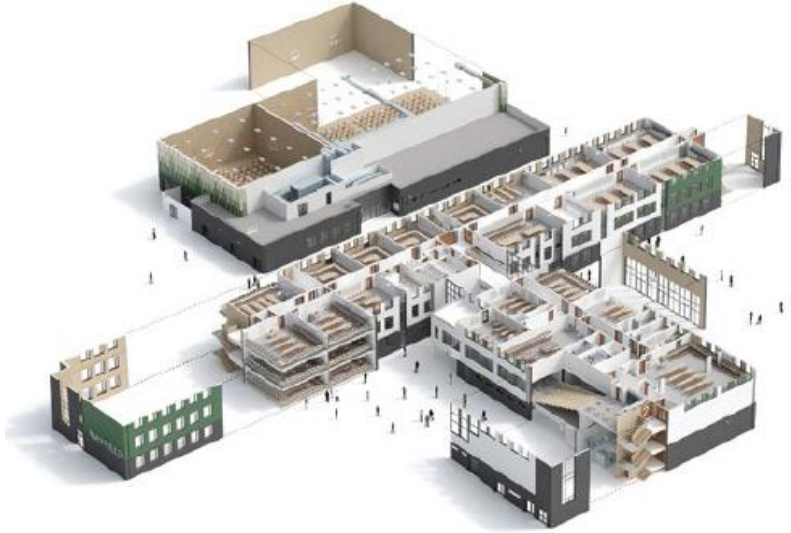




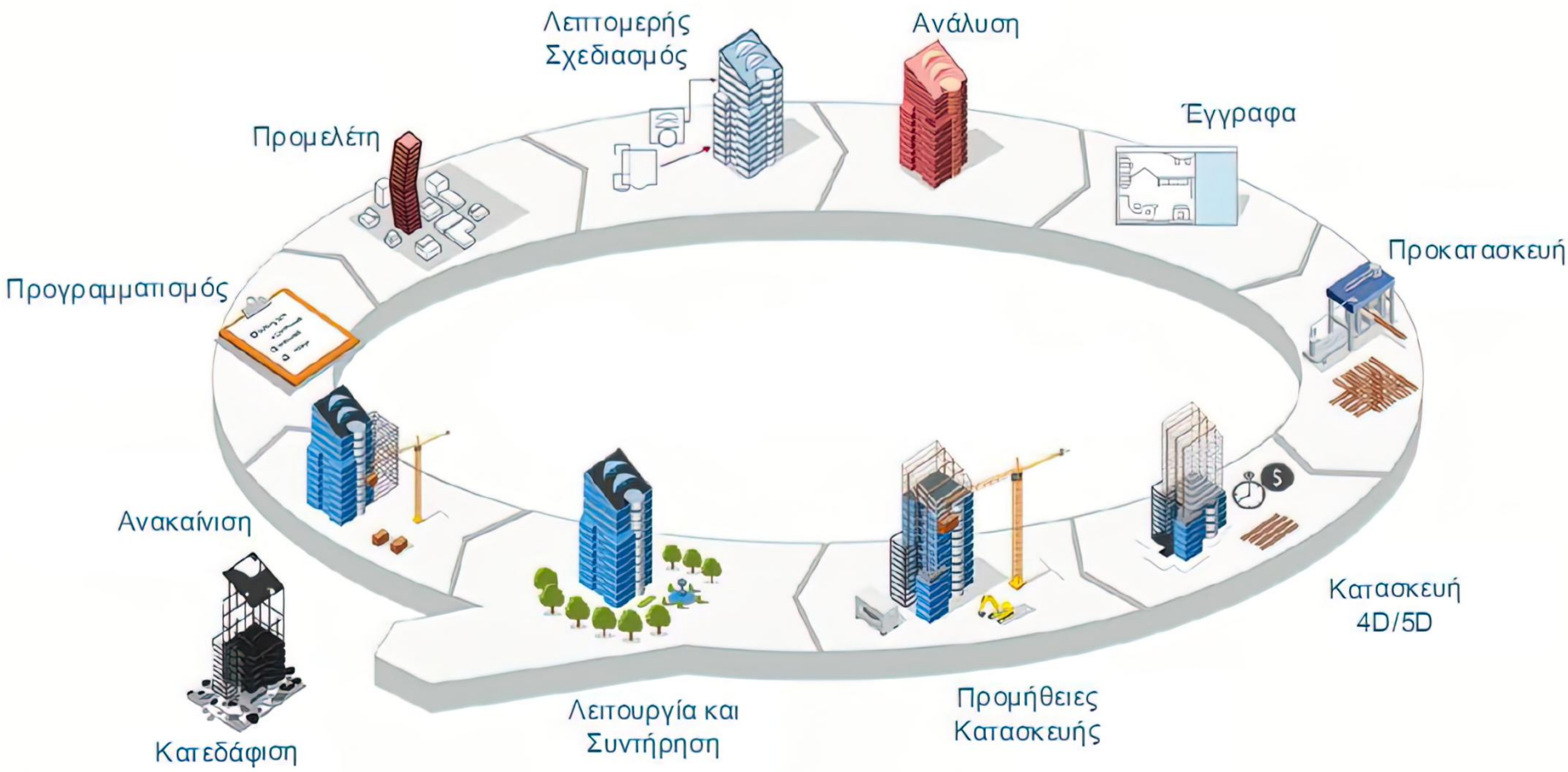
Πηγή: παρουσίαση C.Raitviir, ACE General Assembly, 21-04-2023

2. Πλεονεκτήματα Μελέτης με BIM



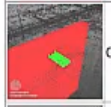
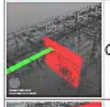
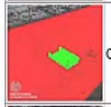



MAYFIELD

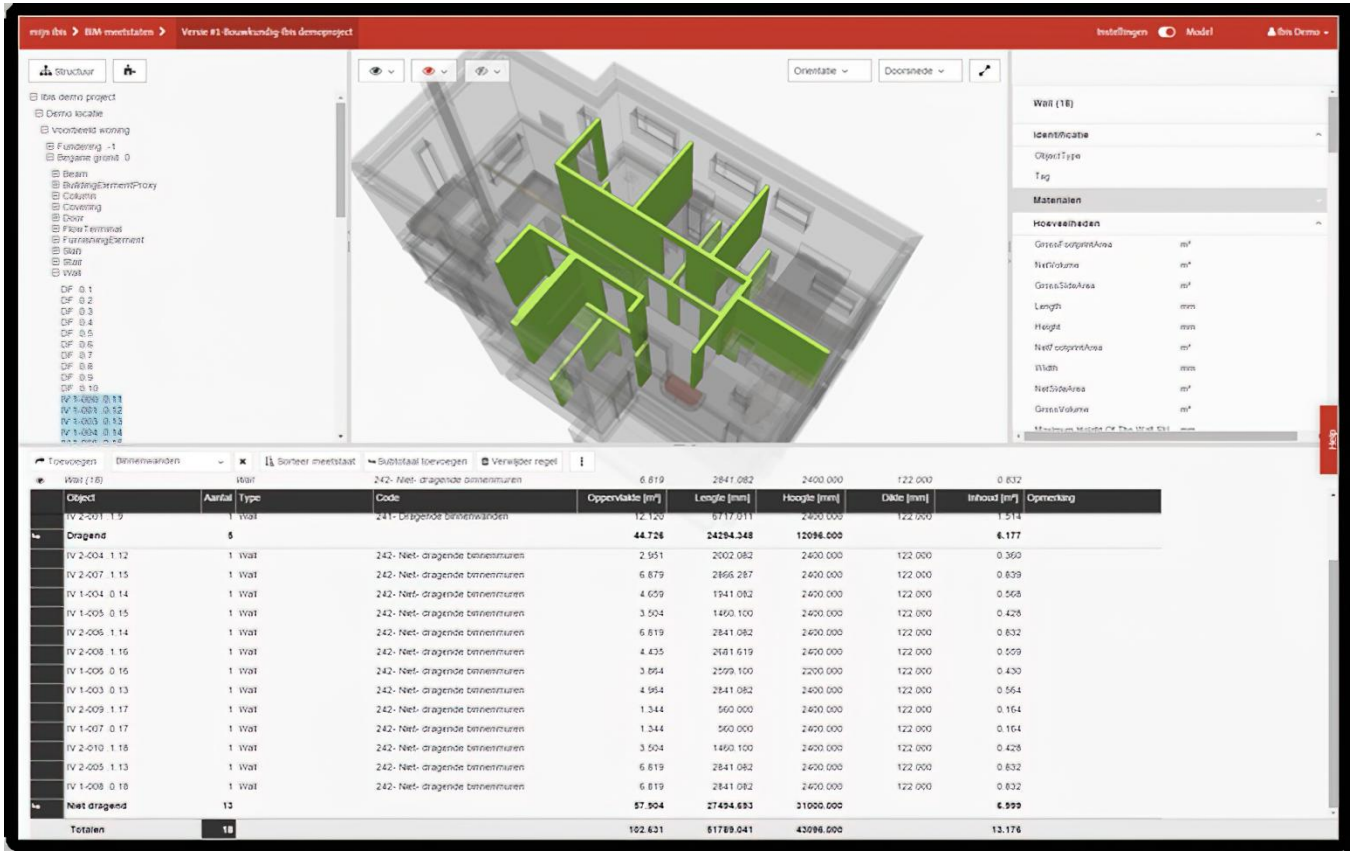

Λεπτομερής Σχεδιασμός
Ανάλυση
Προμελέτη
Έγγραφα
Προκατασκευή
Προγραμματισμός
Ανακαίνιση
Κατεδάφιση
Λειτουργία και Συντήρηση
Προμήθειες Κατασκευής
Κατασκευή 4D/5D

Χωρικός συντονισμός (Clash detection)

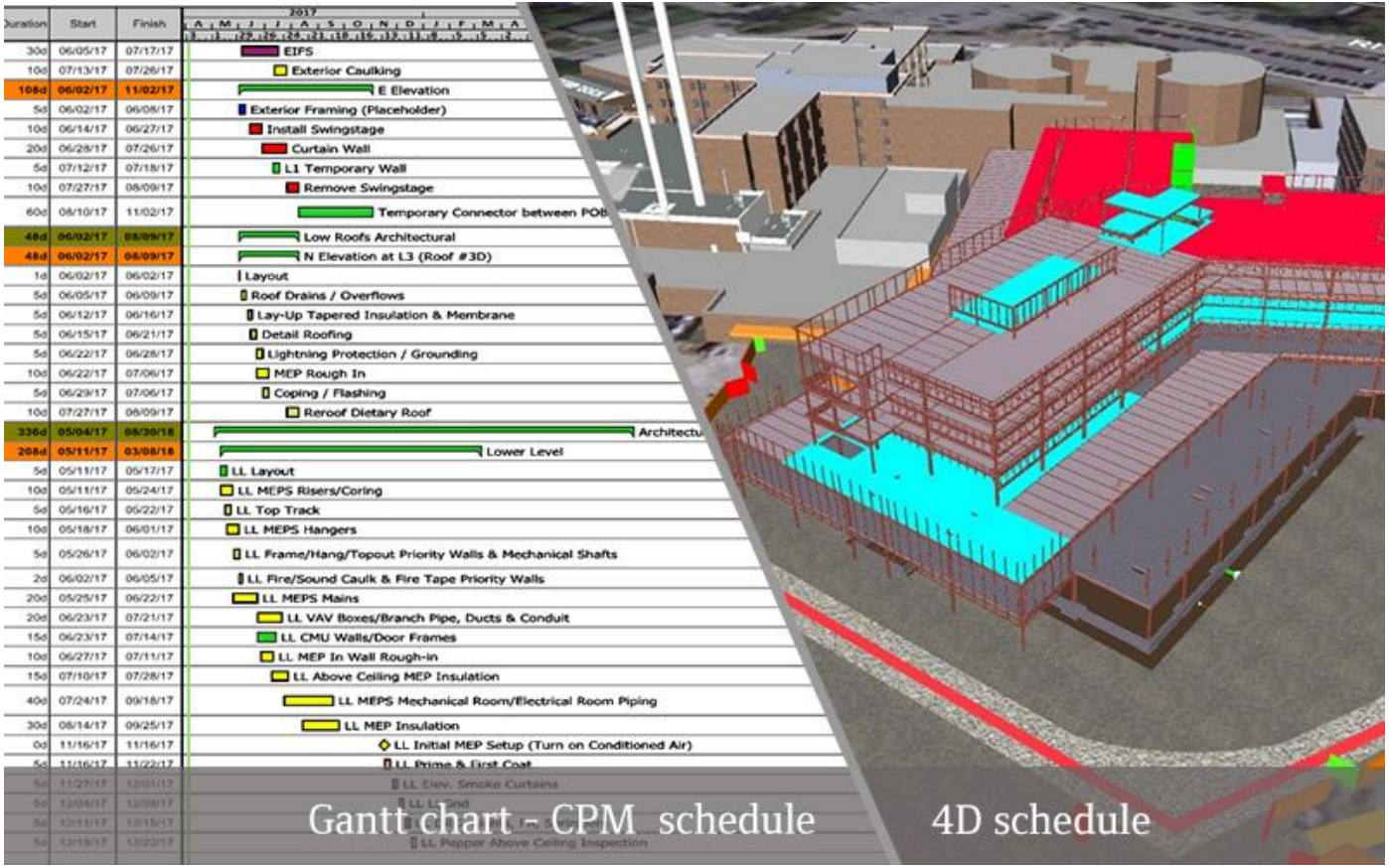
STR VS MEP	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status
	0.050m	50	49	1	0	0	0	Hard	OK

									Item 1				Item 2				
Image	Clash Name	Status	Distance	Grid Location	Description	Date Found	Assigned To	Clash Point	Item ID	Layer	Item Name	Item Type	Item ID	Layer	Item Name	Item Type	Comments
	Clash1	Active	-0.300	T-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16	TOM	x:530141.220, y:183282.171, z:61.981	*Element ID:* 2865321	09 - NINTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 13212004	Ninth Floor Services Datum	Cable Tray with Fittings	Line	*#0 - macalis - 2017/1/31 22:36.14* Assigned to TOM _____ PLEASE CREATE OPENING IN WALL FOR TRAY
	Clash2	New	-0.285	J-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530143.257, y:183296.040, z:64.462	*Element ID:* 4228318	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 5358274	Roof Services Datum	Cable Tray with Fittings	Line	
	Clash3	New	-0.253	T-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530141.102, y:183293.476, z:64.490	*Element ID:* 4228319	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 5360025	Roof Services Datum	Cable Tray with Fittings	Line	
	Clash4	New	-0.247	J-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530143.195, y:183294.657, z:64.437	*Element ID:* 4228318	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 5358346	Roof Services Datum	Cable Tray with Fittings	Line	
	Clash5	New	-0.223	T-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530144.953, y:183282.001, z:63.845	*Element ID:* 2954527	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 13139150	10 - Roof	Metal - Aluminium Extract	Line	
	Clash6	New	-0.223	T-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530141.732, y:183282.147, z:63.845	*Element ID:* 2954527	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 13139106	10 - Roof	Metal - Aluminium Extract	Line	
	Clash7	New	-0.223	T-W : - 00 - Absolute Zero	Hard	2017/1/31 22:35.16		x:530144.660, y:183285.168, z:63.936	*Element ID:* 2956793	10 - TENTH FLOOR	Concrete - Cast In Situ	Solid	*Element ID:* 13139184	10 - Roof	Metal - Aluminium Extract	Line	

Έλεγχος Κόστους - Προμετρήσεις



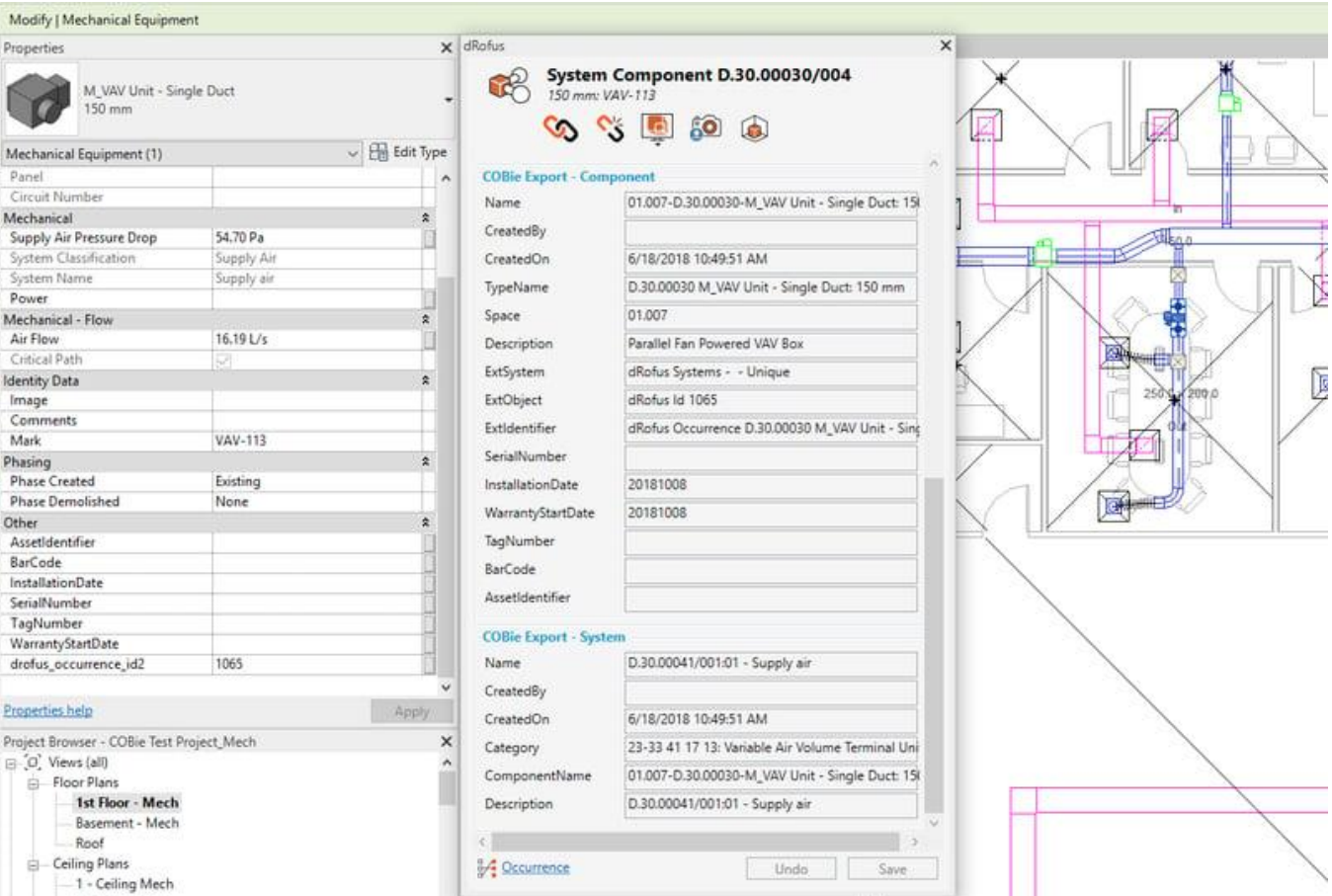
Χρονικός Προγραμματισμός - 4D schedule

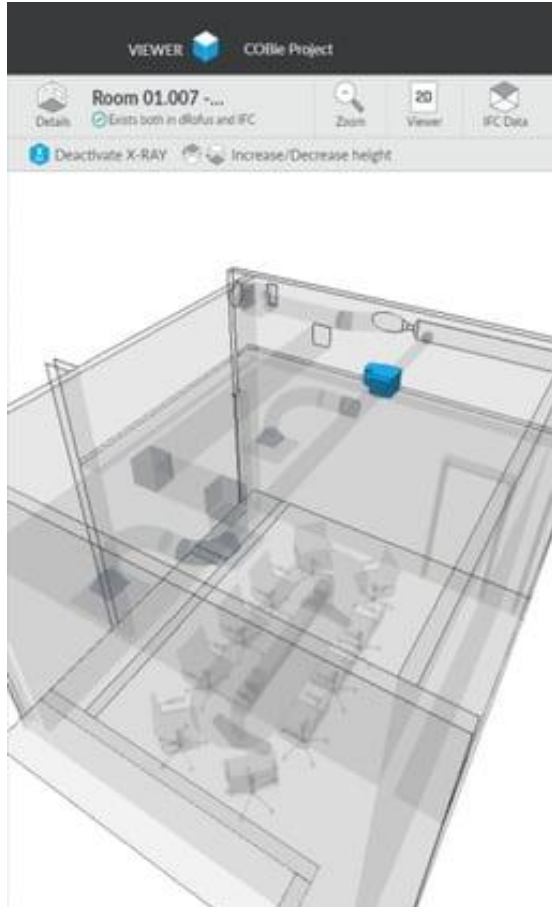


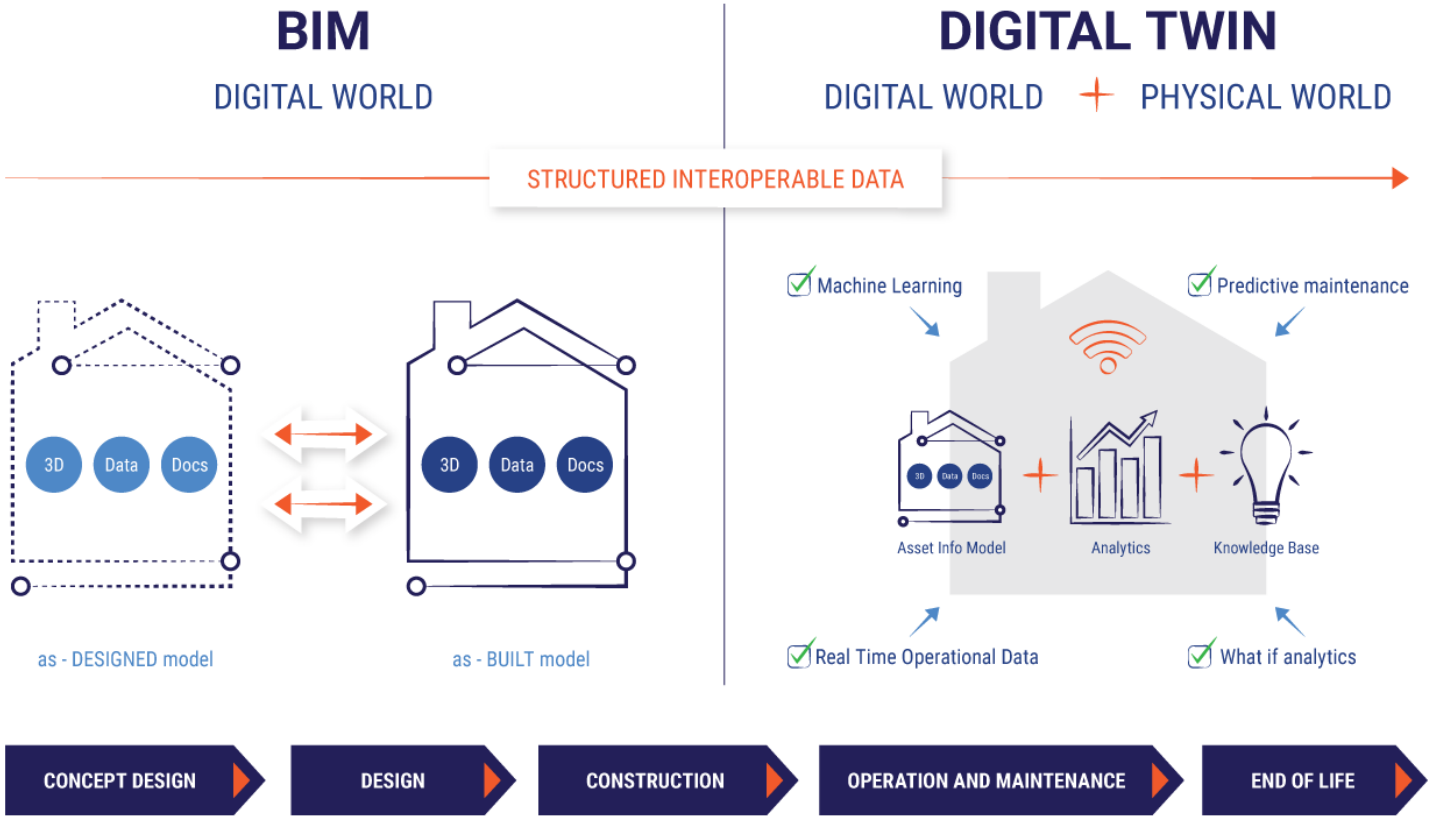
A	B	C	D
Name	CreatedBy	CreatedOn	Category
Pre-planted vegetation blanket	info@ABCArchitecture.com	2017-04-05	Pr_45_57_91_65 : Pre-planted vegetation b
Rootball securing assembly	info@ABCArchitecture.com	2017-04-05	Pr_45_63_64_72 : Rootball securing frames
Stakes	info@ABCArchitecture.com	2017-04-05	Pr_45_63_64_84 : Stakes
Tree grilles	info@ABCArchitecture.com	2017-04-05	Pr_45_63_64_87 : Tree grilles
Tree guards	info@ABCArchitecture.com	2017-04-05	Pr_45_63_64_88 : Tree guards
Corrosion inhibitor chemicals fo	info@ABCArchitecture.com	2017-04-05	Pr_60_55_96_15 : Corrosion inhibitor chem
Scale inhibitor chemicals for op	info@ABCArchitecture.com	2017-04-05	Pr_60_55_96_77 : Scale inhibitor chemicals
Dosing pots	info@ABCArchitecture.com	2017-04-05	Pr_60_55_97_07 : Biocide dosing pots ; Pr_
Gas fired condensing boilers	info@ABCArchitecture.com	2017-04-05	Pr_60_60_08_34 : Gas fired condensing boi
Storage water heaters, gas fired	info@ABCArchitecture.com	2017-04-05	Pr_60_60_96_34 : Gas-fired storage water h
Immersion heaters	info@ABCArchitecture.com	2017-04-05	Pr_60_60_96_42 : Immersion heaters
Low temperature hot water hea	info@ABCArchitecture.com	2017-04-05	Pr_60_65_37_47 : Low temperature hot wa
PVC-U solid wall below ground	info@ABCArchitecture.com	2017-04-05	Pr_65_52_07_88 : Unplasticized polyvinylcl
Covers and gratings for floor gul	info@ABCArchitecture.com	2017-04-05	Pr_65_52_24_30 : Floor gully covers and gra
Floor gullies	info@ABCArchitecture.com	2017-04-05	Pr_65_52_24_31 : Floor gullies
Freestanding grease traps and c	info@ABCArchitecture.com	2017-04-05	Pr_65_52_25_32 : Free-standing grease tra
Pressure gauges	info@ABCArchitecture.com	2017-04-05	Pr_65_52_34_66 : Pressure gauges
Temperature gauges	info@ABCArchitecture.com	2017-04-05	Pr_65_52_34_88 : Temperature gauges

Instruction | Contact | Facility | Floor | Space | Zone | **Type** | Component | System | Assembly | Connect

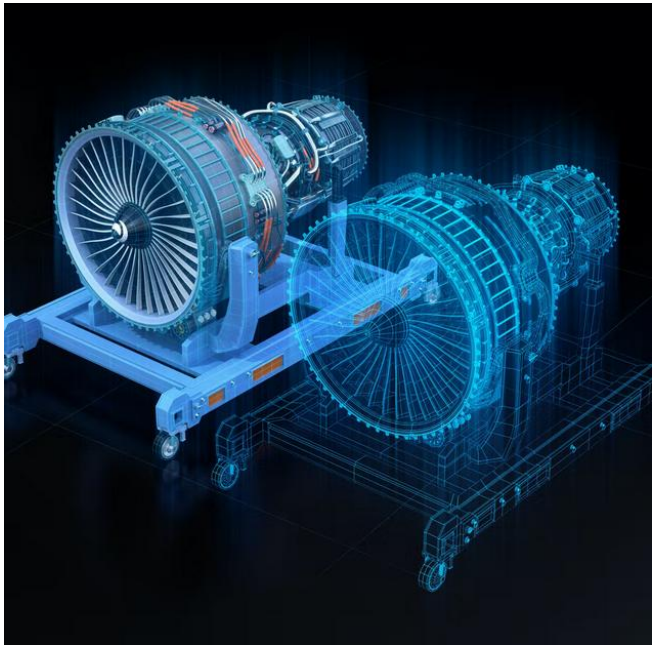
COBie


Modify | Mechanical Equipment
Properties
M_VAV Unit - Single Duct
150 mm
Mechanical Equipment (1)
Edit Type
Panel
Circuit Number
Mechanical
Supply Air Pressure Drop 54.70 Pa
System Classification Supply Air
System Name Supply air
Power
Mechanical - Flow
Air Flow 16.19 L/s
Critical Path
Identity Data
Image
Comments
Mark VAV-113
Phasing
Phase Created Existing
Phase Demolished None
Other
AssetIdentifier
BarCode
InstallationDate
SerialNumber
TagNumber
WarrantyStartDate
drofus_occurrence_id2 1065
Properties help
Apply
Project Browser - COBie Test Project_Mech
Views (all)
Floor Plans
1st Floor - Mech
Basement - Mech
Roof
Ceiling Plans
1 - Ceiling Mech
dRofus
System Component D.30.00030/004
150 mm: VAV-113
COBie Export - Component
Name 01.007-D.30.00030-M_VAV Unit - Single Duct: 15
CreatedBy
CreatedOn 6/18/2018 10:49:51 AM
TypeName D.30.00030 M_VAV Unit - Single Duct: 150 mm
Space 01.007
Description Parallel Fan Powered VAV Box
ExtSystem dRofus Systems - - Unique
ExtObject dRofus Id 1065
ExtIdentifier dRofus Occurrence D.30.00030 M_VAV Unit - Sing
SerialNumber
InstallationDate 20181008
WarrantyStartDate 20181008
TagNumber
BarCode
AssetIdentifier
COBie Export - System
Name D.30.00041/001:01 - Supply air
CreatedBy
CreatedOn 6/18/2018 10:49:51 AM
Category 23-33 41 17 13: Variable Air Volume Terminal Uni
ComponentName 01.007-D.30.00030-M_VAV Unit - Single Duct: 15
Description D.30.00041/001:01 - Supply air
Occurrence
Undo
Save


VIEWER
COBie Project
Room 01.007 -...
Details
Exists both in dRofus and IFC
Zoom
Viewer
IFC Data
Deactivate X-RAY
Increase/Decrease height

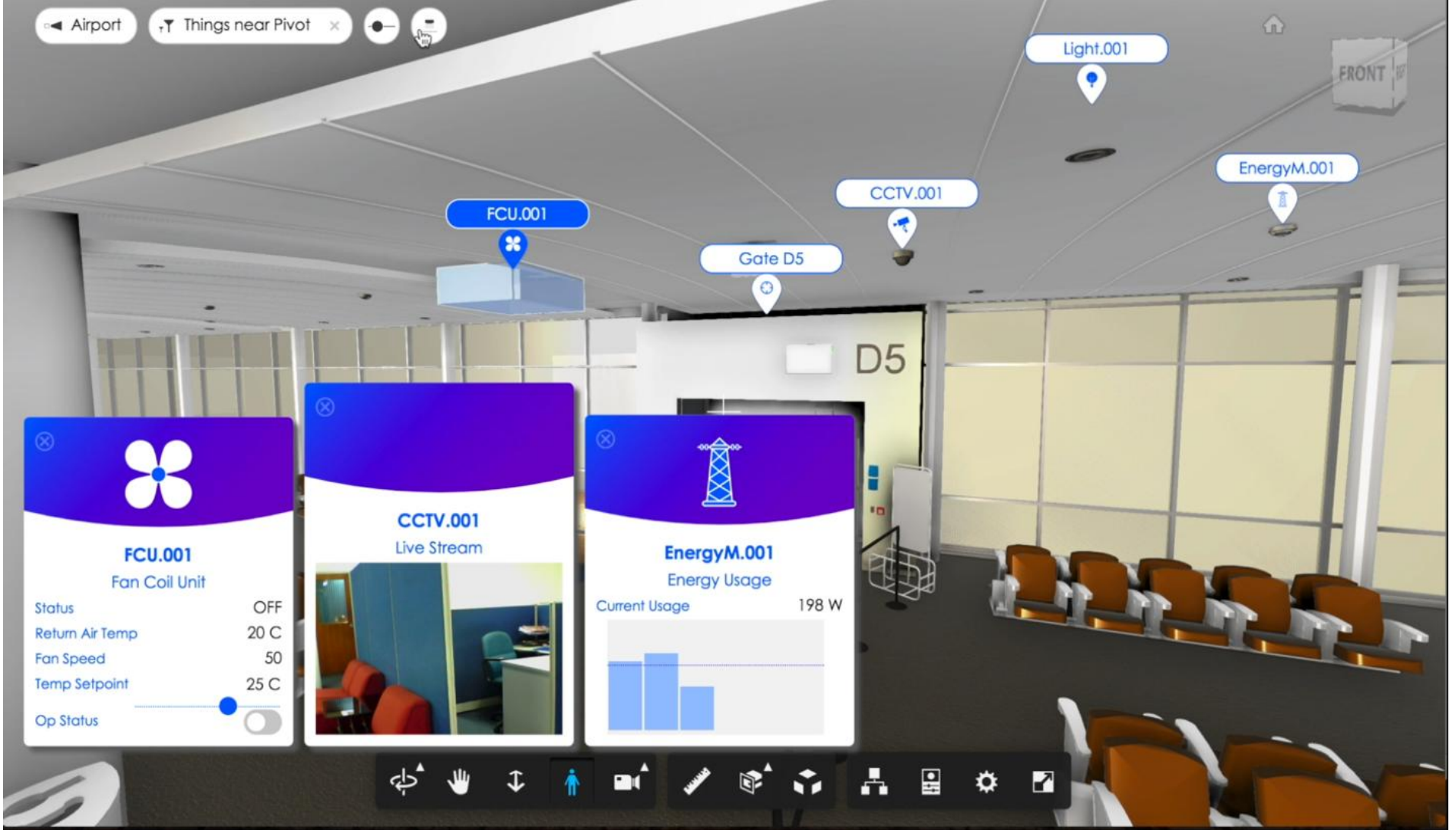

BIM
DIGITAL WORLD
DIGITAL TWIN
DIGITAL WORLD + PHYSICAL WORLD
STRUCTURED INTEROPERABLE DATA
3D
Data
Docs
3D
Data
Docs
as - DESIGNED model
as - BUILT model
Machine Learning
Predictive maintenance
Asset Info Model
Analytics
Knowledge Base
Real Time Operational Data
What if analytics
CONCEPT DESIGN
DESIGN
CONSTRUCTION
OPERATION AND MAINTENANCE
END OF LIFE

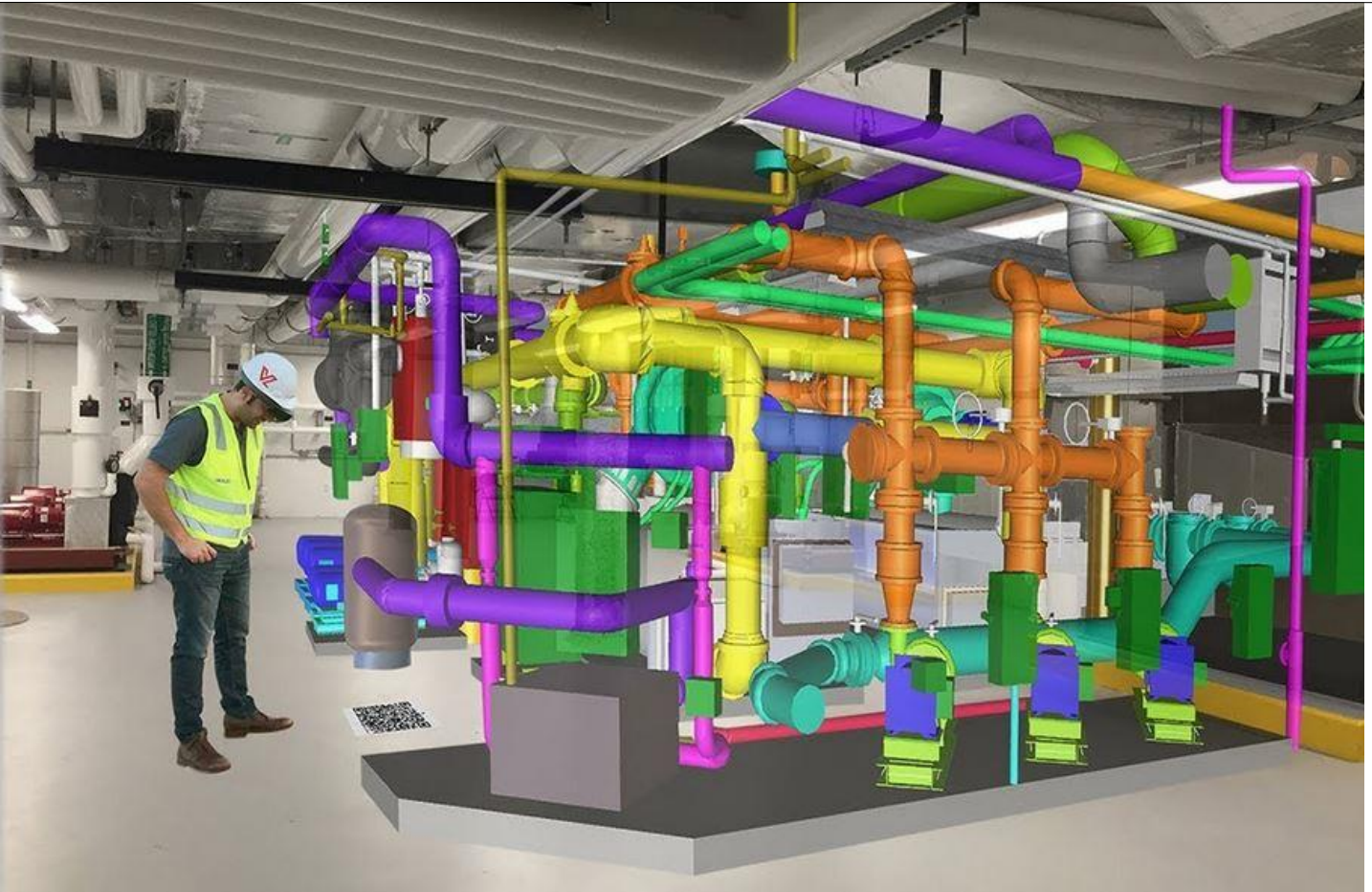
Ψηφιακό Αντίγραφο (Digital Twin)

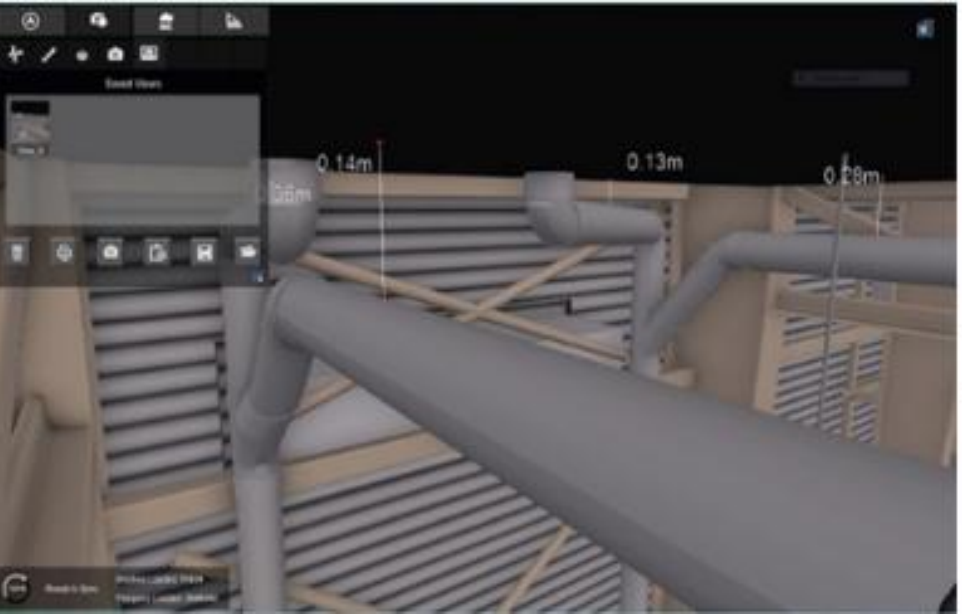


- Ψηφιακή αναπαράσταση ενός φυσικού αντικειμένου
- Διαφορετική σημασία ανάλογα με την βιομηχανία [industry] που χρησιμοποιείται
- Ψηφιακό στοιχείο [digital asset]: Κτίριο, Εξοπλισμός, Όχημα, Υποδομές, Πληροφορία


FUTURE OF CONSTRUCTION
Pre-fabrication & modular construction 1
Advanced building materials 2
3D printing & additive manufacturing 3
Autonomous construction 4
Augmented reality & virtualization 5
Big data & predictive analytics 6
Wireless monitoring & connected equipment 7
Cloud & real time collaboration 8
3D scanning & photogrammetry 9
Building Information Modeling 10


Airport
Things near Pivot
Light.001
FRONT
EnergyM.001
CCTV.001
FCU.001
Gate D5
D5
FCU.001
Fan Coil Unit
Status OFF
Return Air Temp 20 C
Fan Speed 50
Temp Setpoint 25 C
Op Status
CCTV.001
Live Stream
EnergyM.001
Energy Usage
Current Usage 198 W

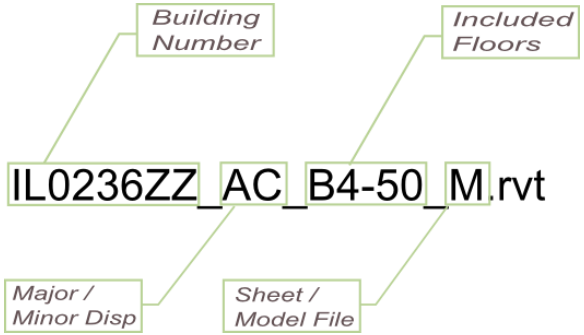



0.14m
0.13m

Scan to BIM

3. Στάδια Μελέτης με BIM

- Design Responsibility matrix (οργάνωση της ομάδας / key activities)
- Ονομασία και κωδικοποίηση αρχείων
- Οργάνωση κτιριακού έργου σε ενότητες
- Παραδοτέα κάθε φάσης
- Απαιτούμενο Επίπεδο πληροφορίας (LOD)
- Μεθοδολογία ελέγχου του μοντέλου (Project Audit)
- CDE (Common Data Environment)



LOD100

(Όγκοπλασία)

LOD200

(Προμελέτη)

LOD300

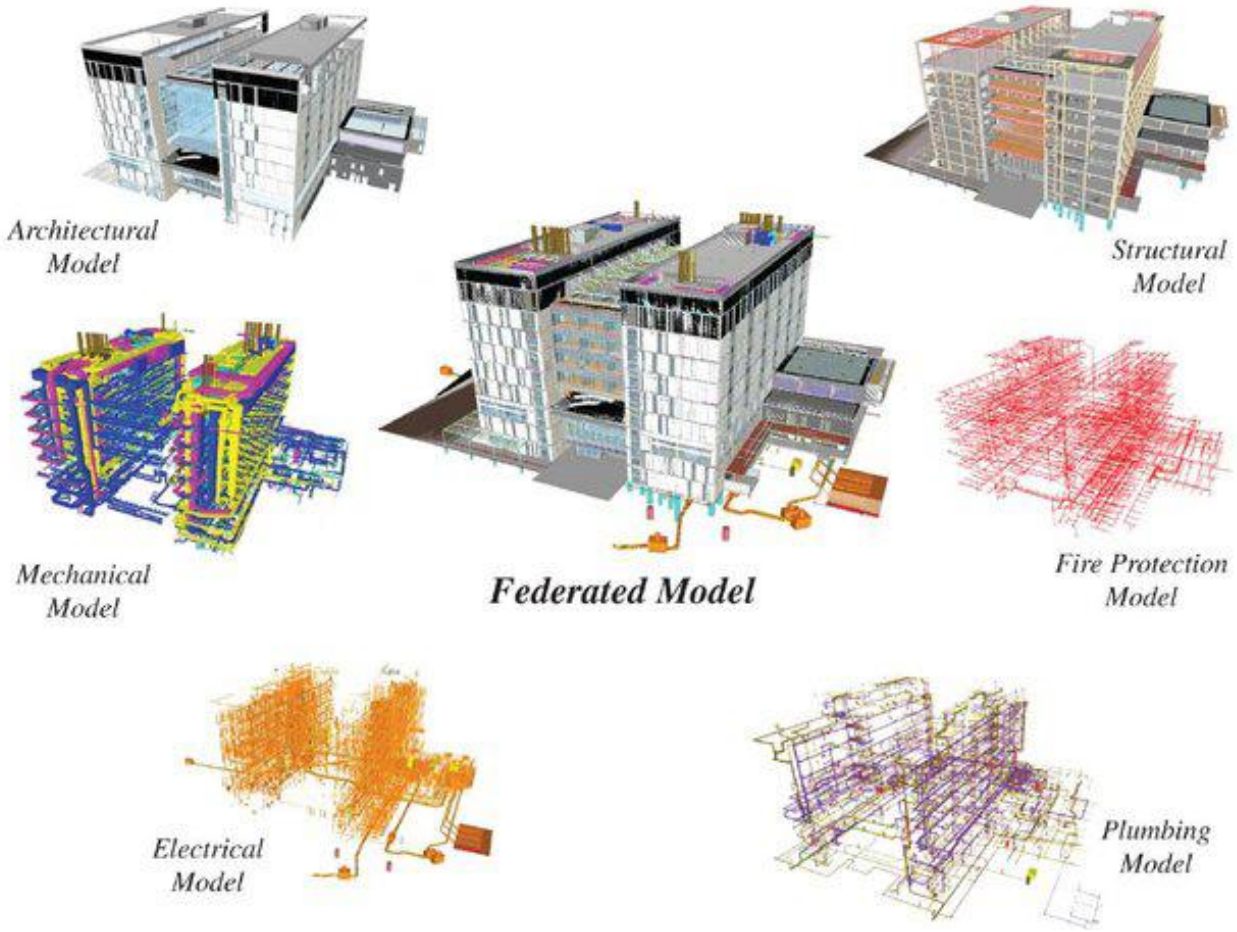
(Οριστική Μελέτη)

LOD400

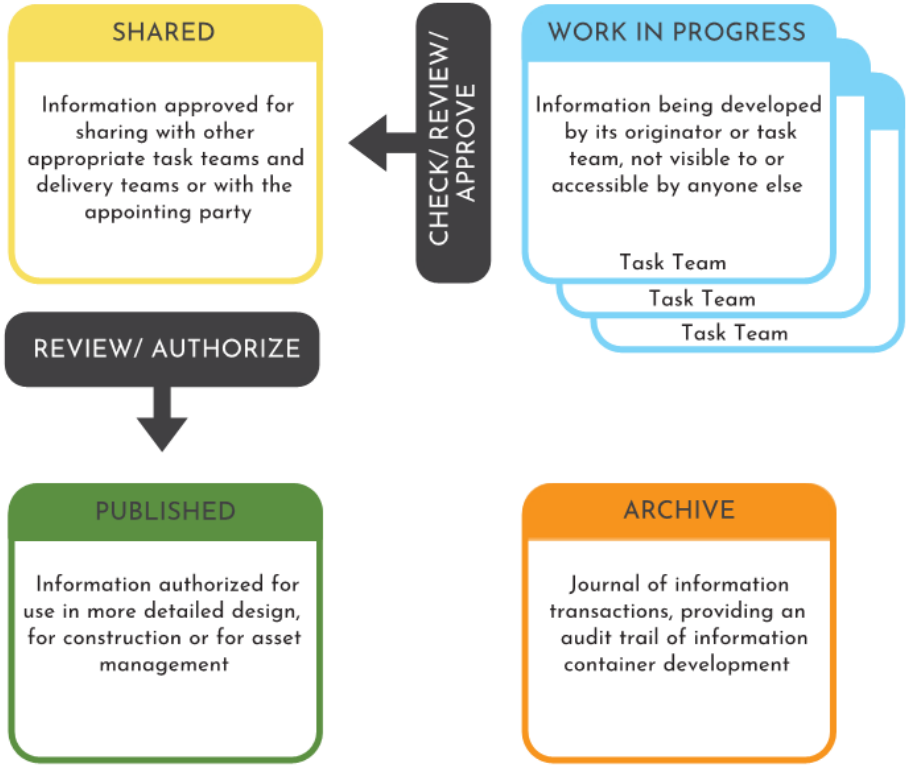
(Μελέτη Εφαρμογής)

LOD500

(Ως κατασκευάσθη- As Built)



Πηγή: Nguyen, Quan & Luu, Quang Phuong & Yen, Ngo. (2020). Application of BIM in design conflict detection: a case study of Vietnam. IOP Conference Series: Materials Science and Engineering. 869. 022038. 10.1088/1757-899X/869/2/022038.


SHARED
Information approved for sharing with other appropriate task teams and delivery teams or with the appointing party
CHECK/ REVIEW/ APPROVE
WORK IN PROGRESS
Information being developed by its originator or task team, not visible to or accessible by anyone else
Task Team
Task Team
Task Team
REVIEW/ AUTHORIZE
PUBLISHED
Information authorized for use in more detailed design, for construction or for asset management
ARCHIVE
Journal of information transactions, providing an audit trail of information container development

Engineering Project Responsibility Matrix

R Responsible for taking the lead to make it happen and produce the deliverable.
A Individual or function to whom "R" is Accountable for output.
S Supports "R" in making it happen. Accountable to "R" for agreed upon work and/or resources.
C Consulted by "R" before plans are final or decisions taken. "C" has opportunity to influence "R's" plans/decisions.
I Informed of decisions, plans, and directions.

		Owner						EPC																														Contractors					
		Project Manager	Electrical Lead	Document Control Lead	Procurment Lead	Operations	Fabrication	Project Sponsor	Project Manager	Project Engineer	Project Administrator	Quality Lead	Project Controls Manager	Project Controls Lead	Estimator	Project Controls Coordinator	Project Accountant	Document Control Manager	Document Control Lead	Process Manager	Process Lead	Electrical Manager	Electrical Lead	Electrical Designer	Instrumentation Manager	I&C Lead	Civil Structural Manager	Civil / Structural Lead	Civil Structural Designer	Piping Manager	Stress Engineer	Matreials Management	Piping Lead	Piping Designer	Piping Designer	Piping Designer	Mechanical Manager	Mechanical Lead	Procurement Lead	Construction Contractor	Structural Steel Contractor	Pump Supplier	Valve Supplier	HAZOP Facilitator	ELM Consultant
Process		I	S	S					A	S						S		A	S	A	R	A	S		A	S				A			S	S	S		A	S					S	
S	Process Flow Diagrams (PFD)	I	S	S					A	S						S					R					S						S											
D	Process & Instrumentation Diagrams (P&ID)	A	S	S					A	S						S				C	R		S			S						S											
	As-Built	A		S					A																							R	S	S									
	Mark up P&IDs to match as-built	S																														A	R										
	Request Custody of P&IDs for updates			S																												R											
	CAD As-builts																															A		S									
	Submit as-builts to CCRL for hard revision			S					A										R													A											
	IFR																																											
	Request Custody of P&IDs for updates			S																												R											
	CAD DBM redlines																				A					A						A		S									
	Request equip tag #s			A																																R							
	Assign equipment tag #s			R																																R							
	Squad check P&IDs for internal review																				A				S							R											
	Review / markup P&IDs								R	R										R	A					R						R				R							
	CAD P&ID markups																				A					A						A		S									
	Issue P&IDs IFR																		R		A											S											
	IFH																				R																							
	Review / markup P&IDs	R	R																	R	A					R						R											
	CAD P&ID markups																				A					A						A		S									
	Issue P&IDs IFH																		R		A											S											
	IFD																																											
	Review / markup P&IDs (during HAZOP)	R	R																	R	A					R						R											S	
	CAD P&ID markups																				A					A						A		S									
	Stamp P&ID																			R	A																							
	Issue P&IDs IFD																		R		A											S											
	IFC																																											
	Review / markup P&IDs	R	R																	R	A					R						R											
	CAD P&ID markups																				A					A						A		S									
	Stamp P&ID																			R	A																							
	Issue P&IDs IFC	A							A										R		A											S											
D	Line Designation Tables (LDT)	I	S	S					A	S											R		S			S																	
	Issue request for line #s from CCRL			S															R		A											S											
	Assign line #s			S																	R											S											
	Stamping LDTs																			R	A																							
	Issue LDTs																		R		A											S											
	Confirm tank venting capacity																			A	R																S							
	Develop MRQ package																																				R							
	Confirm tank PVRV capacity																			A	R																S							
	Revise tank retention times based on supply pumps and increased throughput																			A	R																							

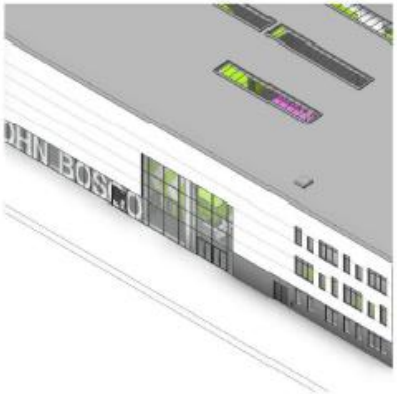
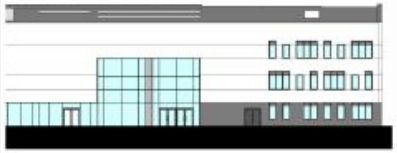
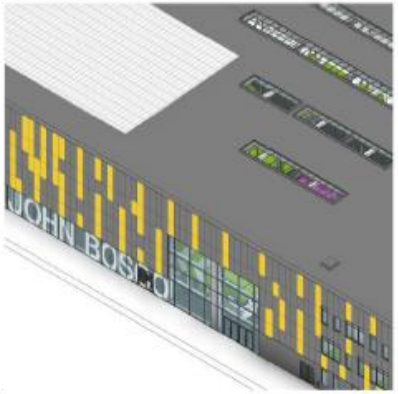
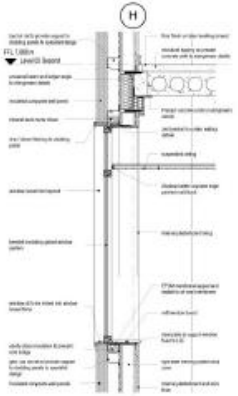
https://www.theNBS.com/our-tools/digital-plan-of-work

Code	Description/ Requirement	Purpose
2 **Concept design** What is typical for concept stage?	Visual information to provide general principles of the design. Showing arrangement of system with their relationship to internal and external context, and key project criteria to suit client brief. General descriptions would be expected to communicate principles of materiality, scope, colour and context. Expect strategic coordination with other professions to show general principles of the design.	To provide a visual indication of proposals at a concept stage and support general spatial coordination, identifying key requirements such as access and maintenance zones for primary systems.
3 **Spatial coordination** What is typical as the design develops?	Visual information to provide developed principles of the design to a greater level of detail. Developed coordination between all professions. Visual development showing coordination for general size and primary relationships between different elements of the construction. Can form a brief for a specialist subcontractor or fabricator to progress with their technical design, fabrication and installation. This would be expected to include critical dimensional coordination, performance requirements and qualities of finish.	To provide a visual representation of proposals at a Design Development stage and to allow greater spatial coordination, confirming brief for Technical Design stage.
4 **Technical design** What is typical as for technical design?	Visual information to provide fixed principles of the design supporting procurement. Developed coordination between all professions. Visual representations showing coordination for general size and relationships between different elements of the construction. Dimensionally accurate graphical representation of system, indicating primary performance characteristics. Graphical information represented may alter, dependent on visual information to be produced, e.g. scope of work drawings, setting out, floor loading, etc. Typical installation details separately produced, linked to model element and adjacent constructions.	To provide a visual representation of proposals at a Technical Design stage supporting full spatial coordination.
5 **Construction** What has been constructed?	Visual information to provide full information to support construction/ installation. Developed coordination between all professions. Visual representations showing final coordination for size and relationships between different elements of the construction. Dimensionally accurate graphical representation of system, indicating primary performance characteristics and sufficient information to support installation. Typical installation details separately produced, linked to model element and adjacent constructions.	To provide sufficient information for construction/ installation of the required products. To be updated during the construction process to reflect final decisions.

Πηγή: www.thenbs.com

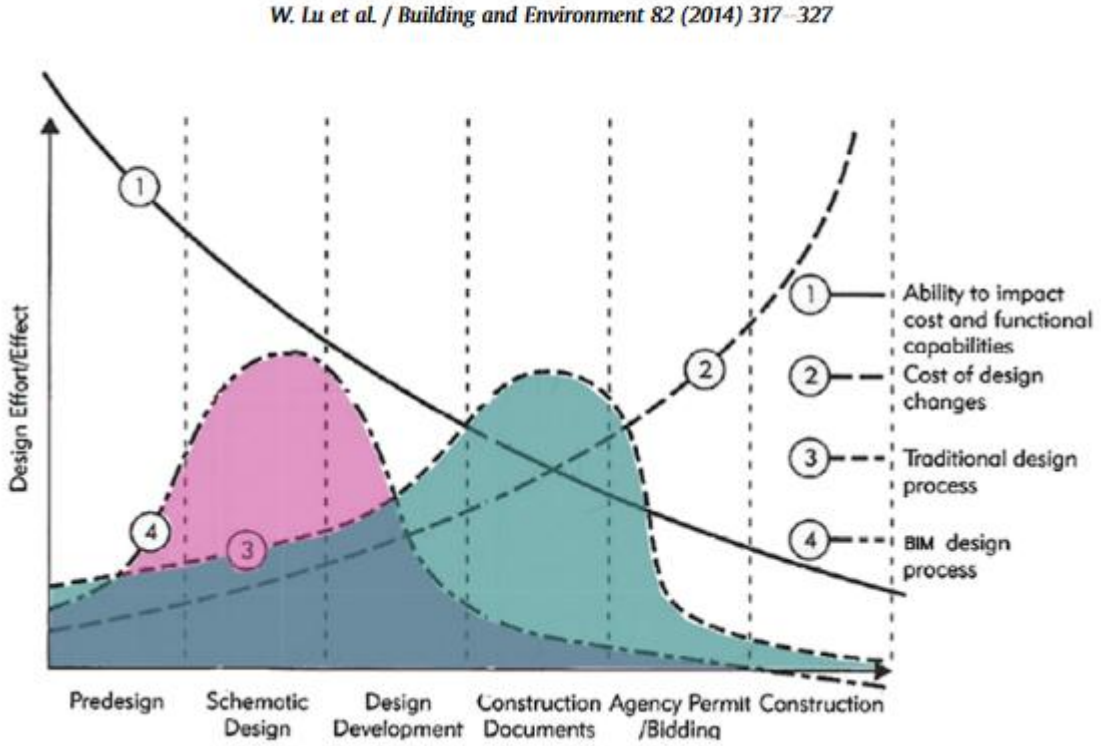
Ss_25_60_35 - Glazing systems

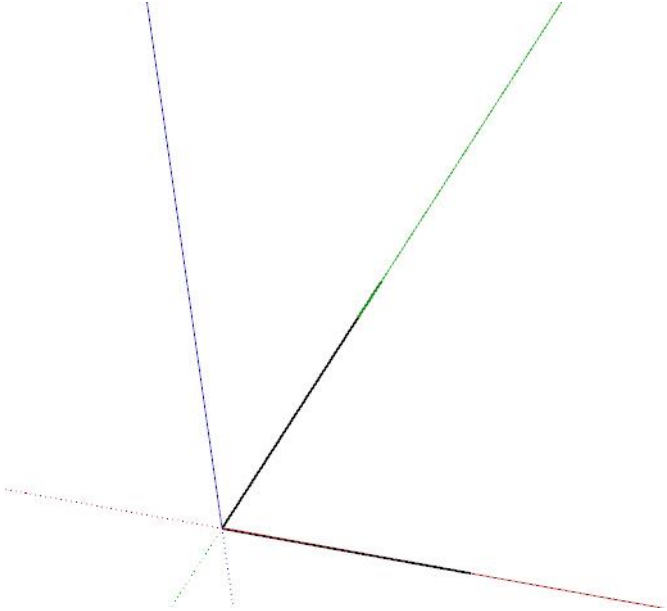
The images below are typical to illustrate visual representations for the system Ss_25_60_35_06 - Bead-fixed insulating glazing systems at selected LOD bandings

LOD	Model	Plan	Elevation	Section
2				
3				

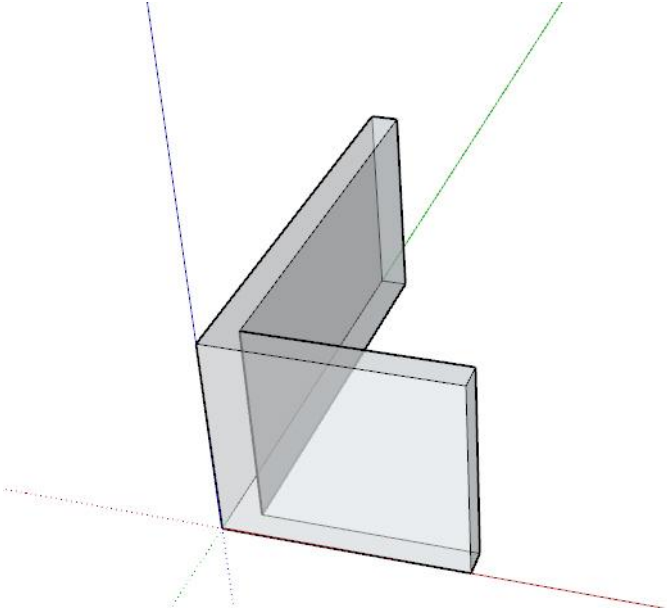
Πηγή: www.thenbs.com

4. Μοντελοποίηση


W. Lu et al. / Building and Environment 82 (2014) 317–327
Design Effort/Effect
1
2
3
4
Predesign
Schematic Design
Design Development
Construction Documents
Agency Permit /Bidding
Construction
1 Ability to impact cost and functional capabilities
2 Cost of design changes
3 Traditional design process
4 BIM design process

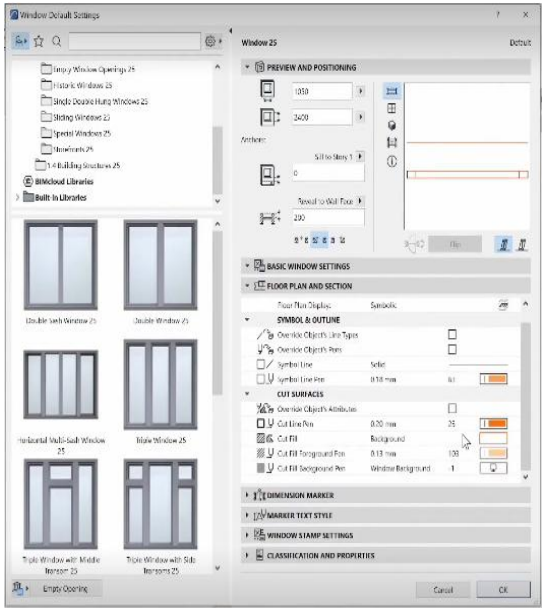


Γραμμές (2d)

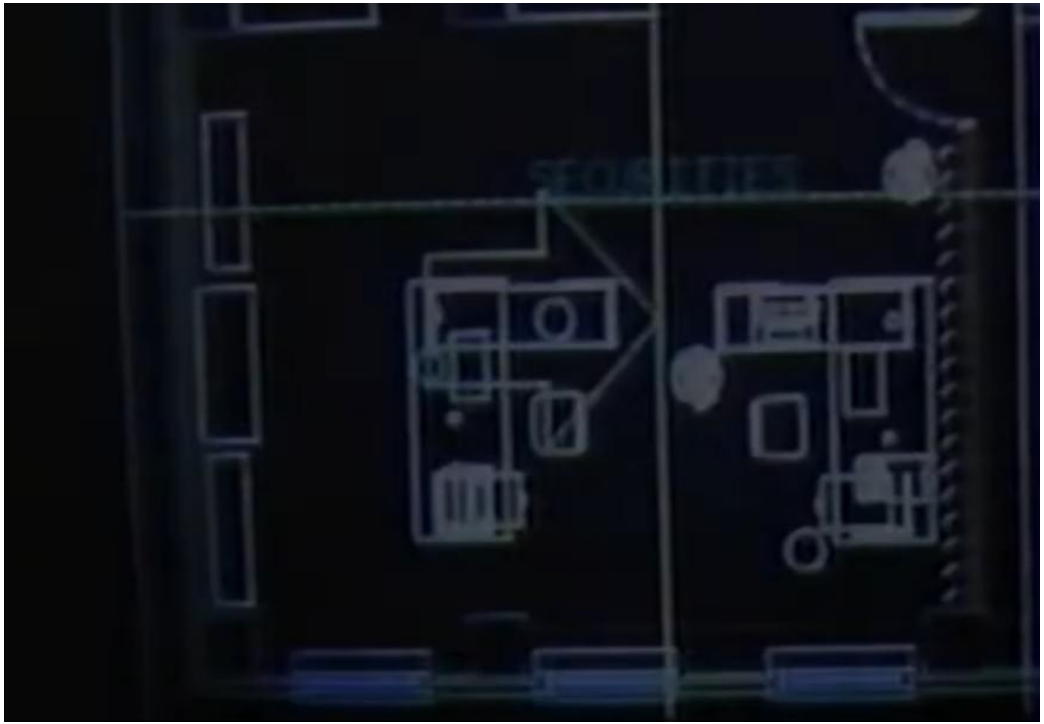


Επιφάνειες / όγκοι (3d)

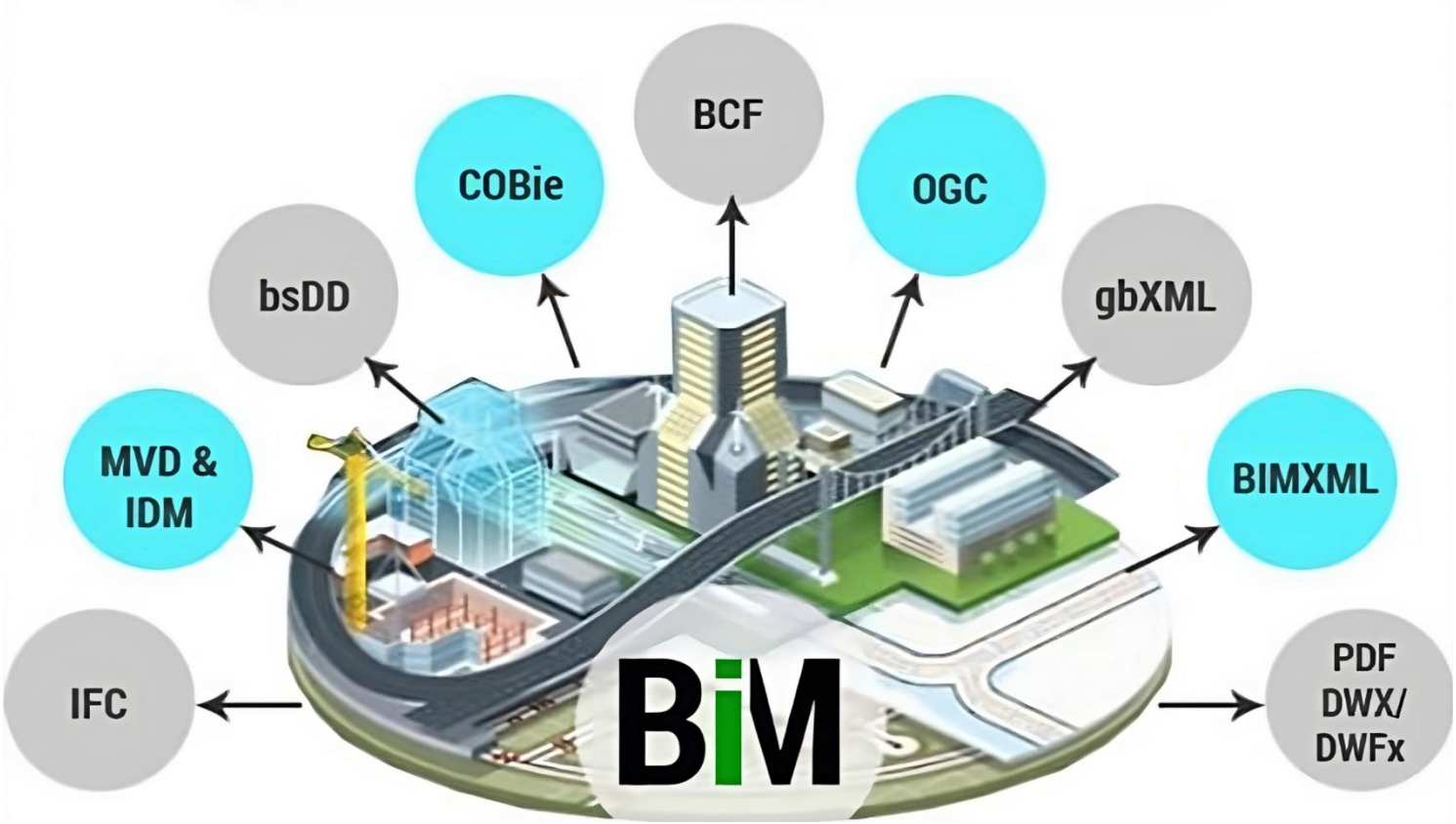
Μετάβαση από CAD σε BIM

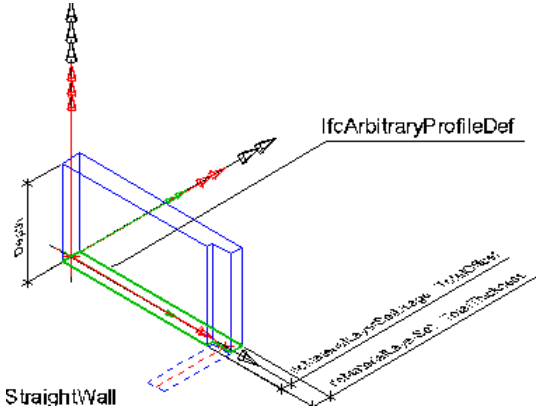


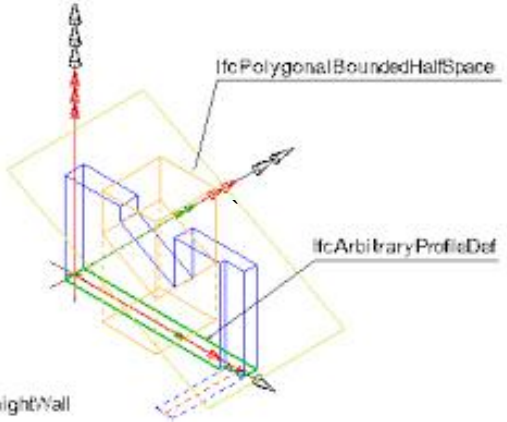
Αντικείμενα (3d)

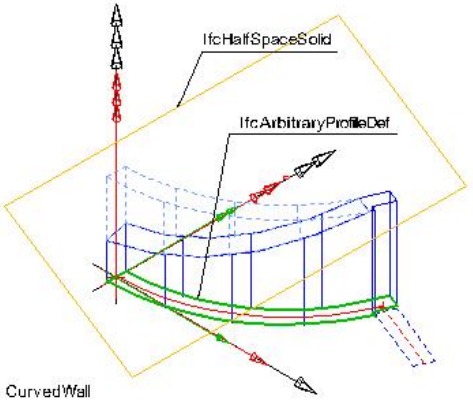


Building Description System (BDS)
- Really Universal Computer Aided Production System (RUCAPS)
- Sonata
- Reflex
- Revit

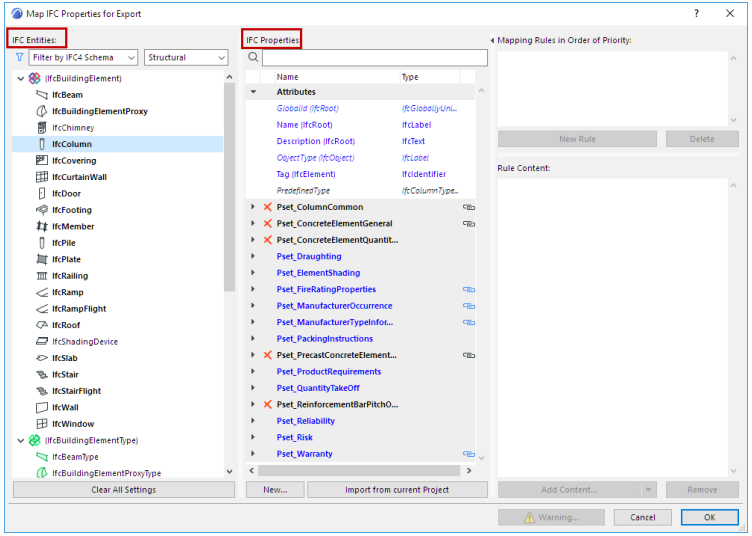

BCF
COBie
OGC
bsDD
gbXML
MVD &
IDM
BIMXML
IFC
BiM
PDF
DWX/
DWFx



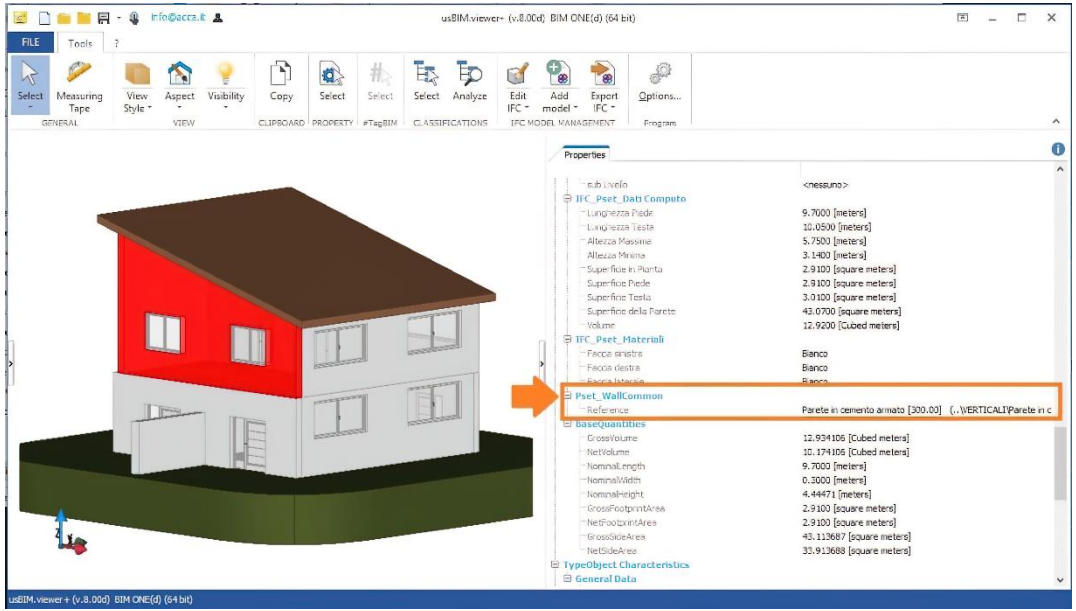


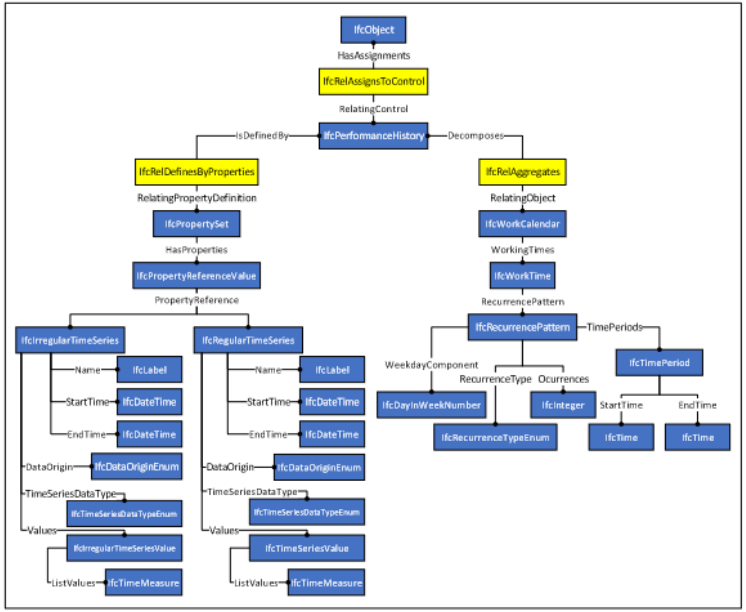


Name	*Description*	*Value Type*
NominalLength	Total nominal (or average) length of the wall along the wall path. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityLength*
NominalWidth	Total nominal (or average) width (or thickness) of the wall perpendicular to the wall path. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityLength*
NominalHeight	Total nominal (or average) height of the wall along the wall path. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityLength*
GrossFootprintArea	Area of the wall as viewed by a ground floor view, not taking any wall modifications (like recesses) into account. It is also referred to as the foot print of the wall. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
NetFootprintArea	Area of the wall as viewed by a ground floor view, taking all wall modifications (like recesses) into account. It is also referred to as the foot print of the wall. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
GrossSideArea	Area of the wall as viewed by an elevation view of the middle plane of the wall. It does not take into account any wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
NetSideArea	Area of the wall as viewed by an elevation view of the middle plane. It does take into account all wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
GrossSideAreaLeft	Area of the wall as viewed by an elevation view of the left side (when viewed along the wall path orientation). It does not take into account any wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
NetSideAreaLeft	Area of the wall as viewed by an elevation view of the left side (when viewed along the wall path orientation). It does take into account all wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
GrossSideAreaRight	Area of the wall as viewed by an elevation view of the right side (when viewed along the wall path orientation). It does not take into account any wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
NetSideAreaRight	Area of the wall as viewed by an elevation view of the right side (when viewed along the wall path orientation). It does take into account all wall modifications (such as openings). The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityArea*
GrossVolume	Volume of the wall, without taking into account the openings and the connection geometry. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityVolume*
NetVolume	Volume of the wall, after subtracting the openings and after considering the connection geometry. The exact definition and calculation rules depend on the method of measurement used.	*IfcQuantityVolume*



Ifc wall property sets. Πηγή: https://standards.buildingsmart.org/IFC/RELEASE/IFC2x3/TC1/HTML/ifcsharedbldgelements/lexical/ifcwall.htm


usBIM.viewer+ (v.8.00d) BIM ONE(d) (64 bit)
FILE
Tools
Select
Measuring Tape
View Style
Aspect
Visibility
Copy
Select
Select
Select
Analyze
Edit IFC
Add model
Export IFC
Options...
GENERAL
VIEW
CLIPBOARD
PROPERTY
#TagBIM
CLASSIFICATIONS
IFC MODEL MANAGEMENT
Program
Properties
IFC_Pset_Dati Computo
Lunghezza Piede 9.7000 [meters]
Lunghezza Testa 10.0500 [meters]
Altezza Massima 5.7500 [meters]
Altezza Minima 3.1400 [meters]
Superficie in Pianta 2.9100 [square meters]
Superficie Piede 2.9100 [square meters]
Superficie Testa 3.0100 [square meters]
Superficie della Parete 43.0700 [square meters]
Volume 12.9200 [Cubed meters]
IFC_Pset_Materiali
Faccia sinistra Bianco
Faccia destra Bianco
Pset_WallCommon
Reference Parete in cemento armato [300.00] (..\VERTICALI\Parete in c
BaseQuantities
GrossVolume 12.934106 [Cubed meters]
NetVolume 10.174106 [Cubed meters]
NominalLength 9.7000 [meters]
NominalWidth 0.3000 [meters]
NominalHeight 4.44471 [meters]
GrossFootprintArea 2.9100 [square meters]
NetFootprintArea 2.9100 [square meters]
GrossSideArea 43.113687 [square meters]
NetSideArea 33.913688 [square meters]
TypeObject Characteristics
General Data
usBIM.viewer+ (v.8.00d) BIM ONE(d) (64 bit)


IfcObject
HasAssignments
IfcRelAssignsToControl
RelatingControl
IsDefinedBy
IfcPerformanceHistory
Decomposes
IfcRelDefinesByProperties
RelatingPropertyDefinition
IfcRelAggregates
RelatingObject
IfcPropertySet
HasProperties
IfcWorkCalendar
WorkingTimes
IfcPropertyReferenceValue
PropertyReference
IfcWorkTime
RecurrencePattern
IfcIrregularTimeSeries
IfcRegularTimeSeries
IfcRecurrencePattern
TimePeriods
Name
IfcLabel
StartTime
IfcDateTime
EndTime
IfcDateTime
DataOrigin
IfcDataOriginEnum
TimeSeriesDataType
IfcTimeSeriesDataTypeEnum
Values
IfcIrregularTimeSeriesValue
ListValues
IfcTimeMeasure
IfcTimeSeriesValue
WeekdayComponent
IfcDayInWeekNumber
RecurrenceType
Ocurrences
IfcInteger
IfcRecurrenceTypeEnum
IfcTimePeriod
StartTime
IfcTime
EndTime
IfcTime

LOD100

(Ογκοπλασία)

LOD200

(Προμελέτη)

LOD300

(Οριστική Μελέτη)

LOD400

(Μελέτη Εφαρμογής)

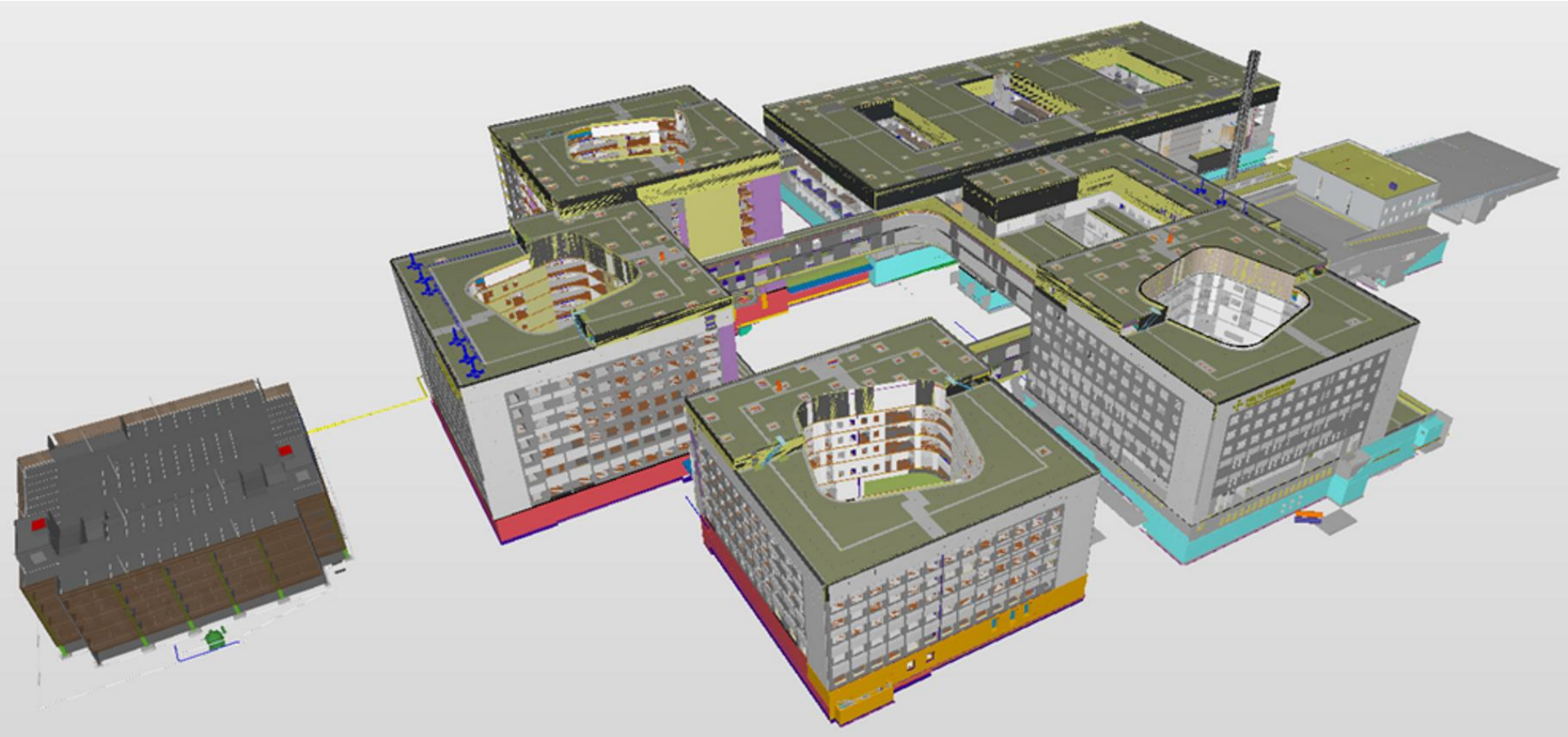
LOD500

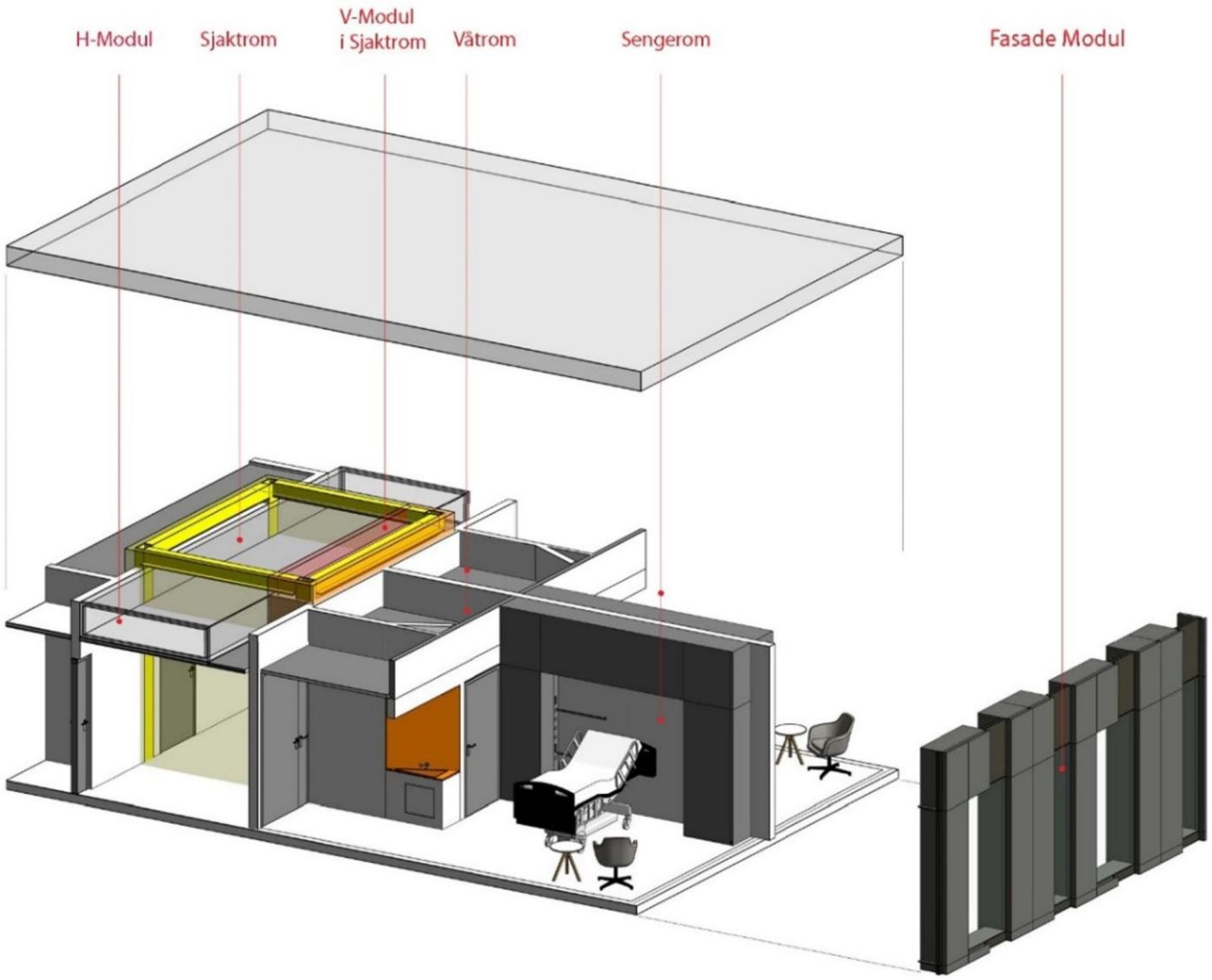
(Ως κατασκευάσθη- As Built)

5. Case studies

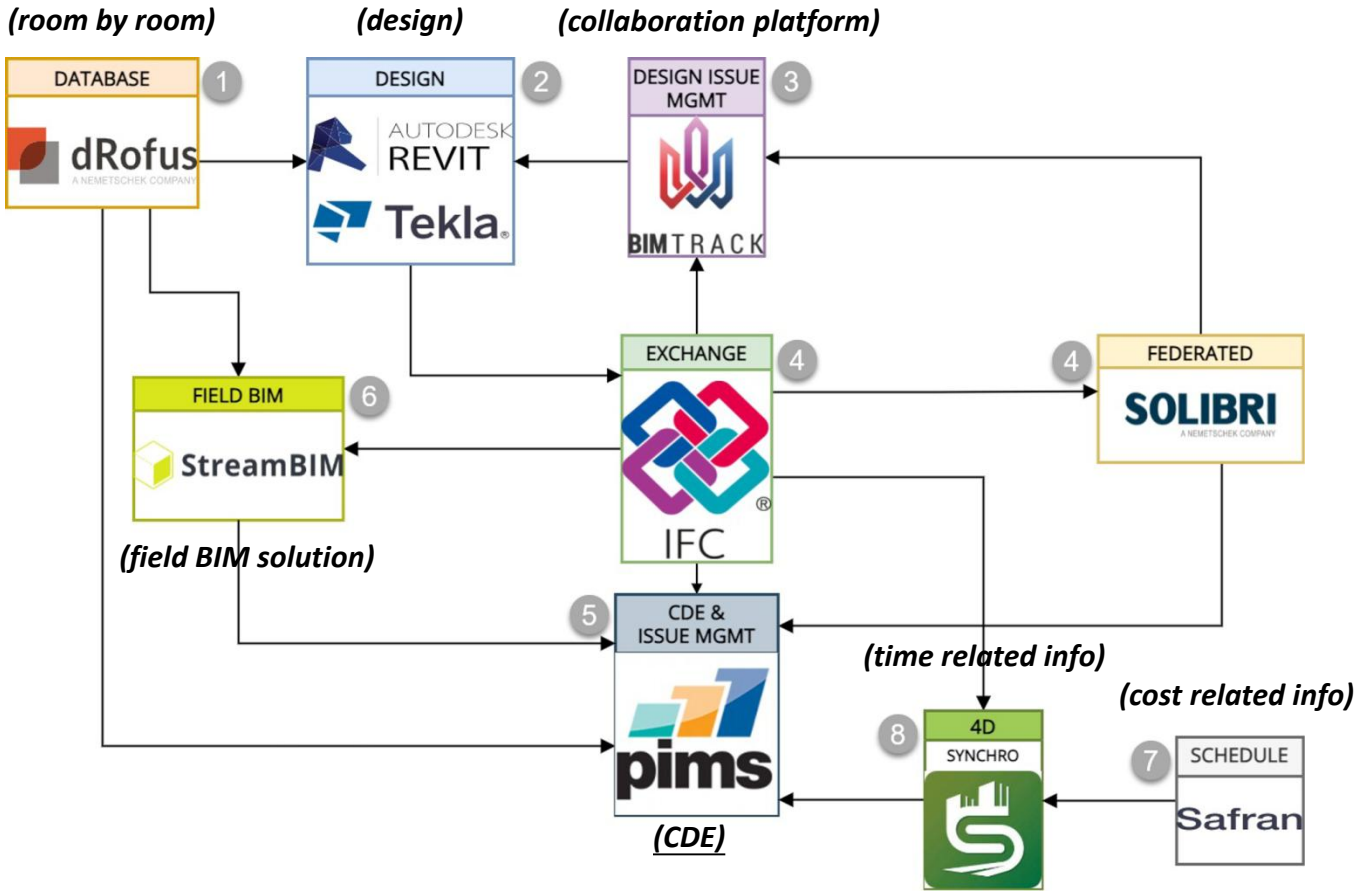
New Stavanger University Hospital, Νορβηγία

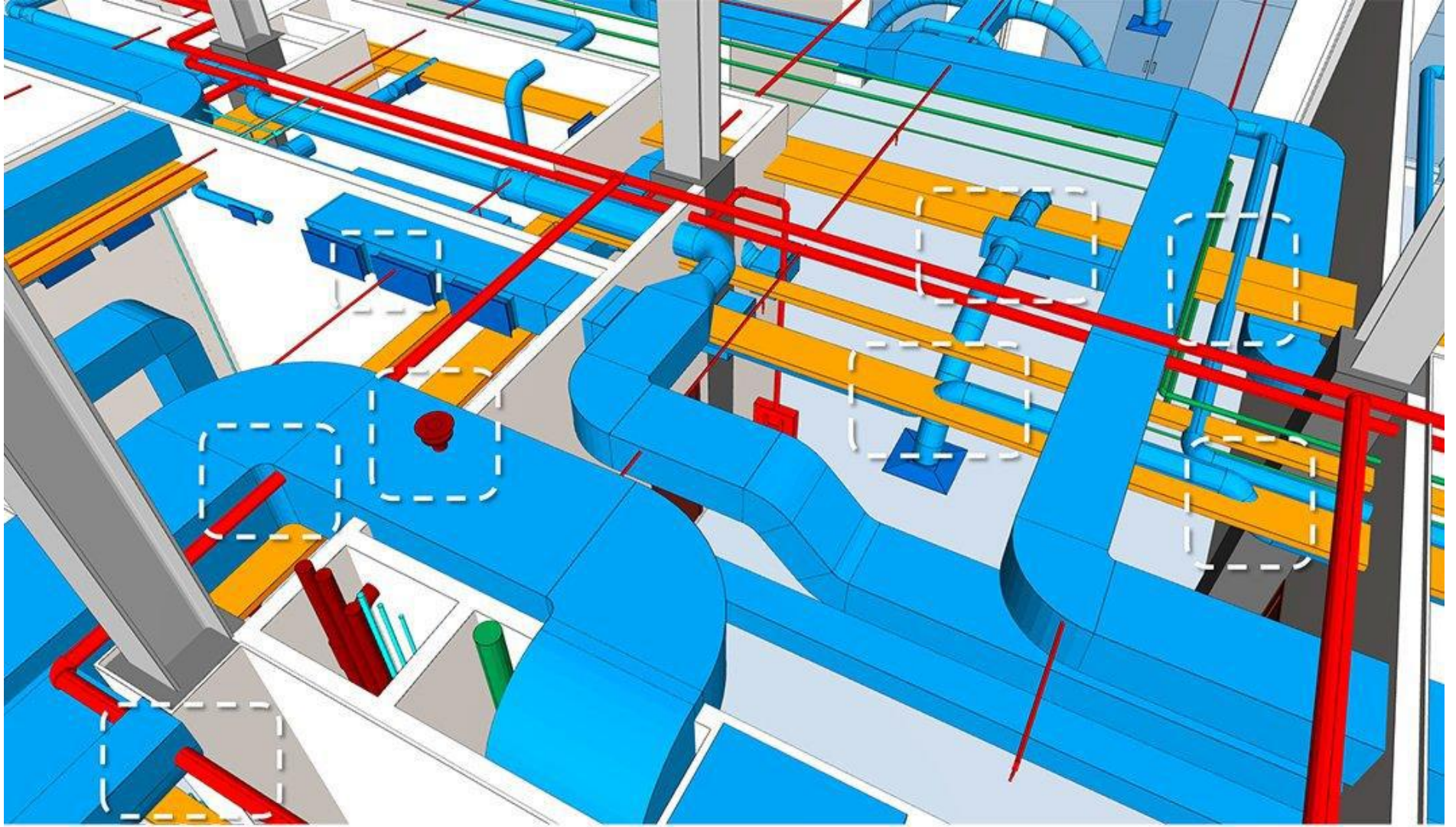
Πηγή: nordicarch.com, BIM Corner



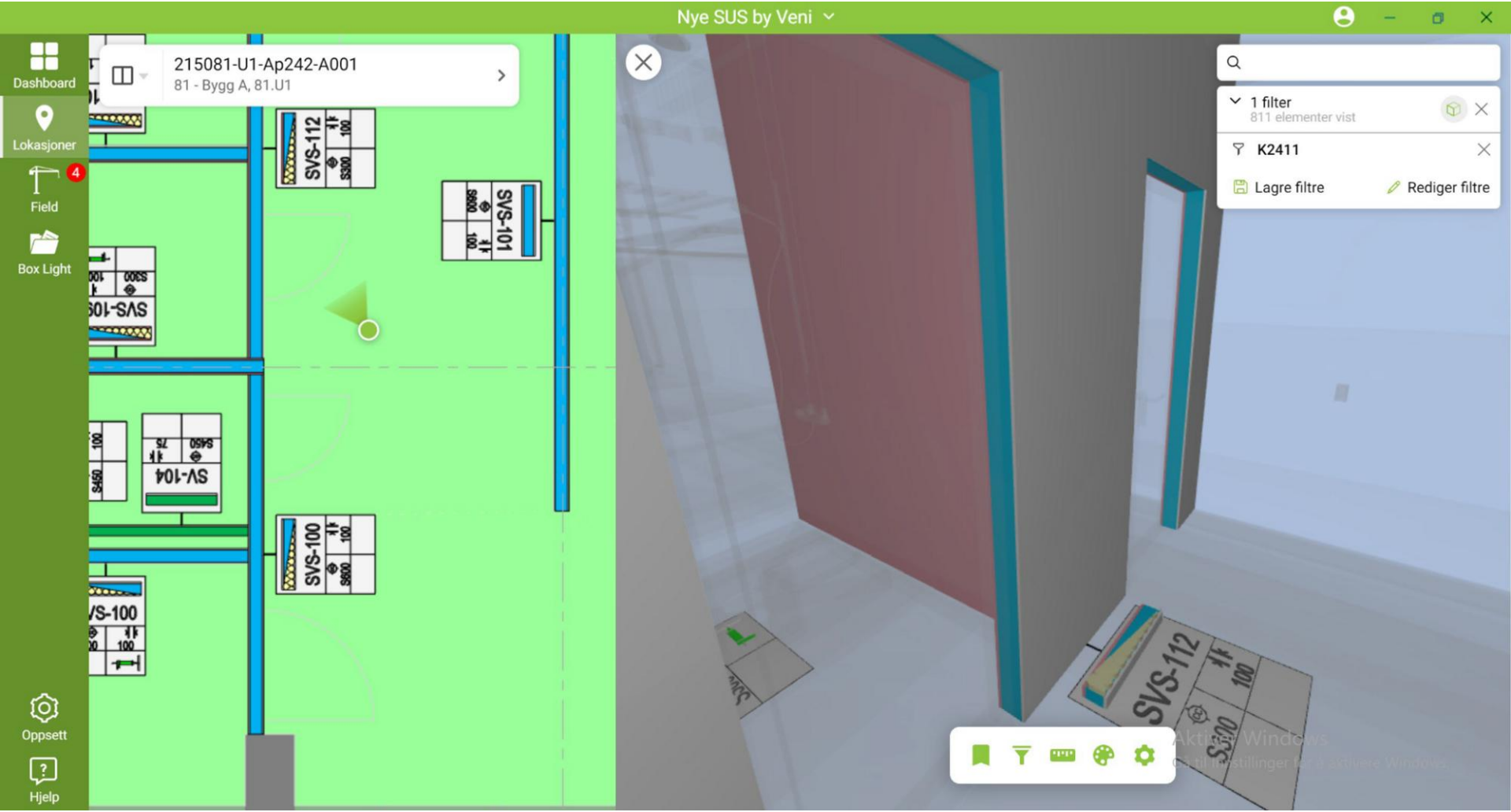

H-Modul
Sjaktrom
V-Modul
i Sjaktrom
Våtrom
Sengerom
Fasade Modul

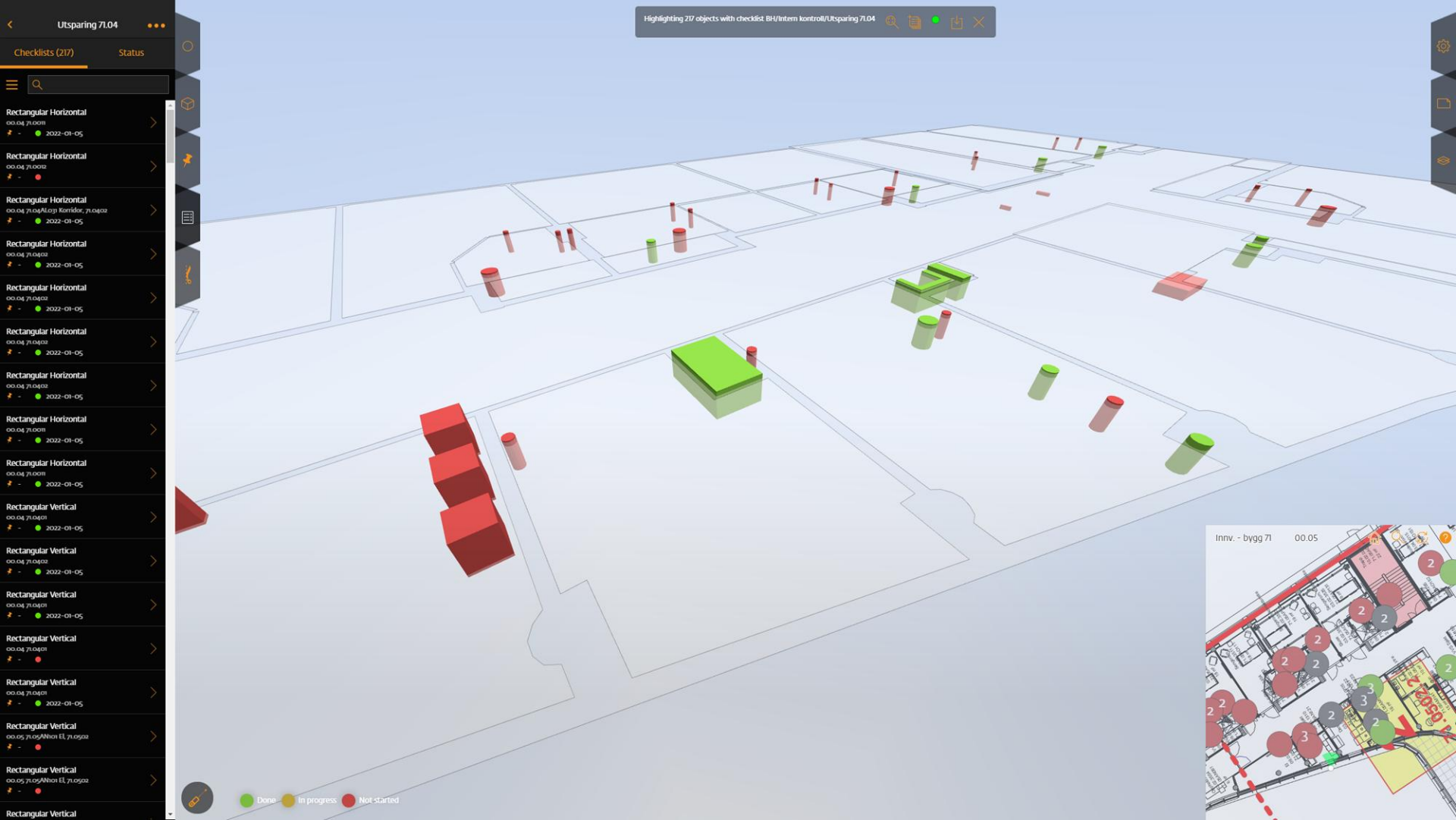
Software workflow






BYGGEKIOSKEN.NO
Naboen
renta
Genie

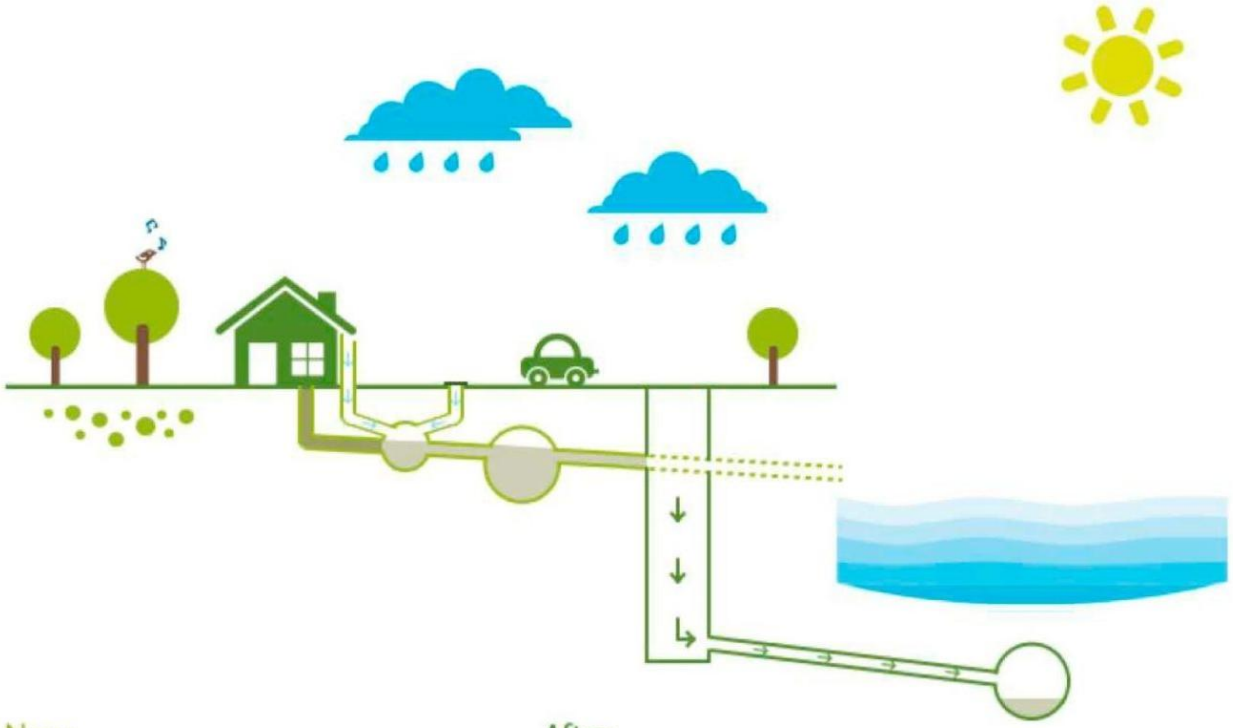

Nye SUS by Veni
Dashboard
Lokasjoner
Field
4
Box Light
Oppsett
Hjelp
215081-U1-Ap242-A001
81 - Bygg A, 81.U1
SVS-112
SVS-101
SVS-100
SV-104
1 filter
811 elementer vist
K2411
Lagre filtre
Rediger filtre


Utsparing 71.04
Checklists (217)
Status
Rectangular Horizontal
00.04 71.0011
2022-01-05
Rectangular Horizontal
00.04 71.0012
Rectangular Horizontal
00.04 71.04/Al.031 Korridor, 71.0402
2022-01-05
Rectangular Horizontal
00.04 71.0402
2022-01-05
Rectangular Horizontal
00.04 71.0402
2022-01-05
Rectangular Horizontal
00.04 71.0402
2022-01-05
Rectangular Horizontal
00.04 71.0402
2022-01-05
Rectangular Horizontal
00.04 71.0011
2022-01-05
Rectangular Horizontal
00.04 71.0011
2022-01-05
Rectangular Vertical
00.04 71.0401
2022-01-05
Rectangular Vertical
00.04 71.0402
2022-01-05
Rectangular Vertical
00.04 71.0401
2022-01-05
Rectangular Vertical
00.04 71.0401
Rectangular Vertical
00.04 71.0401
2022-01-05
Rectangular Vertical
00.05 71.05/Al101 Et. 71.0502
Rectangular Vertical
00.05 71.05/Al101 Et. 71.0502
Rectangular Vertical
Highlighting 217 objects with checklist BH/Intern kontroll/Utsparing 71.04
Done
In progress
Not started
Innv. - bygg 71
00.05

Thames Tideway Tunnel, Αγγλία

Αρχικό αποχετευτικό δίκτυο 1859 – 1875

Chief Engineer Sir Joseph Bazalgette

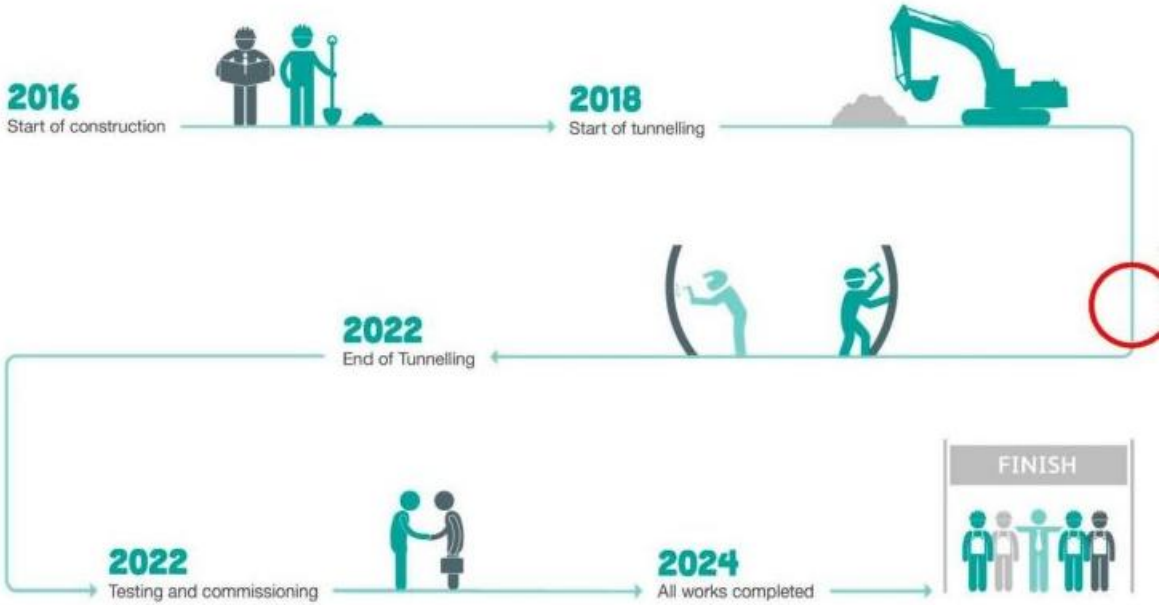


Now:

The low level interceptor sewers fill up and overflow into the River Thames.

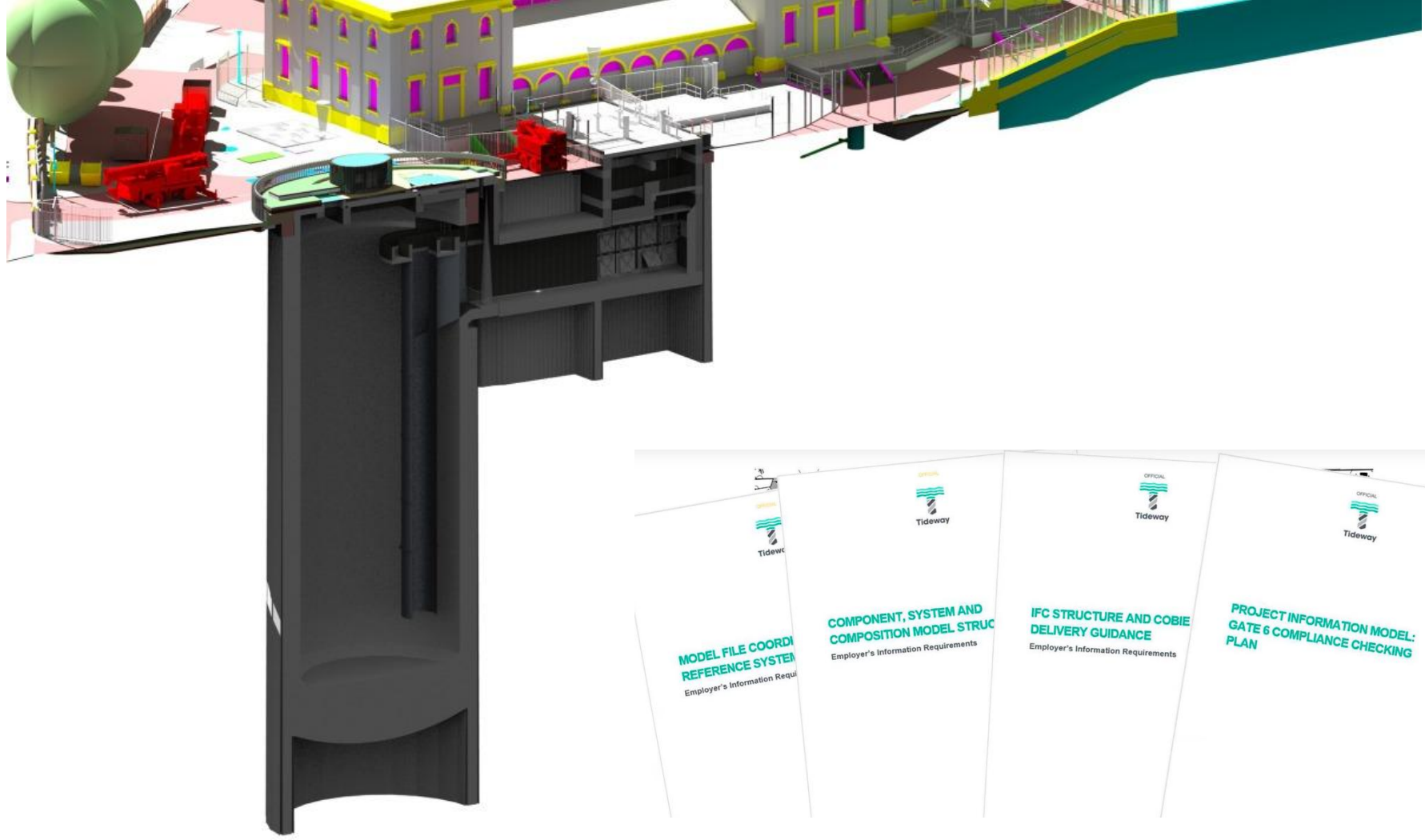
After:

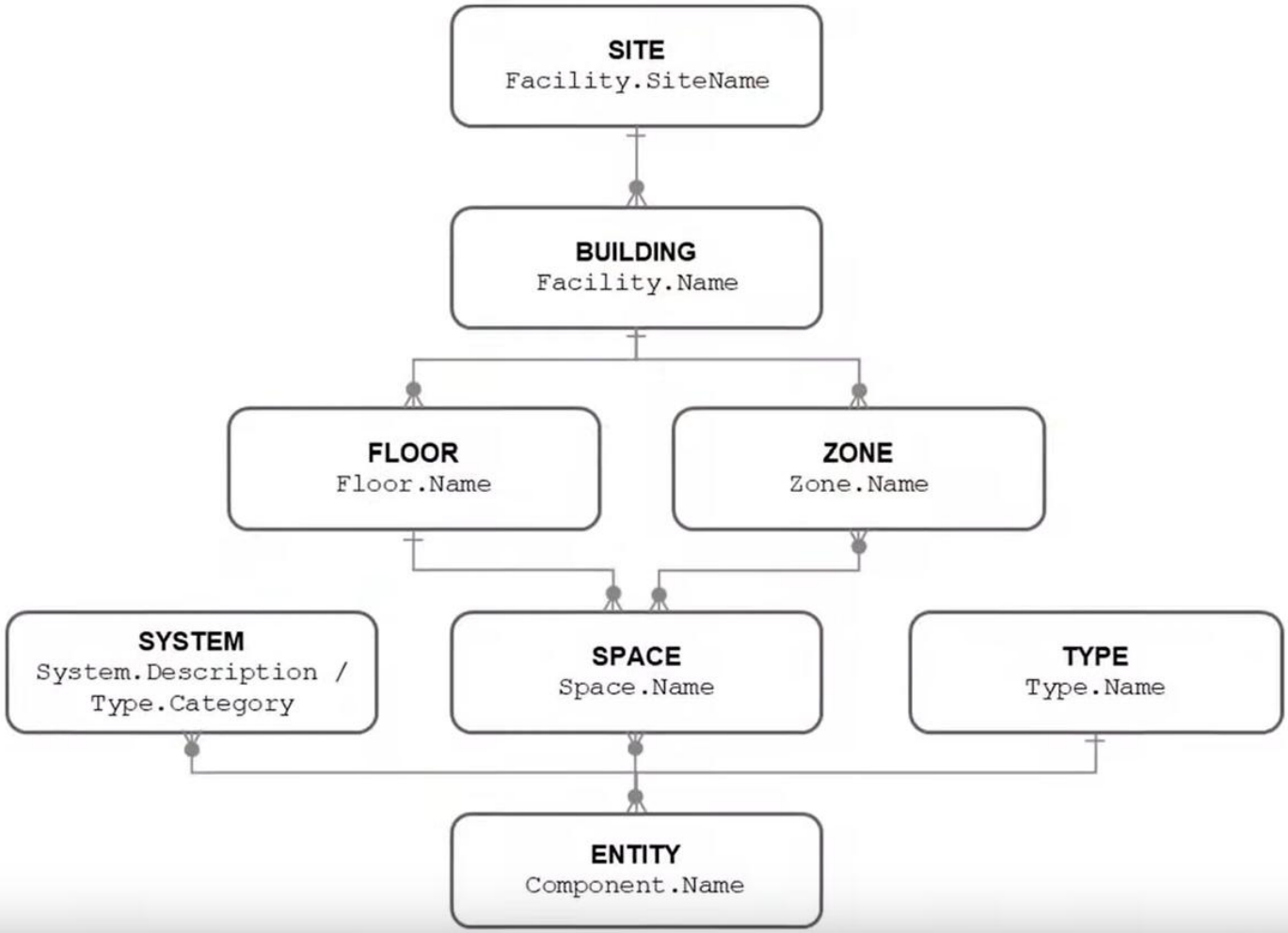
The overflow will be diverted into the tunnel instead of going into the river.



- Έναρξη 2016, ολοκλήρωση 2025
- Κόστος έργου 3,8 δισ. λίρες.
- Επιπλέον 1,1 δισ. προπαρασκευαστικά έργα.
- Σήραγγα διαμέτρου 7,2 μ.
- Βάθος σήραγγας 30–70 μ.
- Μείωση υπερχειλίσεων αποχέτευσης


Fire
hydrant

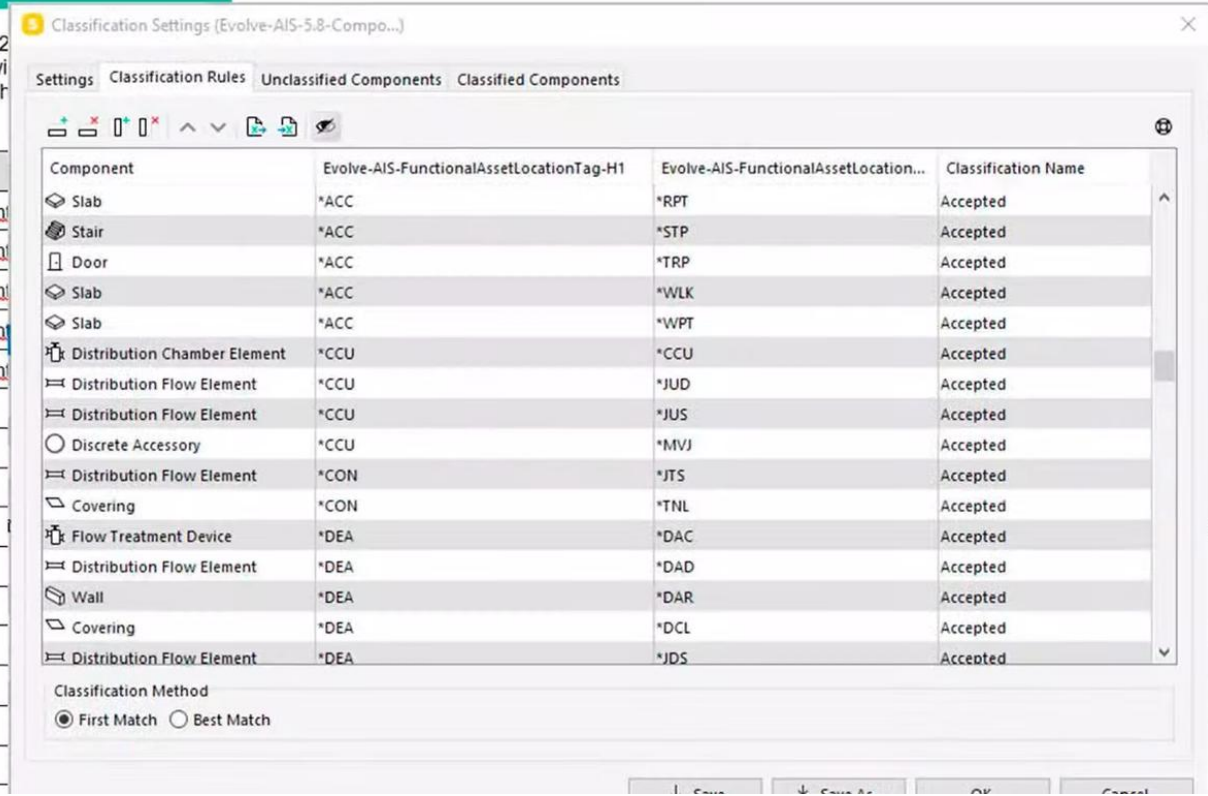

Tideway
COMPONENT, SYSTEM AND COMPOSITION MODEL STRUC
Employer's Information Requirements
Tideway
IFC STRUCTURE AND COBIE DELIVERY GUIDANCE
Employer's Information Requirements
Tideway
PROJECT INFORMATION MODEL: GATE 6 COMPLIANCE CHECKING PLAN

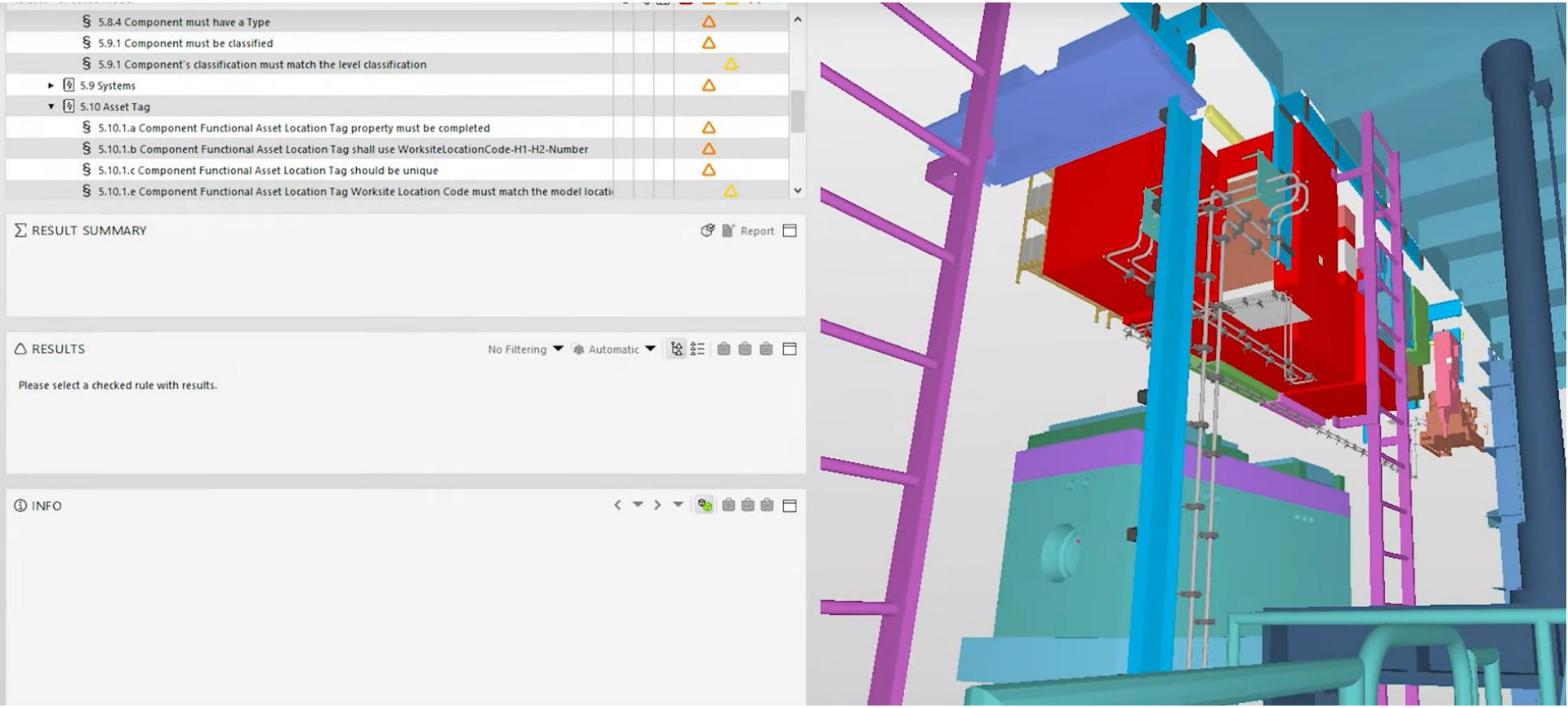

SITE
Facility.SiteName
BUILDING
Facility.Name
FLOOR
Floor.Name
ZONE
Zone.Name
SYSTEM
System.Description /
Type.Category
SPACE
Space.Name
TYPE
Type.Name
ENTITY
Component.Name

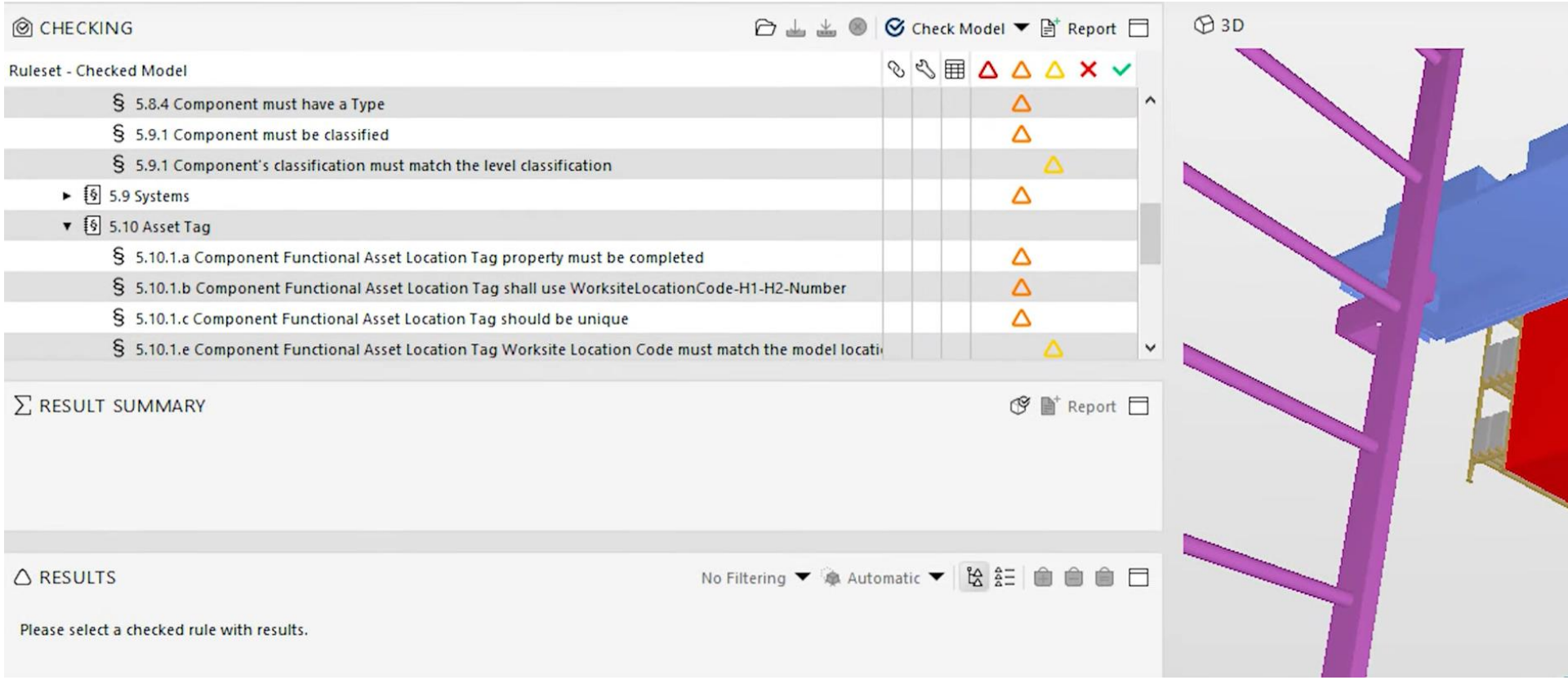
Appendix B – Example IFC mapping

The table below gives examples of the Hierarchy Level 1 and Level 2
they could be mapped to in IFC 2x3. Some of the examples below wi
geometry constraints or the approach that has been used to model th
mapping must be considered case-by-case.

Hierarchy Level 1	Hierarchy Level 2	IFC Entity
UTL	CWT	IfcDistributionFlowElement
UTL	ELC	IfcDistributionFlowElement
UTL	GAS	IfcDistributionFlowElement
UTL	TEL	IfcDistributionFlowElement
UTL	WWT	IfcDistributionFlowElement
BDS	BRF	IfcRoof
BDS	DOO	IfcDoor
BDS	ROO	IfcSpace
BDS	TOI	IfcSpace
BDS	WAL	IfcWallStandardCase
BDS	WIN	IfcWindow
BND	BAL	IfcRailing
BND	FEN	IfcWall
BND	HRD	IfcWall
BND	MTR	IfcRailing




5.8.4 Component must have a Type
5.9.1 Component must be classified
5.9.1 Component's classification must match the level classification
5.9 Systems
5.10 Asset Tag
5.10.1.a Component Functional Asset Location Tag property must be completed
5.10.1.b Component Functional Asset Location Tag shall use WorksiteLocationCode-H1-H2-Number
5.10.1.c Component Functional Asset Location Tag should be unique
5.10.1.e Component Functional Asset Location Tag Worksite Location Code must match the model locati
RESULT SUMMARY
Report
RESULTS
No Filtering
Automatic
Please select a checked rule with results.
INFO


CHECKING
Check Model
Report
Ruleset - Checked Model
5.8.4 Component must have a Type
5.9.1 Component must be classified
5.9.1 Component's classification must match the level classification
5.9 Systems
5.10 Asset Tag
5.10.1.a Component Functional Asset Location Tag property must be completed
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5.10.1.c Component Functional Asset Location Tag should be unique
5.10.1.e Component Functional Asset Location Tag Worksite Location Code must match the model locati
RESULT SUMMARY
Report
RESULTS
No Filtering
Automatic
Please select a checked rule with results.
3D

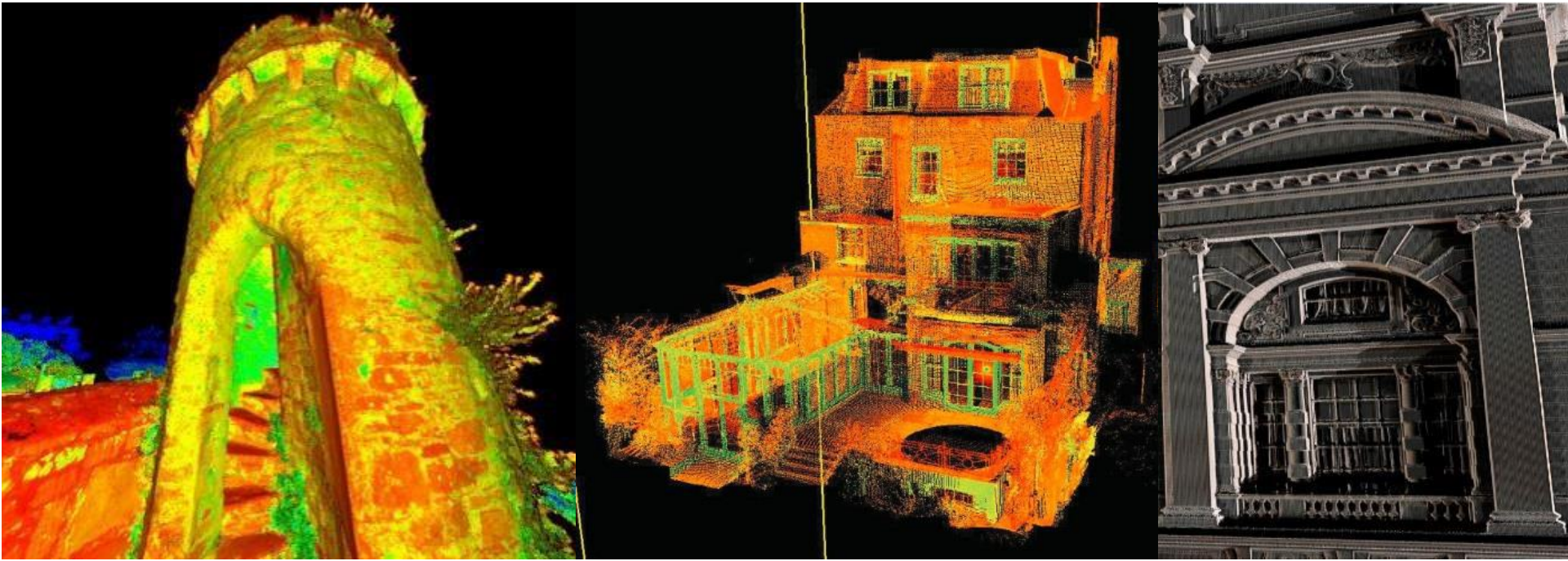
Εφαρμογή BIM
• Σύνδεση BEP και του σχεδίου διαχείρισης πληροφοριών για σωστά παραδοτέα
• Ανάπτυξη προτύπων και οδηγιών για την υποστήριξη της υλοποίησης του BIM από τον ανάδοχο.
• CDE, επιβεβαιωμένες πληροφορίες και συγκεκριμένες ημερομηνίες παράδοσης.

Προκλήσεις
• Σχεδιασμός εκτός προδιαγραφών, λόγω μη αποτελεσματικού ελέγχου του μοντέλου.
• Δεξιότητες εργασίας σε περιβάλλον BIM δεν ήταν στο ίδιο επίπεδο σε όλες τις ομάδες μελέτης.

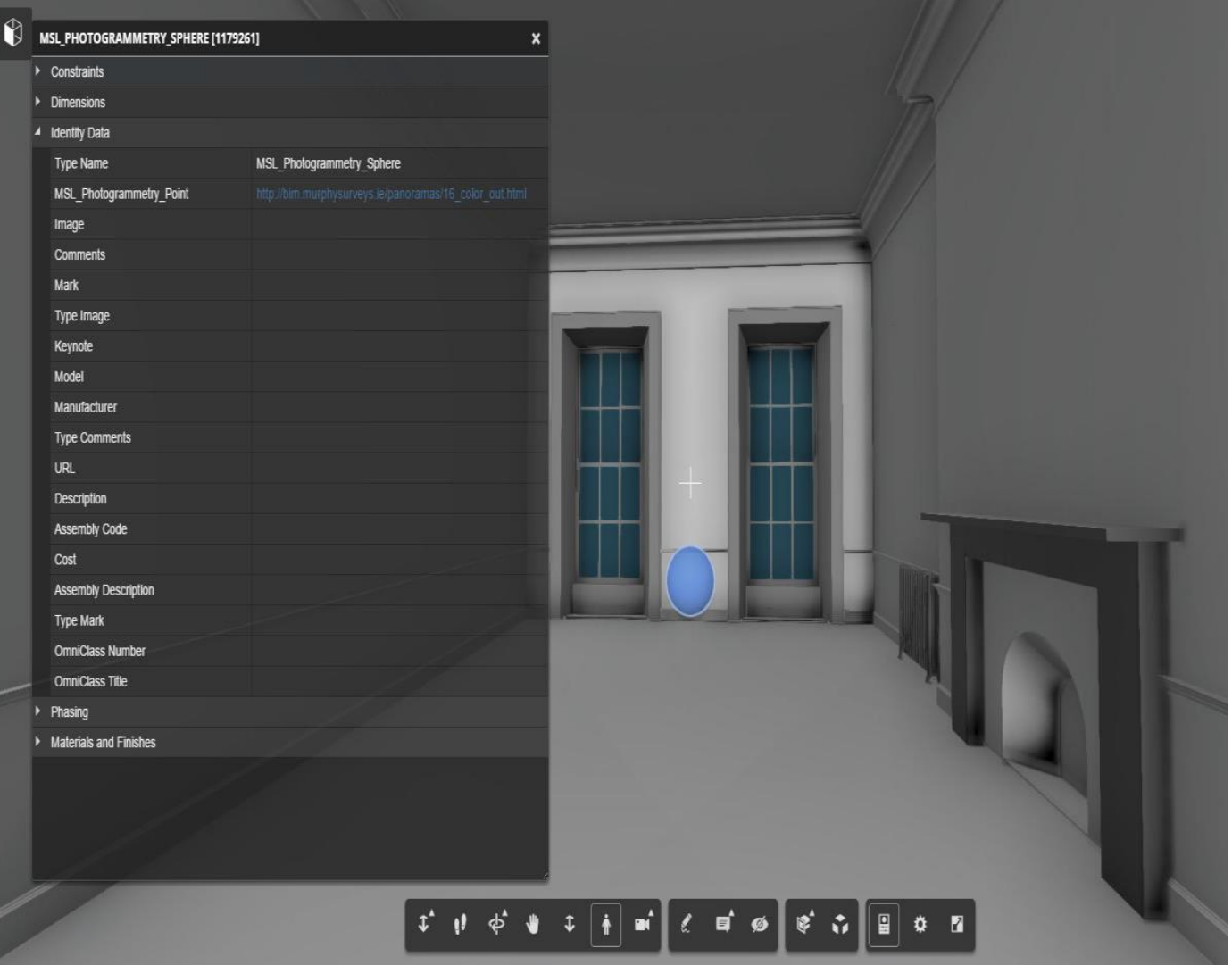
Στρατηγικές
• Εβδομαδιαίες συναντήσεις.
• Έλεγχος του λογισμικού και των διαδικασιών ελέγχου του μοντέλου πριν την έναρξη του έργου.
• Προγράμματα εκπαίδευσης εντός της ομάδας μελέτης.

Οφέλη
• Ταχύτερη μεταφορά πληροφοριών κατά την παράδοση σε σύγκριση με προηγούμενα μεγάλα έργα.
• Η μέθοδος παράδοσης βασισμένη στο μοντέλο συνέβαλε στην αύξηση της παραγωγικότητας.
• Μειωμένη αβεβαιότητα στη μεταφορά πληροφοριών.
• Βελτιωμένη συμμετοχή και αξιοποίηση του μοντέλου.
• Μείωση των ωρών εργασίας που σχετίζονται με αλλαγές στον σχεδιασμό.
• Ενισχυμένη συνεργασία μεταξύ των εμπλεκόμενων φορέων.
• Βελτιωμένες διαδικασίες Υγείας και Ασφάλειας.

Διδάγματα
• Διασφάλιση πρόσβασης σε κατάλληλο λογισμικό και υλικό εξοπλισμό (hardware).
• Βελτίωση της κατανόησης του Level of Detail και του Level of Information.
• Απαιτείται περισσότερη εκπαίδευση για το εμπλεκόμενο προσωπικό.



Πηγή: https://www.bicp.ie/irish-bim-case-studies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MSL_Photogrammetry_Point
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Image
Comments
Mark
Type Image
Keynote
Model
Manufacturer
Type Comments
URL
Description
Assembly Code
Cost
Assembly Description
Type Mark
OmniClass Number
OmniClass Title
Phasing
Materials and Finishes


13513-MSL-XX-M3-B-ParnellSquare_Combined-3DView-{3D}.fbx
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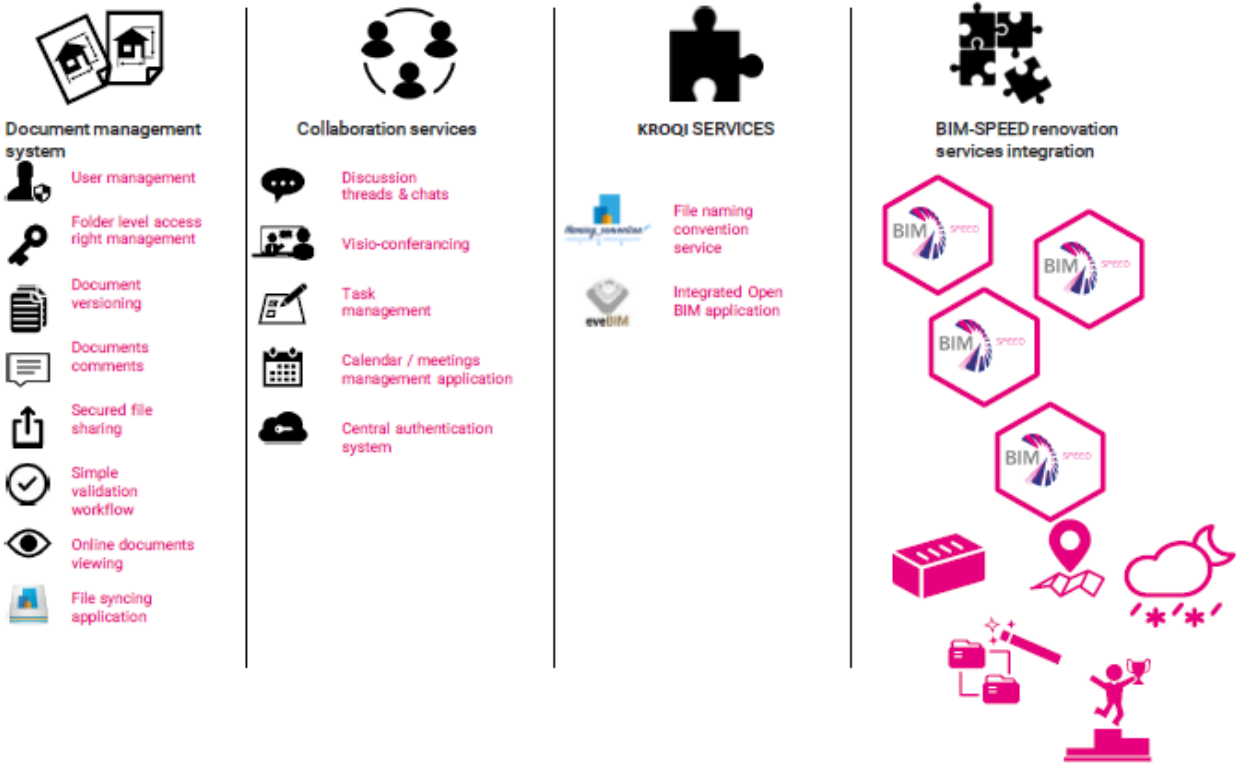
EU BIM - Building Renovation Competition

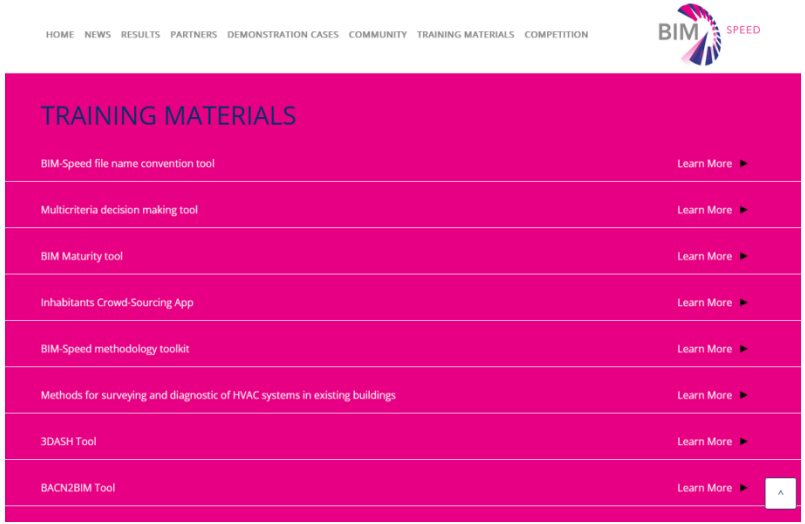
Διαγωνισμός στα πλαίσια του ερευνητικού προγράμματος BIM Speed

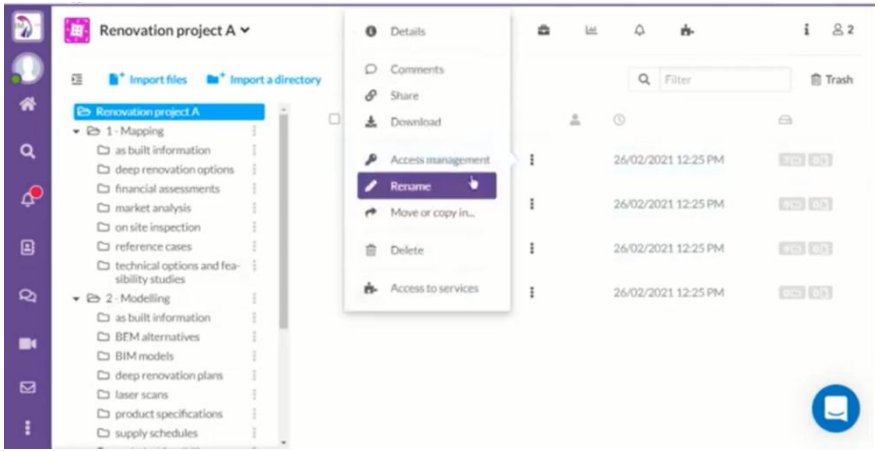
BIM-SPEED PLATFORM COLLABORATION PLATFORM OVERVIEW

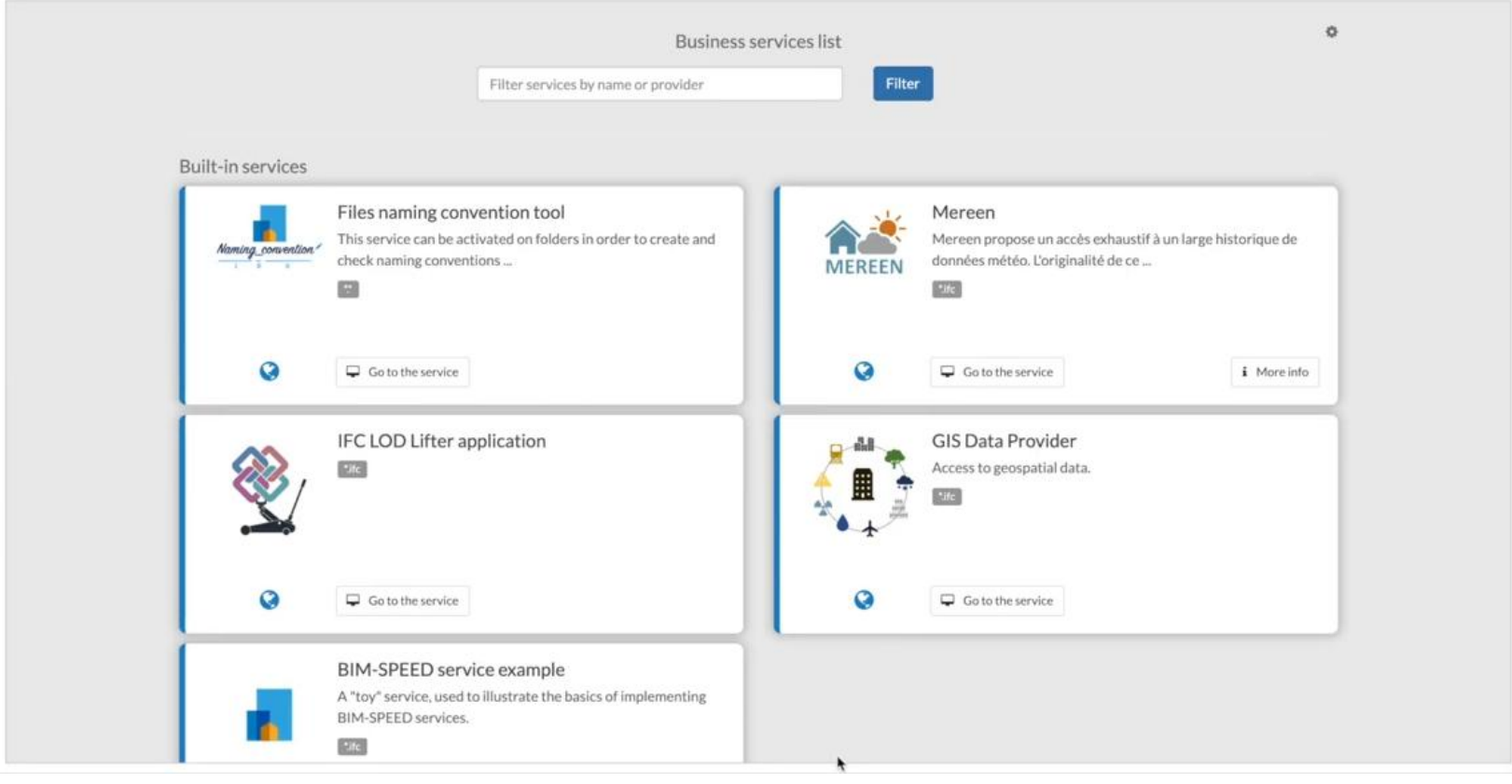


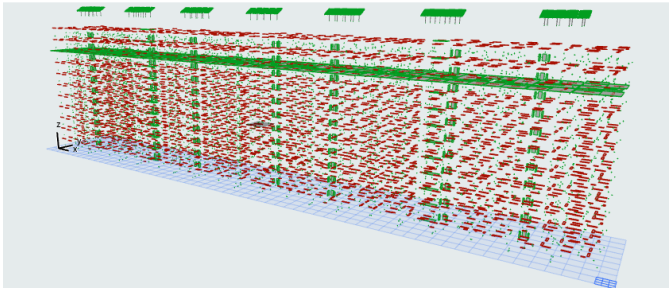
Κριτήρια Αξιολόγησης

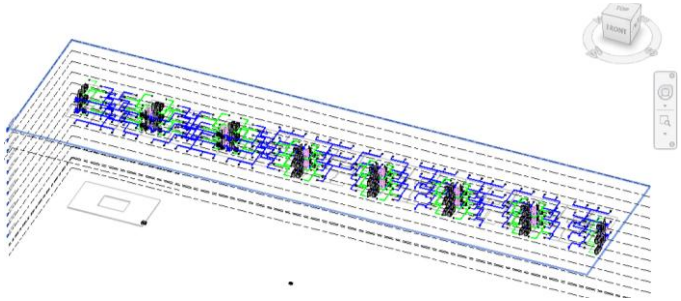
- Εξοικονόμηση χρόνου και κόστους με τη χρήση της πλατφόρμας BIM-SPEED
- Εφαρμογή Αειφορικών στρατηγικών στην ανακαίνιση
- Αντιμετώπιση θεμάτων που σχετίζονται με την υγεία και άνεση των κατοίκων / χρηστών
- Χρήση εργαλείων BIM σε συνδυασμό με τα διαθέσιμα εργαλεία BIM της πλατφόρμας
- Βαθμός συνεργασίας μέσω της πλατφόρμας

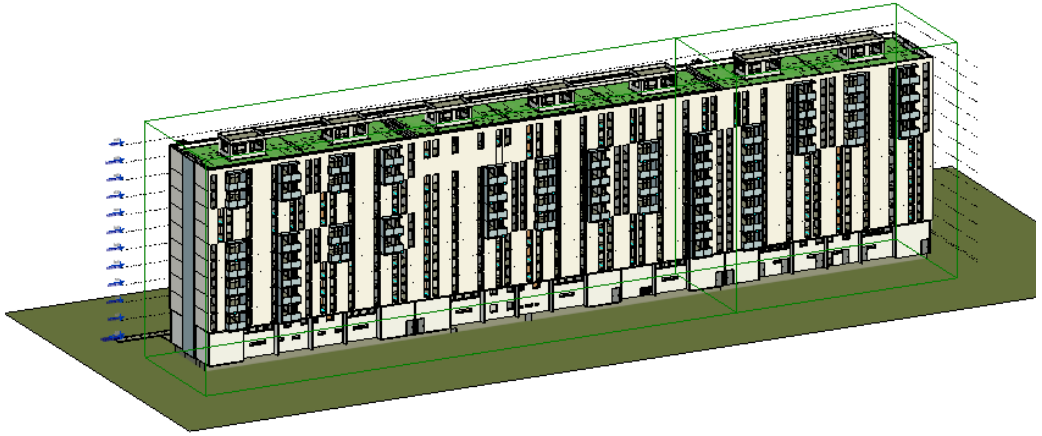




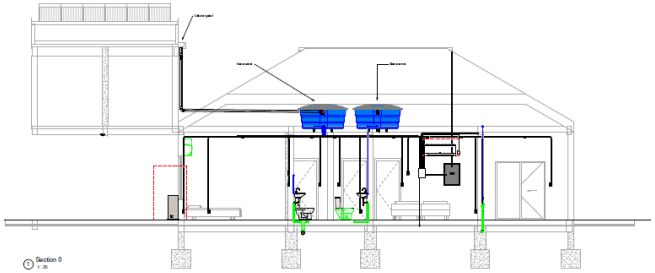

Business services list
Filter services by name or provider
Filter
Built-in services
Files naming convention tool
This service can be activated on folders in order to create and check naming conventions ...
Go to the service
Mereen
Mereen propose un accès exhaustif à un large historique de données météo. L'originalité de ce ...
*.ifc
Go to the service
More info
IFC LOD Lifter application
*.ifc
Go to the service
GIS Data Provider
Access to geospatial data.
*.ifc
Go to the service
BIM-SPEED service example
A "toy" service, used to illustrate the basics of implementing BIM-SPEED services.
*.ifc

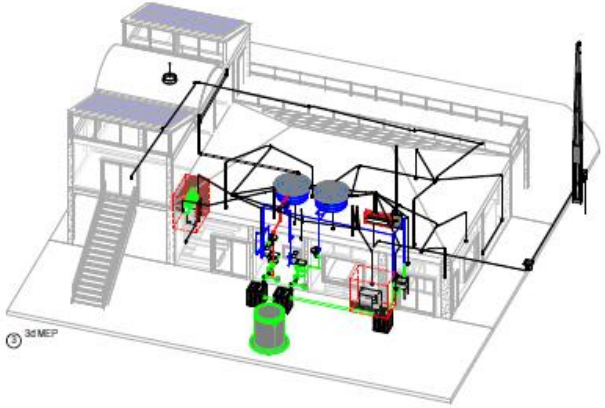




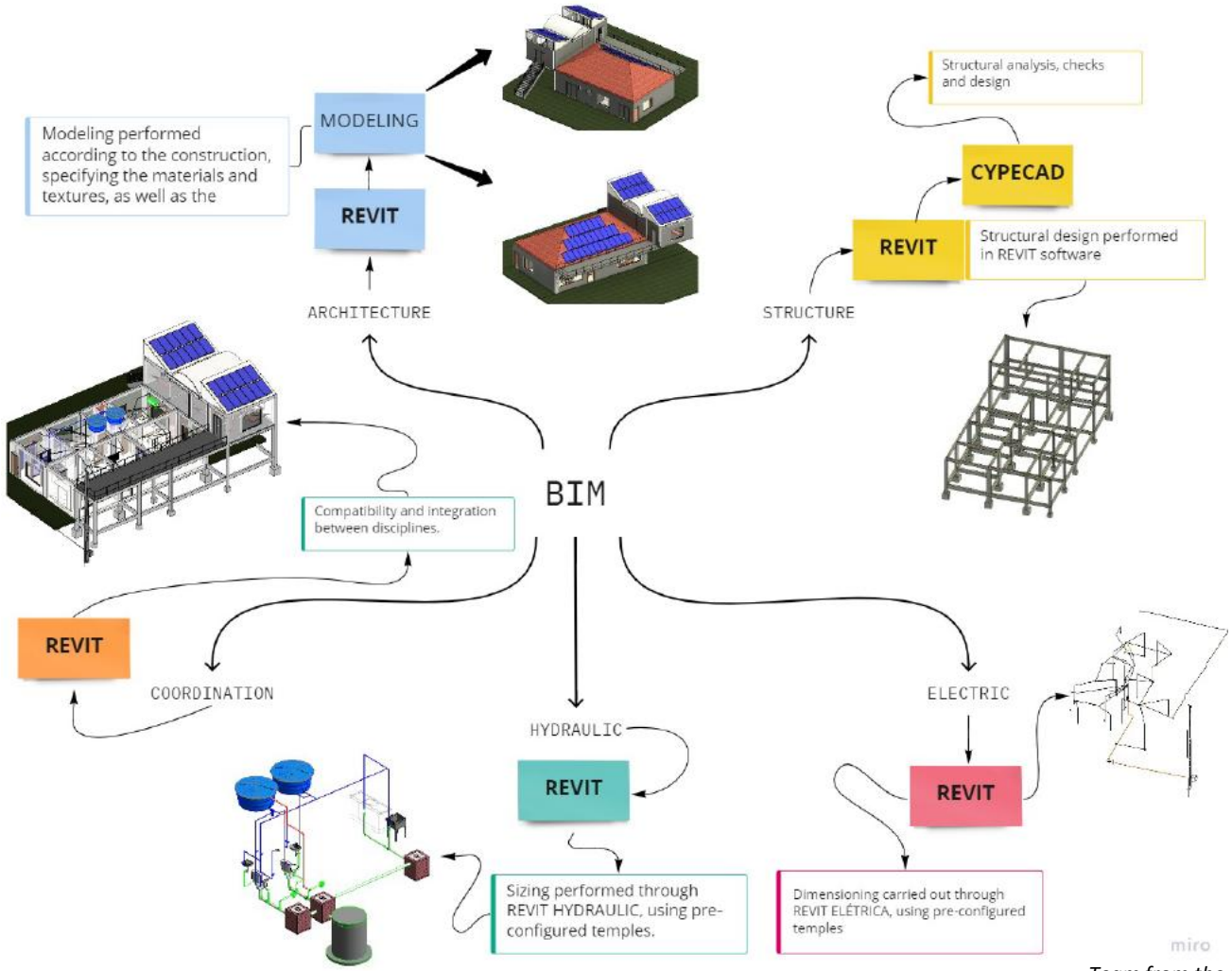


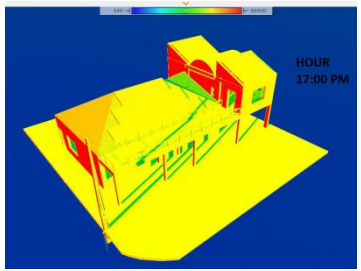
Team ENSTP, National Advanced School of Public Works (Yaounde, Cameroon)

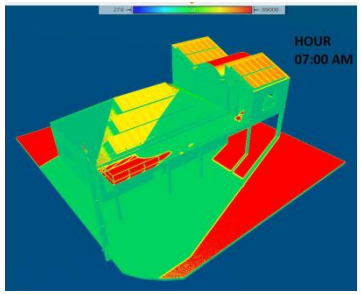


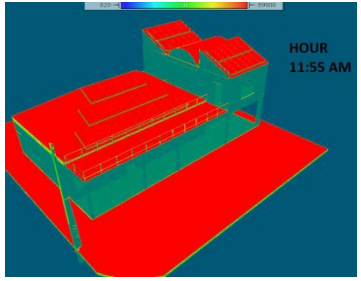


Team from the Federal University of São Carlos (São Paulo, Brazil)









Team from the Federal University of São Carlos (São Paulo, Brazil)

Πηγές (links)

ACE BIM Guide

Singapore BIM Guide

BIM Forum

NBS

Building Smart

BIM Speed Competition