

BIM-BASERET FM

BIM SEMINAR FOR DFM-NETVÆRK

BIM EQUITY A/S

STRANDLODSVEJ 6B, 2300 KØBENHAVN S.

AGENDA

1. Introduktion
2. FM-setup og Datatilgængelighed – leverandøruafhængig gennemgang
3. Værdiskabelsen, kort og lang sigt
4. Besparelsesgrundlag og ROI
5. BIM-modeller som datagrundlag
6. Detaljeringsniveau for ejendomsdigitalisering
7. Klassifikation
8. Case eksempler

HVEM ER JEG...

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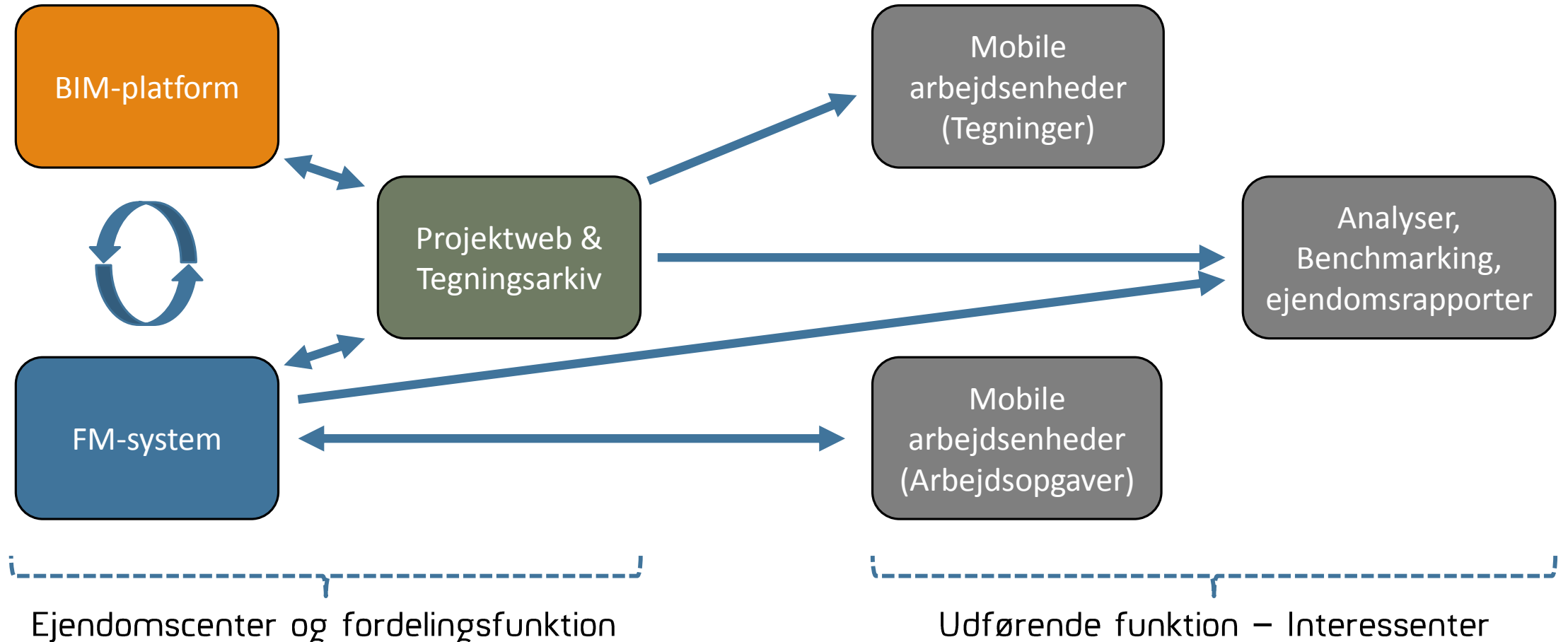
Arbejdsområder:

- BIMfm og implementering heraf
- Digitalisering og opmåling
- Kurser og uddannelse

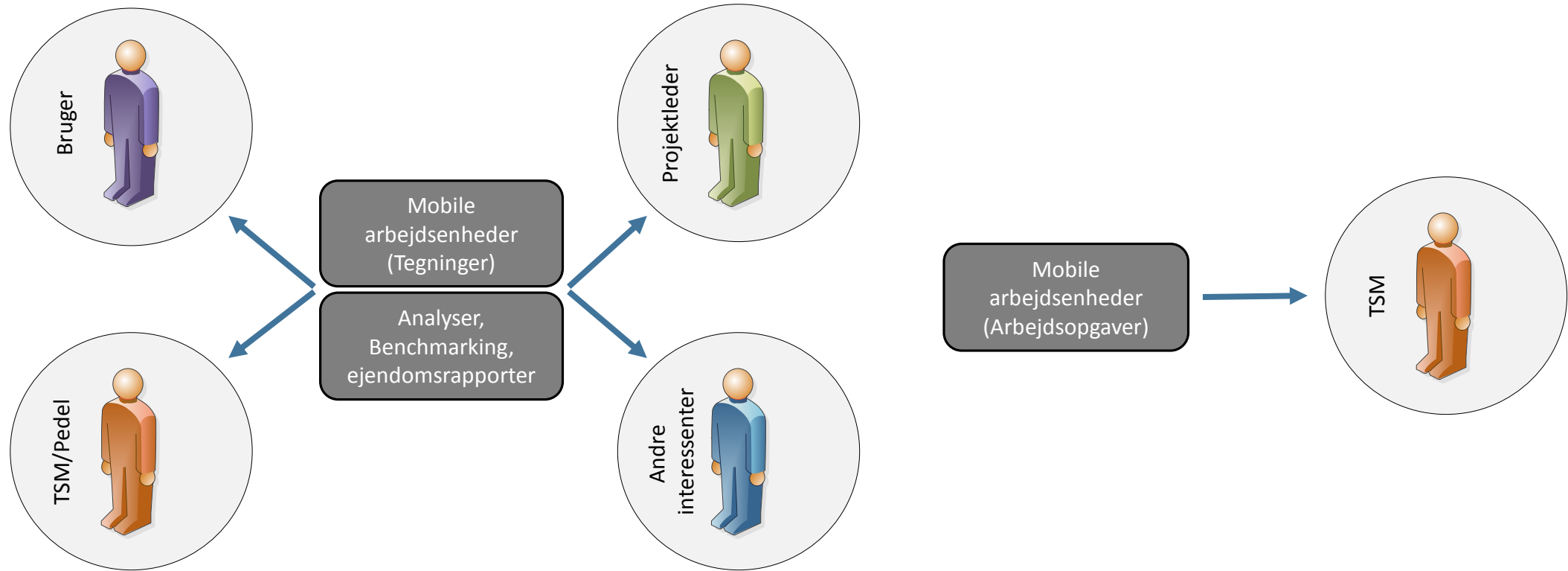
FM-SETUP



FM-SETUP



SLUTBRUGER & DATATILGÆNGELIGHED



VÆRDISKABELSEN

Værdiskabelse kan være mange ting, både økonomisk og både organisatorisk som workflow baseret.

Organisatoriske og workflow-baserede værdiskabelse kan opdeles i kort- og langsigtet værdiskabelse.

Altså, værdi der skabes umiddelbart i starten af implementeringen, og værdi der skabes gennem adoption af forbedret arbejdsgange.

KORTSIGTET VÆRDISKABELSE

Datatilgængelighed

Fælles ejerskab over data

Transparens i arbejdsgange og flow

Opgørelse af arealer og anvendelse

Udbud på baggrund af mere præcise mængder

Tid

LANGSIGTET VÆRDISKABELSE

Bedre ledelsesmæssigt overblik

Optimal oplæring af nye medarbejdere

Lettere overdragelse af arbejdsopgaver

Benchmarking på hidtil ukendte data

Mulighed for strammere, men realistiske D/V-budgetter



Tid

BESPARELSESGRUNDLAG – ROI

Besparelsen og deraf ROI er altid interessant, men skal nødvendigvis ikke være det primære fokus.

De førnævnte værdier bør umiddelbart være incitamentet for investering og implementering, hvorigennem besparelsen og dermed ROI skabes.

Besparelses potentialet er mellem 10-20% og kan hentes på mange områder:

- ✓ Forlænget levetid på bygningerne afledt af bedre og mere forbyggende vedligehold.
- ✓ Mindsket tidsforbrug ved fremfinding og vedligehold af D/V data samt tegningsmateriale.
- ✓ Bedre investerings og udbudsgrundlag i form af mængder og D/V-relateret viden.
- ✓ Optimerede processer og beslutningsgrundlag for aktiviteter.
- ✓ Transparens, fællesskab, vidensdeling og datatilgængelighed for slutbrugeren.

ROI EKSEMPEL

Hvis der i en organisation, investeres i BIM-baseret Facility Management og dertilhørende digitalisering af følgende omfang/portefølje vil ROI i år være:

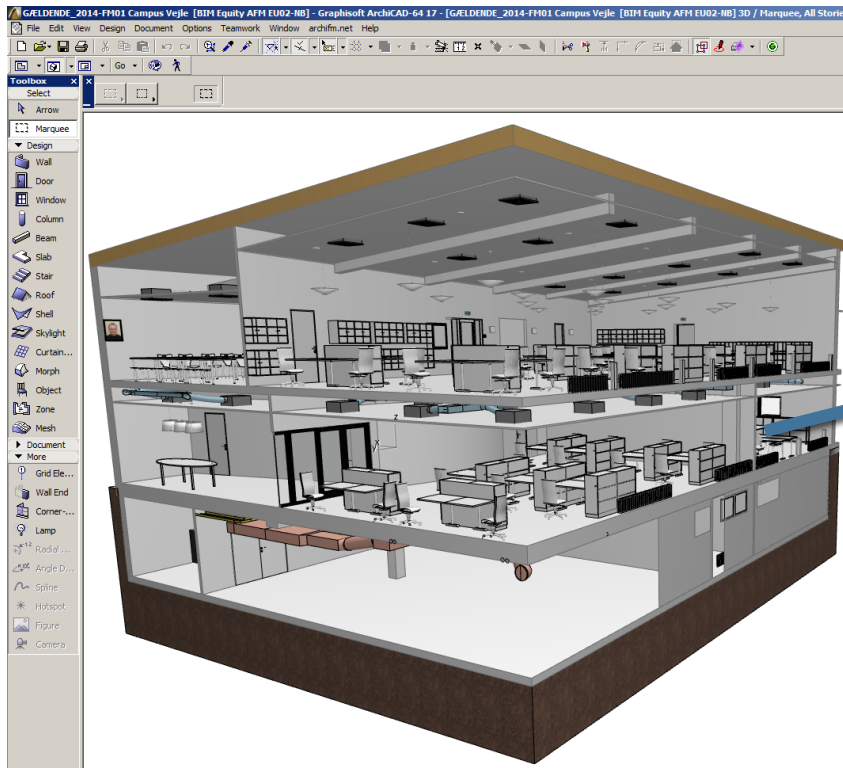
- 750.000 brutto etage m2 ejendomme
- 2D til BIM på alle m2 til 5 kr./m2 = 3.750.000,00 kr.
- Investering i FM-system på 350.000 kr.
- Efterfølgende leje af licenser på 175.000 kr.

- Årligt D/V budget på 100.000.000 kr.

Investeringssum over 5 år **= 4.800.000,00 kr.**

Ved bare **2,5%** samlet besparelse på det årlige D/V-budget er hele investeringen tjent hjem på **2 år**, efter udnyttet potentiale.

BIM SOM DATAGRUNDLAG



Arealforvaltning

Ny Slet Rediger Visning Struktur Eksporter til

Fuldenavn	Nominelt areal	Antal Objekter
Danmark		0
Region Syddanmark		0
Vejle		0
Boulevarden 48, 7100 Vejle		0
J - Bygningsafsnit J		51
Fløj J.Bygningsfløje		0
000 - Kælder		0
Depot	14,18 m2	2
Depot	28,97 m2	7
Depot	2,25 m2	0
Depot	71,93 m2	8
Gang	8,34 m2	5
Gang	28,96 m2	16
Gang	5,69 m2	6
Garage	122,82 m2	89
Teknikrum	34,40 m2	8

Ny Slet Opdater Visning Træstruktur

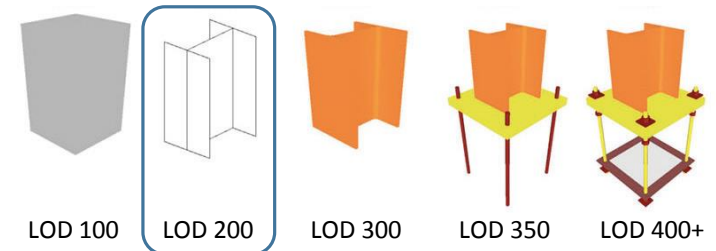
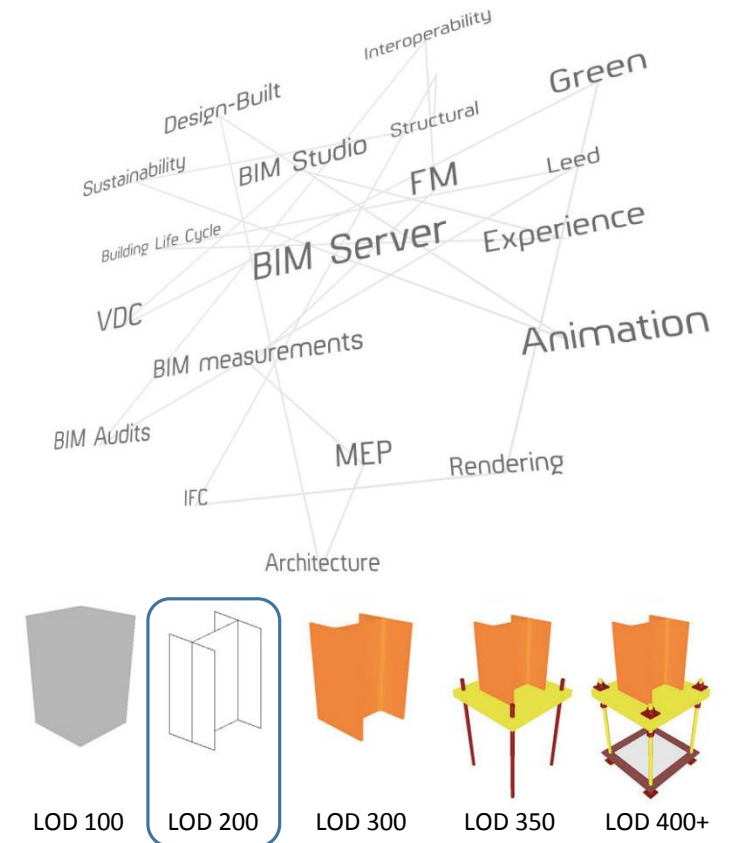
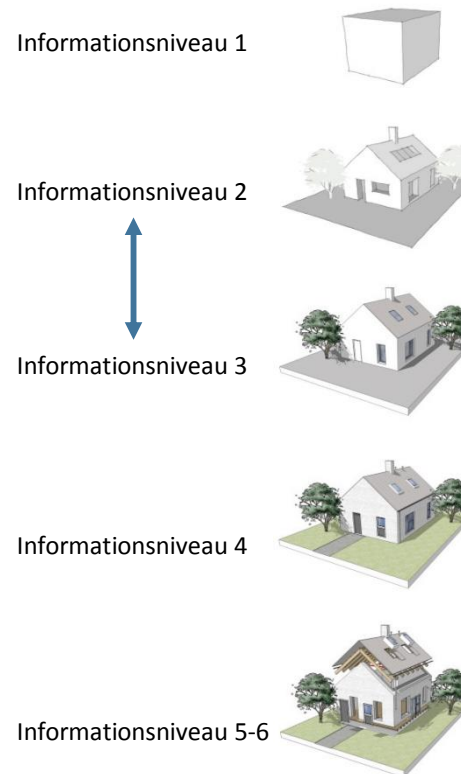
Objekttype	Kode	Navn
Brandmateriel	(61)004	Fire Hose Cabinet 17
Brandmateriel	(61)010	Fire Alarm 17
Strømforsyning	(63)049	Fordelerboks
Strømforsyning	(63)027	Pol-1 box30
Strømforsyning	(63)028	Pol-1 box30
Strømforsyning	(63)032	Pol-1 box30
Telekommunikation	(61)007	Højtaler
Ventilation	(57)309	Duct Bend 17
Ventilation	(57)310	Duct Bend 17
Ventilation	(57)311	Duct Bend 17
Ventilation	(57)202	Duct Straight 17
Ventilation	(57)203	Duct Straight 17
Ventilation	(57)204	Duct Straight 17
Ventilation	(57)205	Duct Straight 17
Ventilation	(57)206	Duct Straight 17
Ventilation	(57)460	Duct Transformer 17

DETAJLERINGSNIVEAU FOR BIM

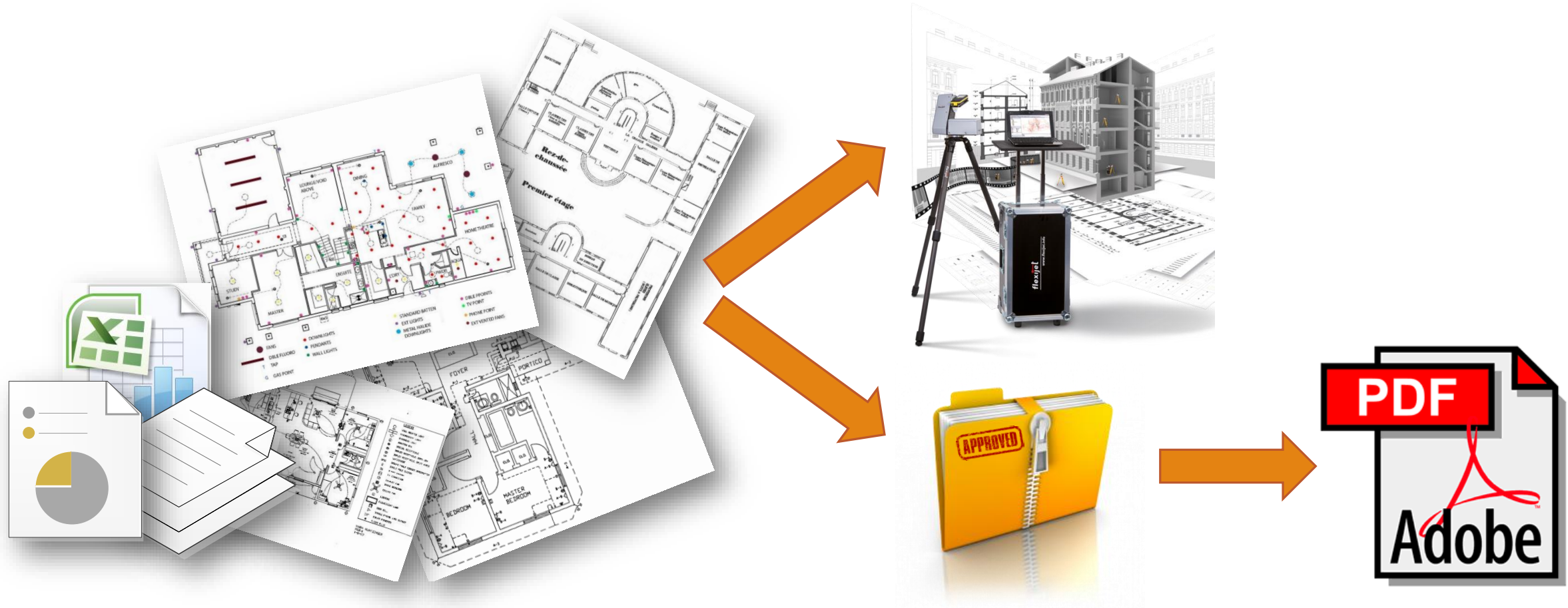
Kommer an på formålet:

- Space Management
- Asset Management
- Behov for viden og Tek. Instal.

Der findes flere forskellige standarder



DETAJLERINGSPROCES – STEP 1



DETAJLERINGS PROCES – STEP 2

BIMfm

Campus Vejle – Project description

The project consists of two building volumes:

- Building M, N, O modelled as one ArchiCAD 18 BIM-model
- Building A, D modelled as one ArchiCAD 18 BIM-model

For overview and understanding of the two building models, see picture on the last page. When modelling building A and D in the same mode, do this with the correct distance between the two according to the delivered 2D drawing material. We will later on be measuring the rest of the building crop on site.

The total amount of gross square meters, all stories included, is 15.375.00 m². This 2D to BIM digitalization has been defined and should be carried out based on the LOD 200 for both Arch and MEP.

Start with modelling the BIM-model for Building A, D. When done modelling, send it to BIM Equity for revision and quality assurance. While BIM Equity is going through Building A, D start modelling the BIM-model for Building M, N, O. This way we save time, and have the needed time to correct quality for the final delivery.

All drawings are named with their specific drawing number, followed by the English name. There is, for every discipline, attached a complete drawing list in Danish (you can relate to the drawings via the drawing number). All drawings has an (X), (D), (M), (N) or (O) in their name. This defines which building-section the drawing relates too. If (X) is used, it means that more than one building-section is placed on the drawing.

What should be modelled	What should NOT be modelled
The building envelope according to delivered 2D drawing material, with windows, doors, curtain walls etc.	Electrical trays/cables.
All MEP: All Ventilation installations. All Sanitary installations. All Heating installations	Loose furniture.
All electrical wall outlets and wall switches.	MEP installations cast into concrete floors.
All Lamps.	Sewerage and rain water pipes.
All fixed furniture, such as kitchens and their appliances etc.	
All rain water drains, sewerage junctions and gully holes/wells (also in terrain).	

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Classification

All building components should be classified with a type code. The system to be used is the Danish standard SIB.

Classification system on a type level. This means that you do not need to do a unique sequential number. Exterior walls should have the ID 1 should have the ID (22).

Information table for objects and building components:

It is just a list, you are not necessary going to use all of them in your project.

ID	Component/Object type
(12)	Foundations
(13)	Ground slabs
(21)	Exterior walls
(22)	Inner walls
(23)	Deck
(24)	Stairs and ramps
(26)	Balconys
(27)	Roof construction
(31)	Covering on Exterior walls
(32)	Covering on interior walls
(33)	Floors
(35)	Ceilings
(37)	Roof surfaces
(40)	Terrain covering
(50)	Sewerage and rain water in terrain
(52)	Sanitation and Sewerage
(53)	Water installations
(56)	Heat installations
(57)	Ventilation
(62)	High voltage outlets, switches etc.
(63)	Low voltage outlets, switches etc.
(71)	Fire equipment, alarms and detectors
(72)	Signs, guidance and markers
(73)	Kitchen cabinets and household appliances

NOT classify pipes for MEP (sanitation and ventilation)

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Modelling Guidelines

When starting the project, orientate the model correctly according to North. Use the 'set orientation' command if it eases the modelling process.

The TPL file, BIM Equity has delivered a set of objects in Danish that HAS been fully translated. TPL file that has been set up only for the 2D to BIM project.

Do not add objects to the embedded library, other than the necessary stairs, wall panels and trusses.

The TPL file, BIM Equity has delivered a set of objects in Danish that HAS been used when modelling. The objects are impeded into the delivered TPL file. You might lack certain objects to complete the digitalization, in this case create native ArchiCAD 18 and MEP objects.

ArchiCAD 18 Native Name	Danish Object Name
ISwitch – See object in ArchiCAD	1-pol 1-pol
ISwitch – See object in ArchiCAD	1-pol med 2-pol jord
ISwitch – See object in ArchiCAD	1-pol med lampe 230v
ISwitch – See object in ArchiCAD	2-pol til
ISwitch – See object in ArchiCAD	2-pol box30
ISwitch – See object in ArchiCAD	2-pol med 2-pol jord
ISwitch – See object in ArchiCAD	3-pol x 2
ISwitch – See object in ArchiCAD	3-pol
ISwitch – See object in ArchiCAD	Baseline 50 1-pol
Alarm 18	Brandsalarm
urized Extinguisher 18	Brandslukker
e Door 18	Dobbeltdeur
18	Dar
st 18	Elevator
trill Window 18	Glasfacadeparti
chana	Håndvask i porcelæn
steel	Håndvask i stål
steel on legs	Håndvask selvstændig
ISwitch – See object in ArchiCAD	Kabelbakke – 11 stik
ISwitch – See object in ArchiCAD	Kontakt2 stik 1-220
atic door-stopper	Magnetisk dørstop
s and Heat Detector 18	Røgalarm
Siren 18	Sirenealarm
ose Cabinet 18	Slangevinder
st 18	Toilet
for Panel 18	Radiator, vandbåren
e Window 18	Vindue, dobbeltfags
w 18	Vindue, enkeltfags
Window 18	Vindue, I-fags
– See object in ArchiCAD	Værm, horizontal baluster #1
– See object in ArchiCAD	Værm, horizontal baluster #2
– See object in ArchiCAD	Værm, medleber #1

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Layers

Do not create and use any special GDL-objects, use all ways native gdl-objects and objects.

Direct layers as described in the TPL file on the worksheet.

Group any created groups before final delivery.

Basic structure" setting when creating walls, slaps and roofs.

Do not use Hotlinked modules in the final delivery.

Group any created groups before final delivery.

Layers should be named and numbered according to the delivered 2D-material. Please relate every Zone to the "Zone Category" "000".

At any point, doubt about how to model specific parts of the building, please contact BIM Equity for clarification. It is evident that the model created and identical to the actual building and delivered 2D-drawing material.

Objects and Building Components with ID's according to the specified in the table above.

Colors and colors in the model should be white – use the surface "Maling".

Use of Layers

The TPL file has a pre-defined set of layers that should be used. You should use 4 layers named FM. These layers are dedicated Sanitary, Heating, Ventilation- and Sprinkling objects that are NOT pipes:

Layer Name	Object Type
FM01	Sanitary-ACR#1
FM02	Heating-ACR#1
FM03	Ventilation-ACR#1
FM04	Sprinkling-ACR#1

For Sanitary, Heating, Ventilation- and Sprinkling, should be used the following layers:

Layer Name	Object Type
ACR#1	Sanitary
ACR#2	Heating
ACR#3	Ventilation
ACR#4	Sprinkling

Adjustments as they suite your digitalization's process, but DO NOT change the layer names, unless necessary.

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Deliverables

Deliverables should be delivered upon project handover to BIM Equity. BIM Equity will review and go through the project to ensure that the quality is as agreed.

Deliverables according to the above descriptions, containing:

- Drawings with tags and labels according to 2D-drawing material.
- Grids according to 2D-drawing material.
- Measurements according to 2D-drawing material.
- Signatures for switches and outlets, according to 2D-drawing material.

For each floor plan without measurements.

For each section with levels, according to delivered 2D-material (no partial sections, just main sections).

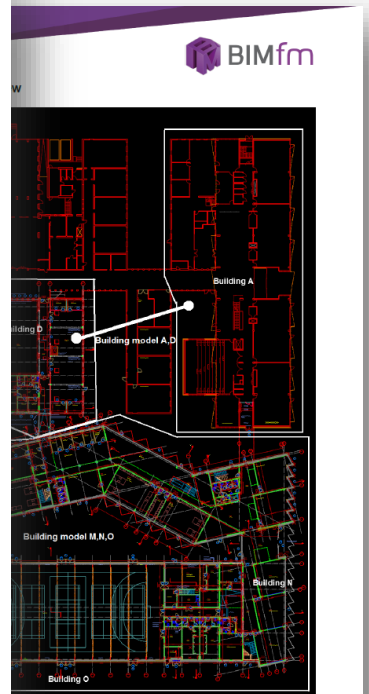
Ventilation plan of each floor.

2D-drawings with correct defined orientation (North, south, east and west).

For the project, adjust to the deliverables can be performed, if something is needed.

Use the deliverables accordingly when Building A is handed over to BIM Equity for revision.

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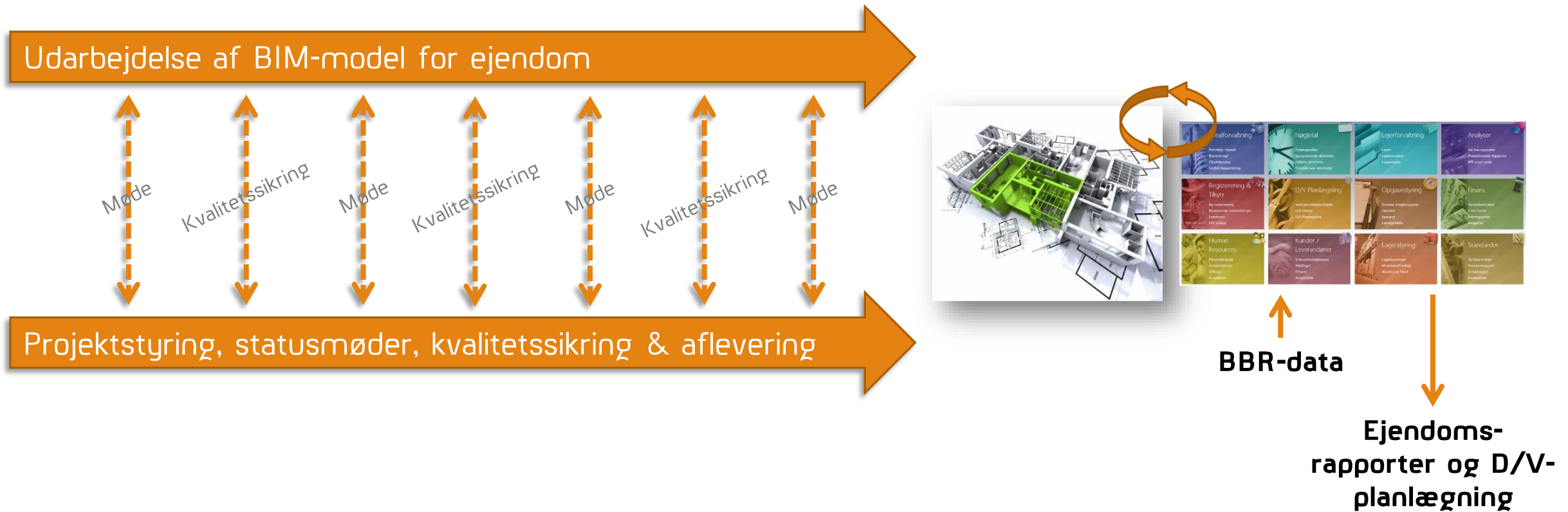
DETAJLERINGSPROCES – STEP 3



DIGITALISERENDE PART



DETAJLERINGSPROCES – STEP 4



KLASSIFIKATION

Databaser kan ikke skælnes uden klassifikation.

BIM-modeller ser internt, BIM-baserede FM-systemer ser på tværs.

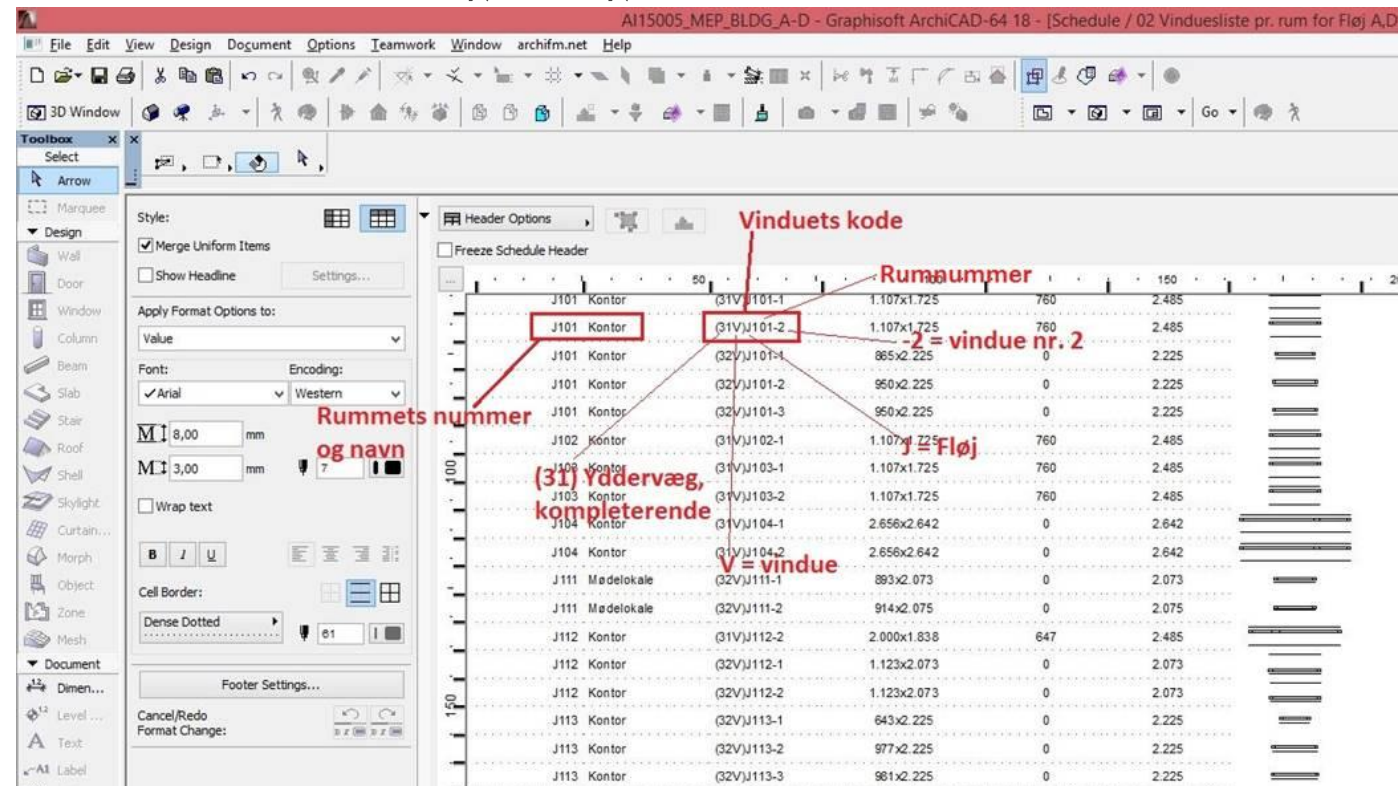
Klassifikationstyper:

- Cuneco Classification System
- SfB-klassifikation
- BIM7AA
- Forvaltningsklassifikation

Disse har fokus på bygningdelsklassifikation og tek. inst...

KLASSIFIKATION

Rumklassifikation er vigtigt! Vi skal kunne sammenstille rumtyper på tværs af ejendomme, uafhængigt af deres lokale navngivning.



The screenshot shows the ArchiCAD interface with a window schedule table. The table has columns for room number, window code, dimensions, and area. Red annotations highlight specific parts of the table:

- Rumnummer**: Points to the room number column.
- Vinduets kode**: Points to the window code column.
- Rummets nummer og navn**: Points to the room number and name column.
- (31) Ydervæg, kompletrende**: Points to a specific row in the table.
- 2 = vindue nr. 2**: Points to the window code column.
- V = vindue**: Points to the window code column.
- J = Fløj**: Points to the window code column.

Room Number	Room Name	Window Code	Dimensions	Area
J101	Kontor	(31V)J101-1	1.107x1.725	760
J101	Kontor	(31V)J101-2	1.107x1.725	760
J101	Kontor	(32V)J101-1	865x2.225	0
J101	Kontor	(32V)J101-2	950x2.225	0
J101	Kontor	(32V)J101-3	950x2.225	0
J102	Kontor	(31V)J102-1	1.107x1.725	760
J103	Kontor	(31V)J103-1	1.107x1.725	760
J103	Kontor	(31V)J103-2	1.107x1.725	760
J104	Kontor	(31V)J104-1	2.656x2.642	0
J104	Kontor	(31V)J104-2	2.656x2.642	0
J111	Mødetokale	(32V)J111-1	893x2.073	0
J111	Mødelokale	(32V)J111-2	914x2.075	0
J112	Kontor	(31V)J112-2	2.000x1.838	647
J112	Kontor	(32V)J112-1	1.123x2.073	0
J112	Kontor	(32V)J112-2	1.123x2.073	0
J113	Kontor	(32V)J113-1	643x2.225	0
J113	Kontor	(32V)J113-2	977x2.225	0
J113	Kontor	(32V)J113-3	981x2.225	0

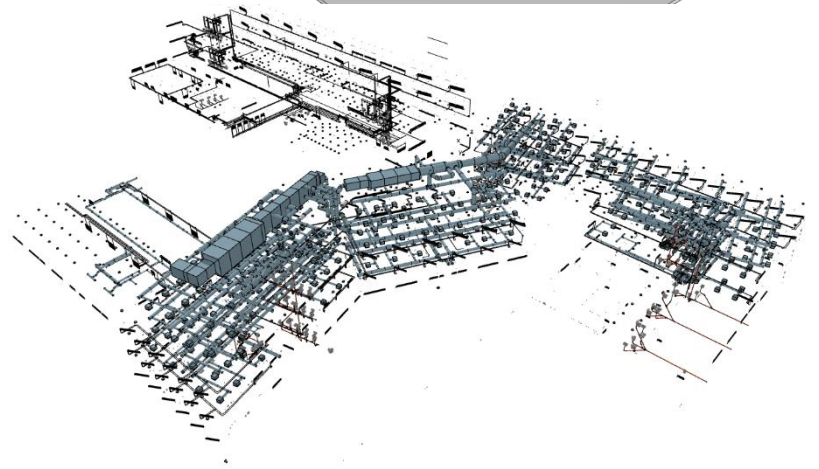
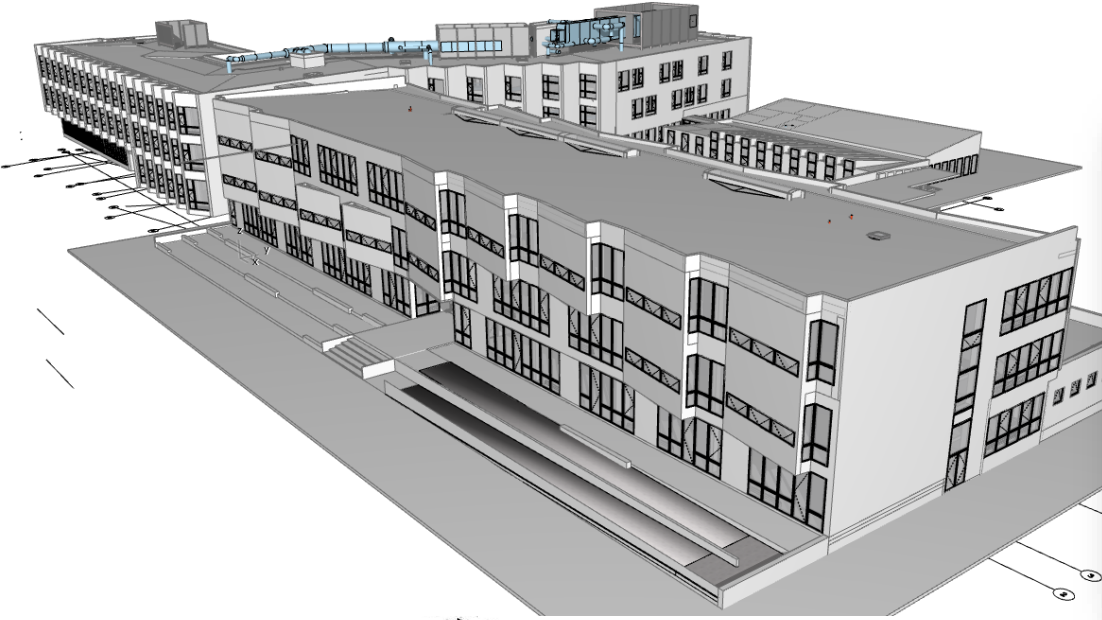
CASE – CAMPUS VEJLE



Fokus på fleksibilitet, datasynlighed og visuel tilgang til vedligeholdelse af data, er nøgleordene hos Campus Vejle.

- ✓ Der er med ArchiFM sat fokus på inventarstyring, planlagt vedligehold med stort fokus på serviceaftaler.
- ✓ Niveaulet for digitalisering er valgt højere end gennemsnittet – informationsniveau 4-5 på alle installationer.
- ✓ Rammerne fra databasen udfærdiges på baggrund af de digitaliserede bygninger, hvortil den mere specifikke information for bygningsdele og rum påfyldes via on-site registrering med direkte Excel import.

CAMPUS VEJLE



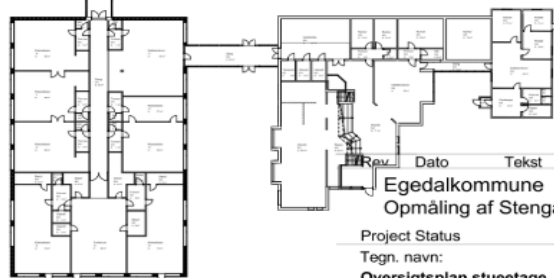
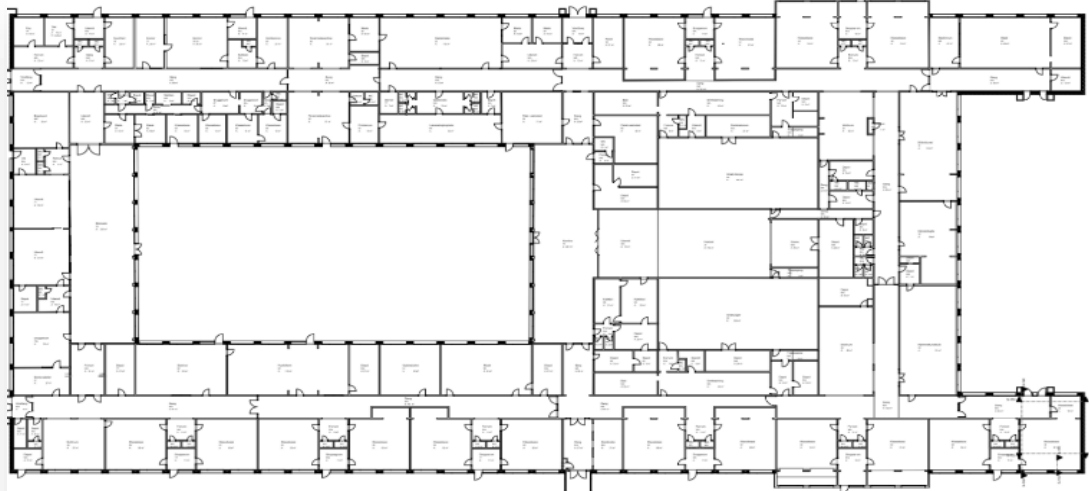
CASE – EGEDAL KOMMUNE



Kloge kvadratmeter er nøgleordet i Egedal Kommunes Ejendomsstrategi.

- ✓ Som en del af deres ejendomsstrategi har Egedal Kommune implementeret ArchiFM til drift og vedligehold af deres 220.000 m² store ejendomsportefølje.
- ✓ Startede med et pilotprojekt – 8.500 m² digitalisering af Stengårdsskolen.
- ✓ Fokus ligger især på at tegningsmaterialet altid skal være opdateret og tilgængeligt for de ansatte via BIMx PRO's mobile tegningsarkiv, samt ejendomsrapporter genereret fra ArchiFM via tegningsarkivet og projektweb BIMcontact.

EGEDAL KOMMUNE



Rev.	Dato	Tekst
		Egedalkommune Opmåling af Stengårdsskolen
Project Status		
Tegn. navn:		Tegn. nr.:
Oversigtsplan stueetage		K01_T33_H1_001
Sagsnr.: 2013 443 00 Mål: 1:100 Dato: 01-04-2014 Tegnet af: MPE Godkendt af: KL • Arkitekt: AI/A/S Refshalevej 147, 2. sal - 1432 København K +45 32 68 08 00 www.a.s.k.		
Ingeniør konstr.:		Revis:
○ Ingeniør VVS:		
○ Ingeniør EL:		

