

Sara Cultural center and hotel, Skellefteå

Use of VDC framework

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Role: Development manager
Company: Construction company
HENT from Norway
Date: 15.09.2022



Sara Cultural center and hotel - Skellefteå - Wooden megabuilding

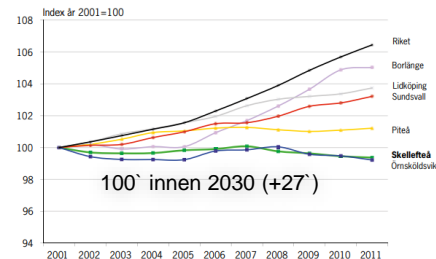


SKELLEFTEÅ

Latitud 59.32932349

Longitud 18.068580800000063

BEFOLKNINGSUTVECKLING 2001–2011

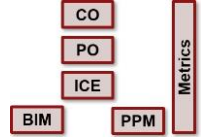


Sara Cultural center – Skellefteå

- Client: Skellefteå Municipality
- Building: Cultural center and hotel (30 000 sqm and 20 floors)
6 stages, ateljè, art gallery, workshop, library, 205 hotel rooms, restaurants, cafe, gym, relax center
- Duration: March 2018 – September 2021 (Phase 1 and 2)
(Phase 1 2018-03 – 2018-10)
- Targetprice: 100 MILL EURO



Challenges for the hotelpart



New and unfamiliar working methods for the project participants

Complex construction with an unproven and innovative construction method for wooden construction buildings

Hotel operator (tenant) late into the project

What to achieve after the handover?

CLIENT OBJECTIVE

- Opening of the hotel 14.10.2021
- Rental cost as agreed (XX kr.)



What did the project have to deliver in order for the customer to be satisfied?

Project objective

- Complete phase 1: 01.10.18
- Handover > 14.08.21, 2 month before the opening of the hotel
- Agreed target price hotel < 500 MILL
- 0 errors on handover



Use of VDC at Sara cultural center

CO

Client objective:
Opening hotel: 14.10.2021
Rental cost: As agreed (XXXX pr/sqm)

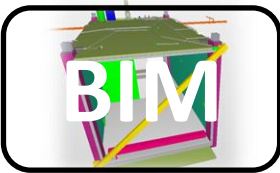
Project objective:
Handover: 10.08.2021
Finishing phase 1: 01.10.2018
Cost: Target price < 50 MILL Euro
Quality: 0 errors by handover

PO



- Meeting quality in decision-making processes > 5
- Self-evaluation > 4,5
- Preparation before session > 5
- Meeting attendance > 90%
- Agenda sent out for decision-making sessions: **5 days before**
- Decision-making sessions every **2 weeks with the tenant**
- Collocation of all stakeholders

BIM (VIA):
• Crash controls: **0 collisions after TFK**
• Tenant satisfaction after VR
• Use of VR_ Better basis early for the tenant
• Establish the HENT shed for easier access and understanding of BIM

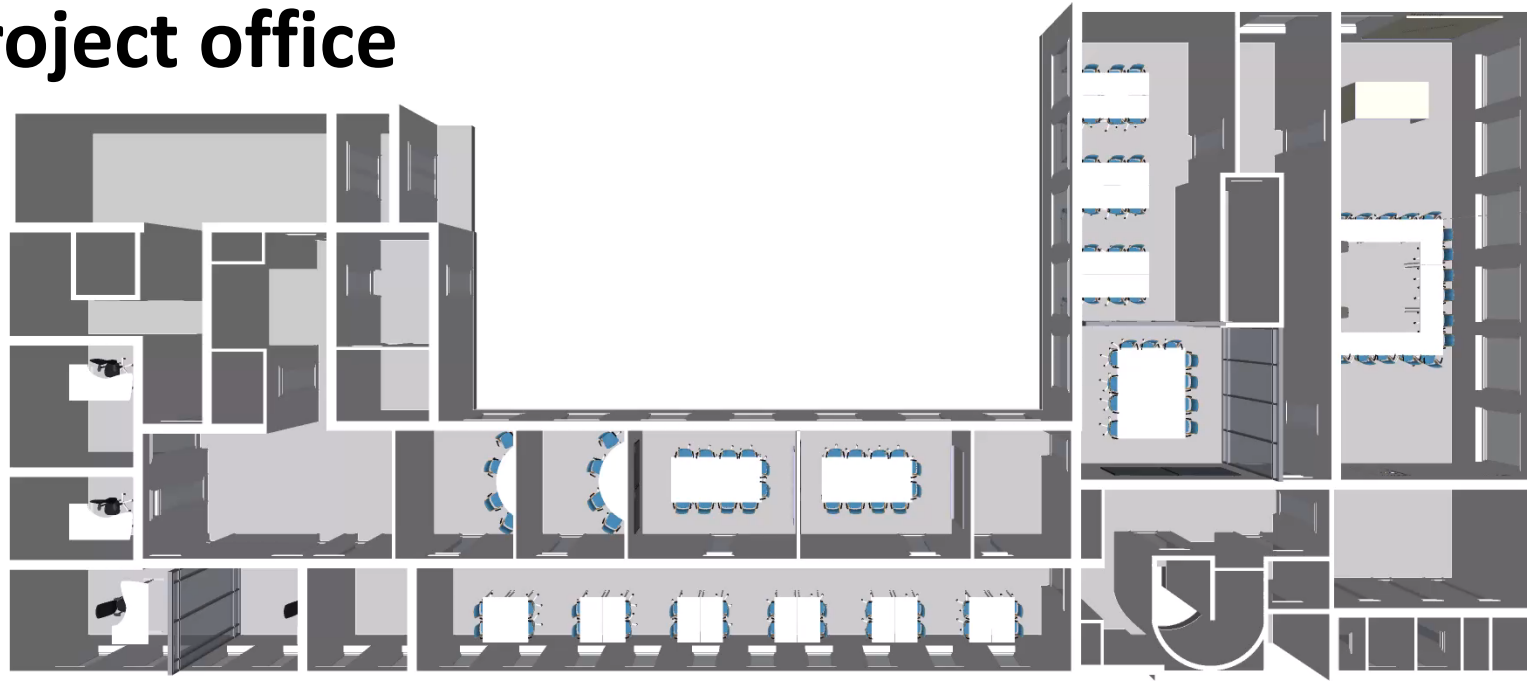


PPM
• PPU for decision-making activities > 90%
• **Follow-up of open/closed cases > 90%**
• **Involving planning**
• **Weekly plan checks**

**How did we work to achieve the client (CO)
and project objectives (PO)?**

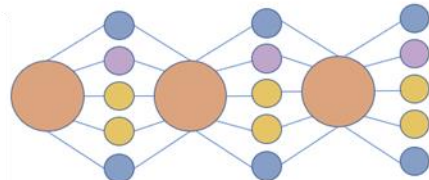
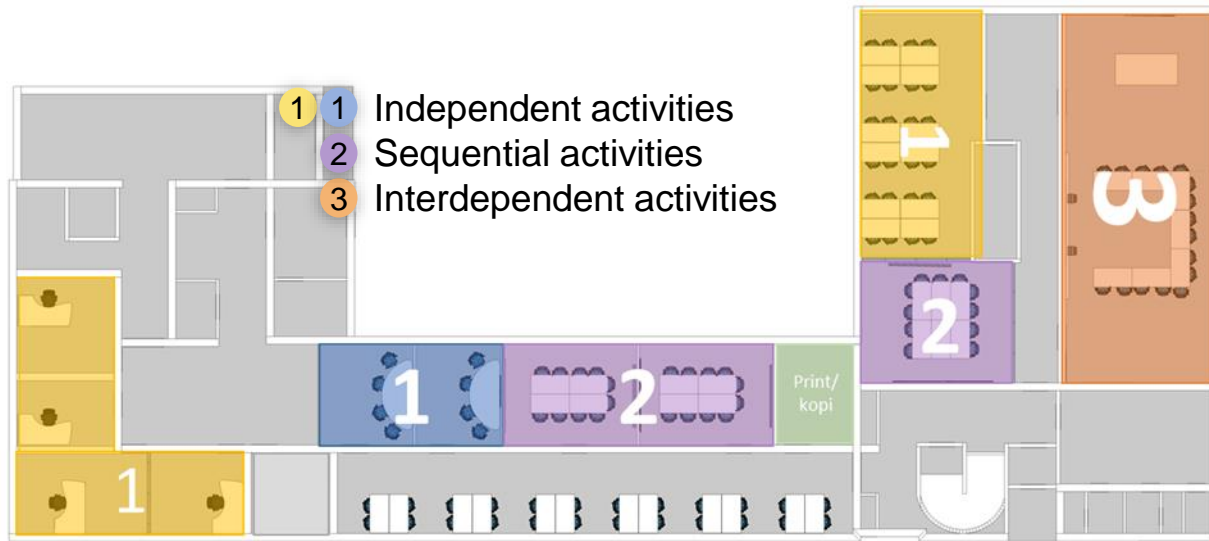
How did we rig ourselves? Colocation at job project office

ICE



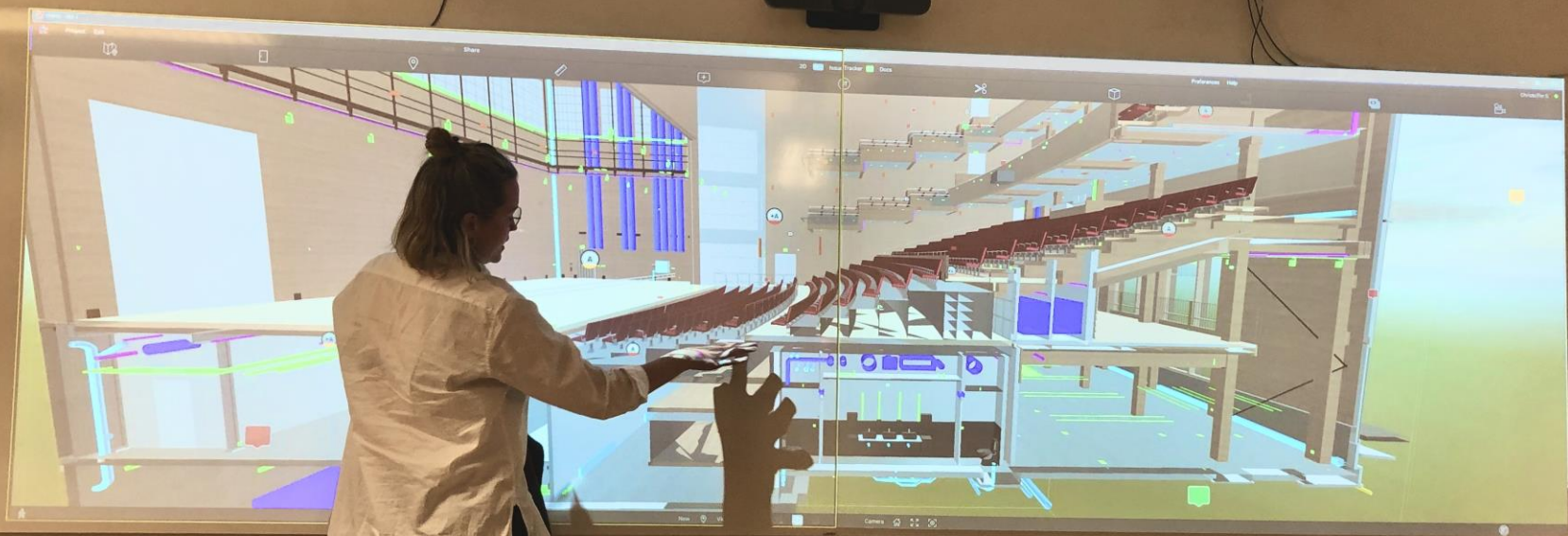
Different meeting rooms adapted to the different clarification needs and meeting forms

ICE



Arbeidsflyt

Kunnskap for en bedre verden



Cost/calculation-ICE: Follow-up of optimization proposals and status ICE

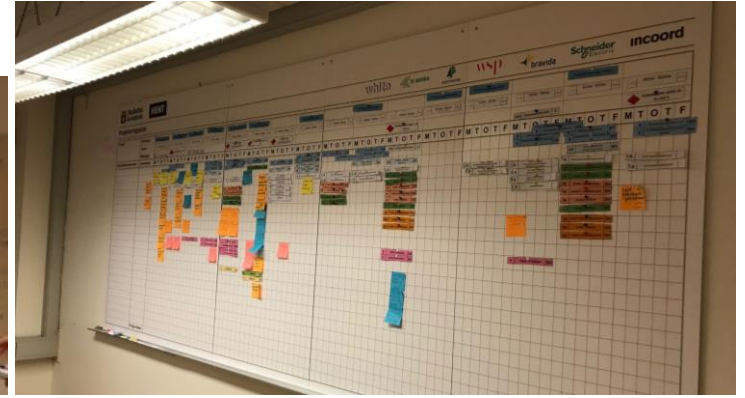
Cost management

- Calculation Milestones every 2 weeks
- Alternative assessments
- Involvement of all project participants
- Visualization and goal management
- Decisions ongoing during the session



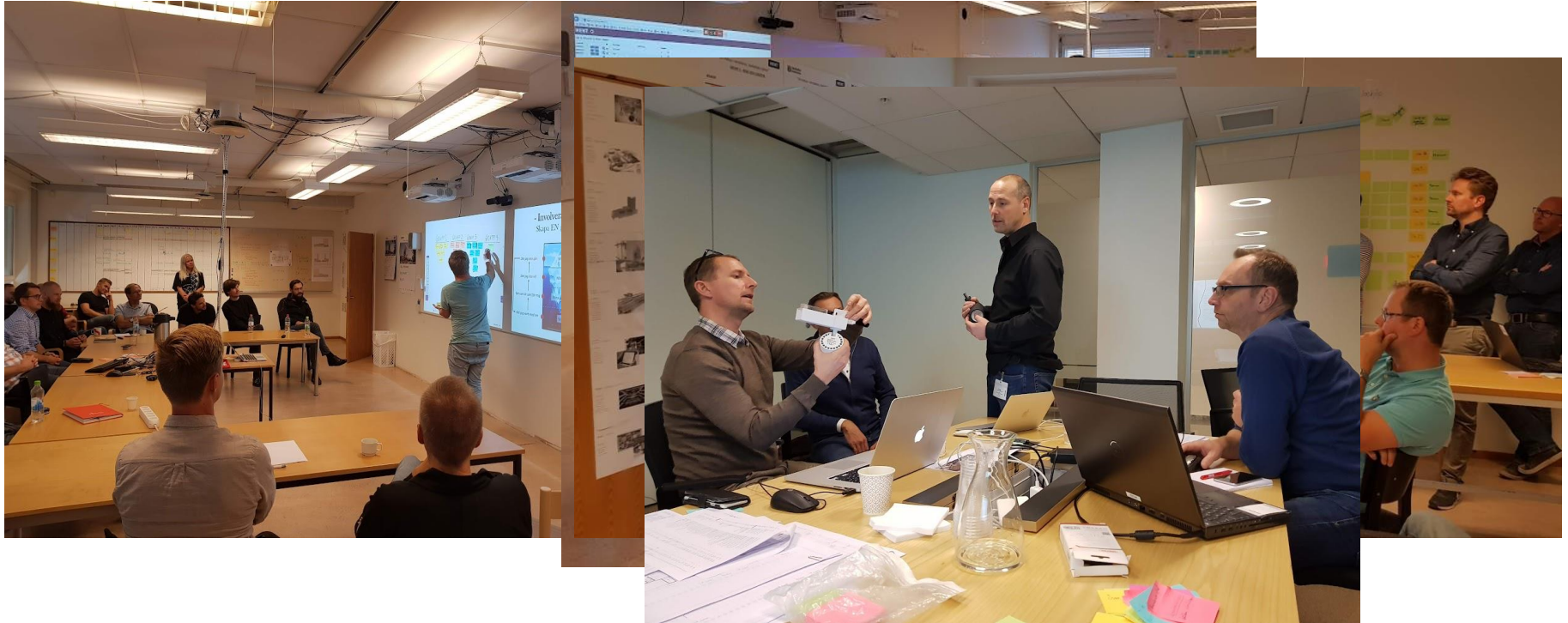
How did we plan together in order to developing the project?

PPM



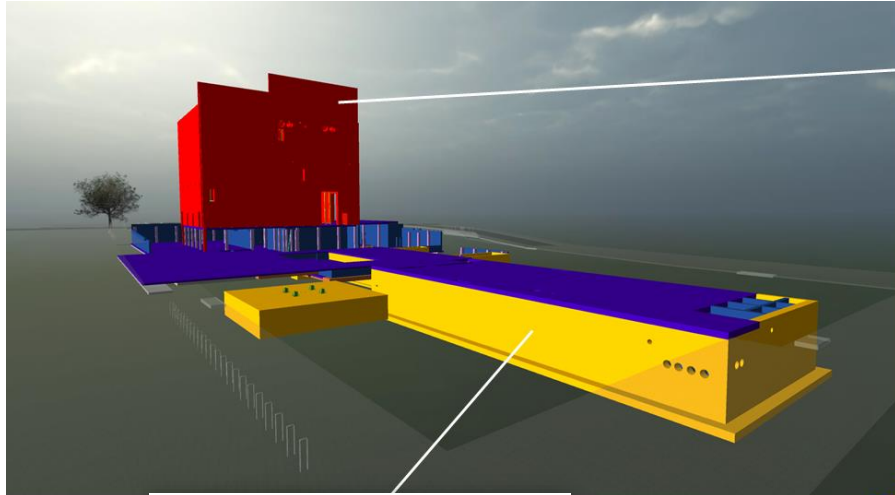
How did we plan together in order to developing the project?

PPM



Hvordan benyttet vi BIM (VIA)?

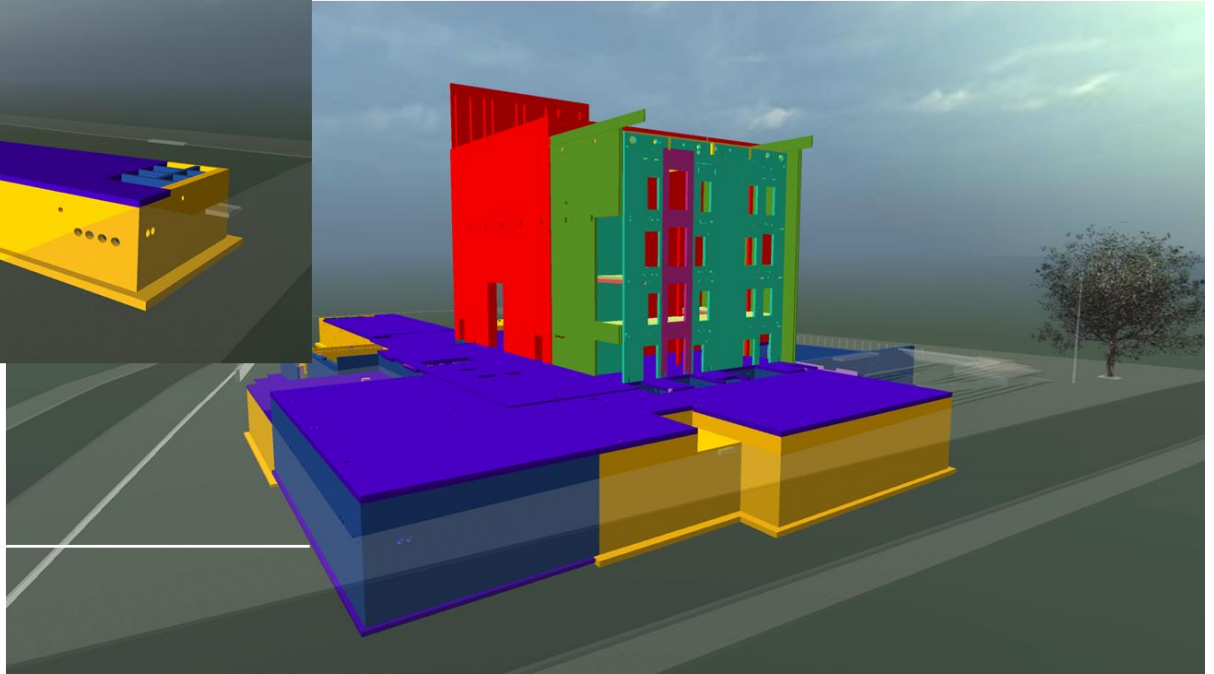
BIM



Sent to factory

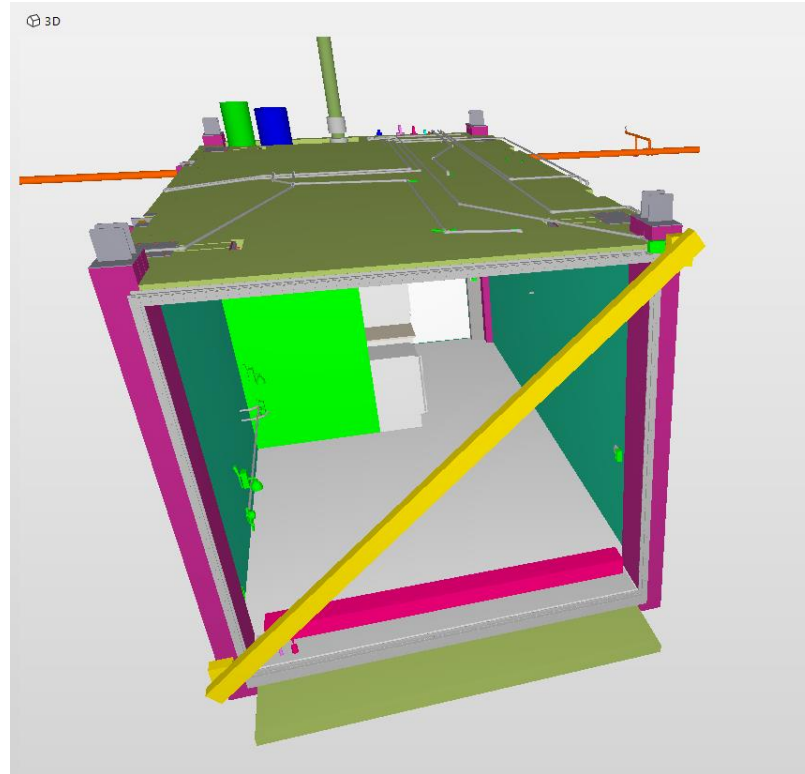
Sent to construction site

Work complete



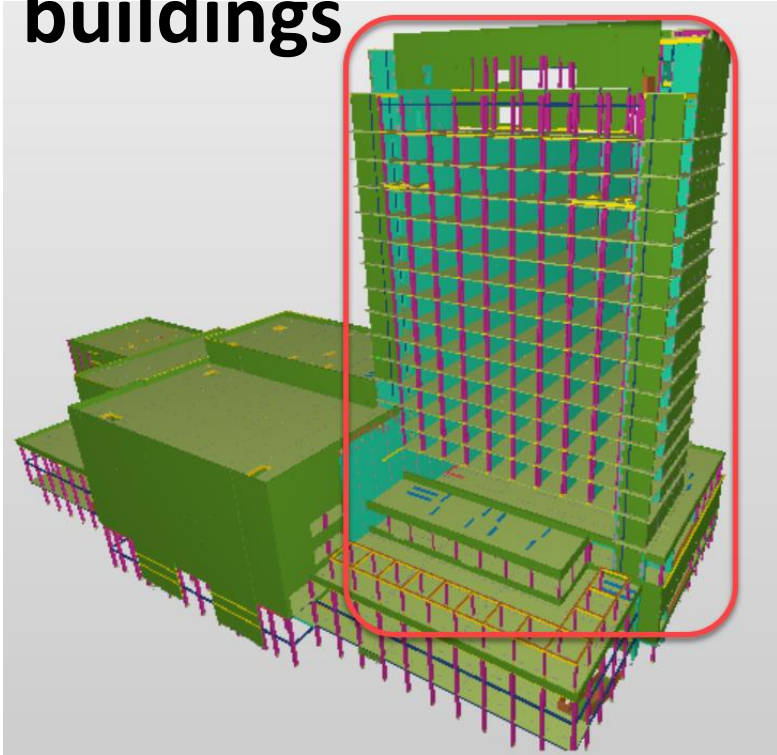
How did we use BIM (VIA)? Digital MockUp!

BIM

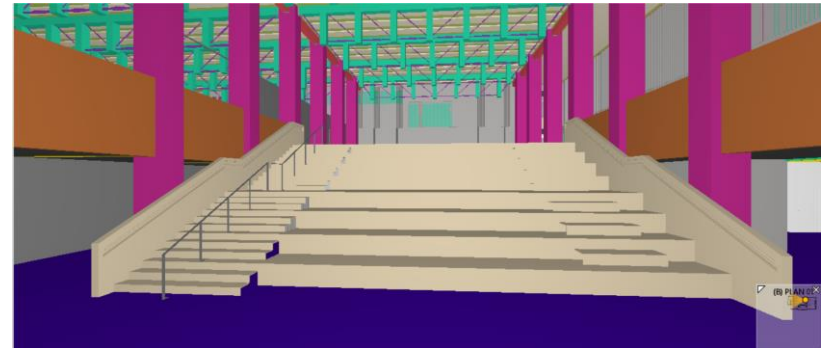


Example: How did we use VDC to solve the most challenging part of the project, the Hotel?

New construction method – Wooden high-rise buildings

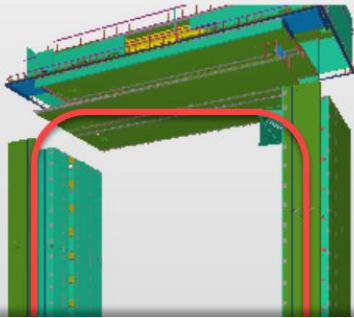


- Technical challenges of raw construction
- No reference data available
- Hotel location and features

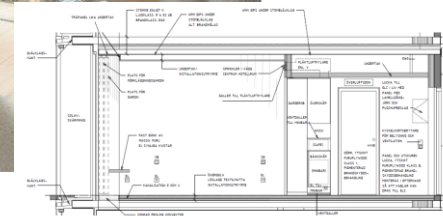
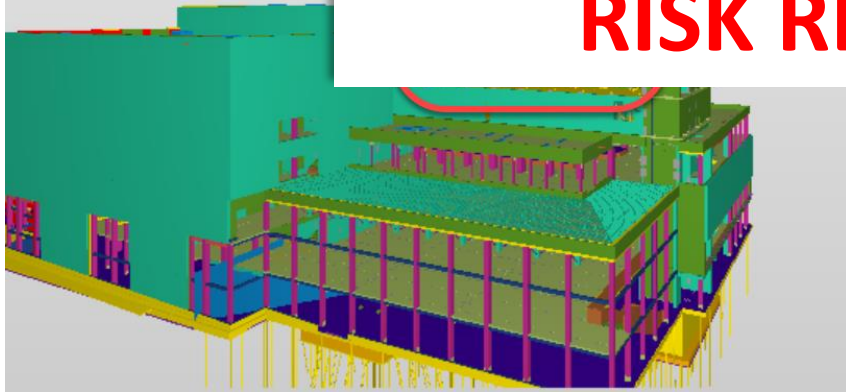


Main strategy - Hotel modules

Hotellmoduler fra plan 6-18
208 hotellrom



RISK REDUCING

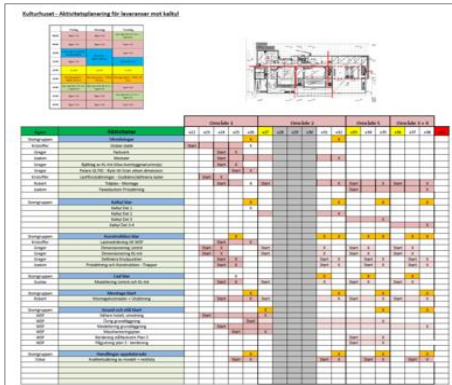


Agreed planning using involving planning

Process for developing hotel room modules



Plans



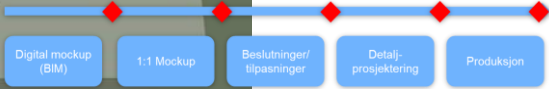
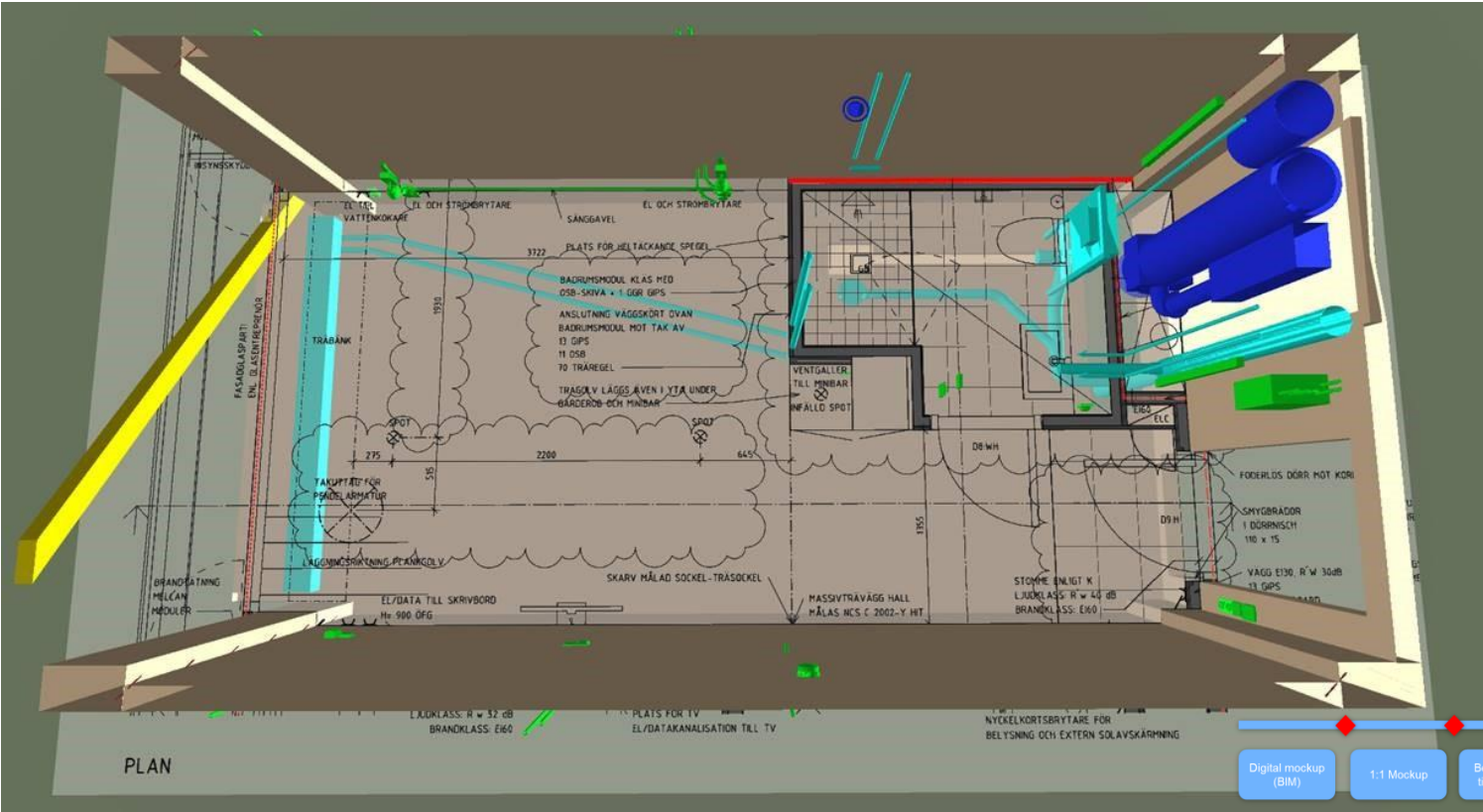
Activity plan SPG

Id	Arbetspaket	Beskrivning	Utförare av	Planering	Estimerad start	Estimerad slut
901	Märtnings - Guld stark		Robert Larsson	Kristoffer Malm	28.06.2018	28.06.2018
902	Lämningsplan till SPG	Analysrapport för stabiliserings- och rekonstruktsamt omvärldens åtgärder som krävs för att klara i så hand om lasterna	Robert Larsson	Kristoffer Malm	11.05.2018	28.06.2018
903	Stållning	Stållningen ska monteras upp på taket. Framfäst till ett 15 mm lastningsting takanordningen som är 400 mm på tak	Erik Johansson	Benny Ranting	07.06.2018	28.06.2018
904	Märtnings - Övriga 1		Robert Larsson	Göran Lindgren	11.06.2018	21.06.2018
905	Dimensionering av bärande		Andreas Gustafsson	Göran Lindgren	11.06.2018	21.06.2018
906	Övriga 1	Stavarna ska dimensioneras.	Andreas Gustafsson	Andreas Gustafsson	11.06.2018	21.06.2018
907	Trappor och andra detaljer		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	21.06.2018
908	Kalkyl Del 1 - klar		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.06.2018
909	Materialförbrukning Del 1		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	21.06.2018
910	Klämna material - Övriga 1		Andreas Gustafsson	Carolina Lundmark	11.06.2018	09.07.2018
911	Märtnings - Övriga 2		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.06.2018
912	Materialförbrukning		Andreas Gustafsson	Göran Lindgren	11.06.2018	07.08.2018
913	Dimensionering Länk 1 och R1, R2		Andreas Gustafsson	Göran Lindgren	11.06.2018	07.08.2018
914	Beställa Anordningar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	08.08.2018
915	Prisförslag Trappor		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
916	Kalkyl Del 2 - klar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	09.08.2018
917	Märtnings - Övriga 3		Andreas Gustafsson	Göran Lindgren	11.06.2018	11.09.2018
918	Dimensionering Länk 1 och R1, R2		Andreas Gustafsson	Göran Lindgren	11.06.2018	11.09.2018
919	Beställa Anordningar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
920	Prisförslag Trappor		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
921	Kalkyl Del 3 - klar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	11.09.2018
922	Materialförbrukning		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	11.09.2018
923	Dimensionering Länk 1 och R1, R2		Andreas Gustafsson	Göran Lindgren	11.06.2018	22.08.2018
924	Beställa Anordningar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
925	Prisförslag Trappor		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
926	Kalkyl Del 4 - klar		Andreas Gustafsson	Andreas Gustafsson	11.06.2018	20.09.2018
927	Materialförbrukning		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
928	Övriga		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
929	Märtnings - Övriga 4		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
930	Märtnings - Övriga 5		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
931	Märtnings - Övriga 6		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
932	Märtnings - Övriga 7		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
933	Märtnings - Övriga 8		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
934	Märtnings - Övriga 9		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018
935	Märtnings - Övriga 10		Andreas Gustafsson	Kristoffer Malm	11.06.2018	21.08.2018

Delivery plan SPG

Cost estimation plan

BIM – VMU (Visual Mockup) - Verification



After zero collisions in digital VMU and no more tenant adaptations, we built a physical MockUp in 1:1 (room 15-037)

FMU (Physical mockup 1:1)





Final product!!





Use of VDC at Sara cultural center

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- Handover:** 10.08.2021
- Finishing phase 1:** 01.10.2018
- Cost:** Target price < 50 MILL Euro
- Quality:** 0 errors by handover

CO

PO



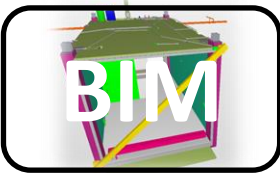
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PPM

- PPU for decision-making activities > 90%
- Follow-up of open/closed issues > 90%
- Involving planning
- Weekly plan checks

RESULT!

The project delivered on both Client and project objective

Client:

“By using VDC, we have been able to get a better overview of the status of our processes and targets, through collocation, use of ICE, and visualizing the status for all participant. We have been able to adjust along the way, in case of deviations

We have therefore managed to hand over the hotel within the agreed time, and approximately at cost.”



Consequences for the tenant!

Due to lack of decisions from the tenant:

Logistic:

- 416 mattresses
- 208 refrigerator
- 208 classet
- 208 beds
- 416 bedside table
- etc...

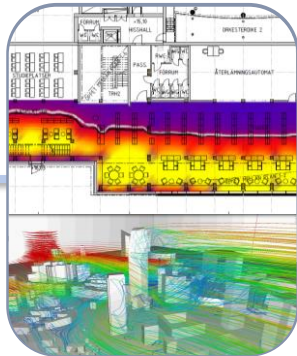
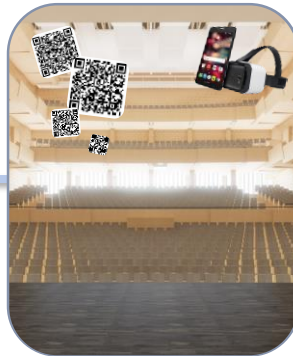


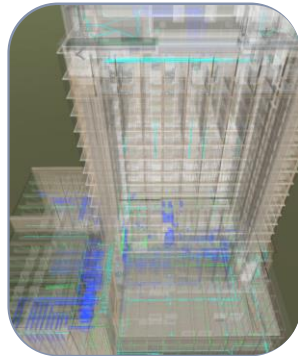
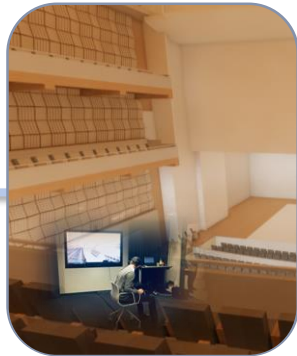
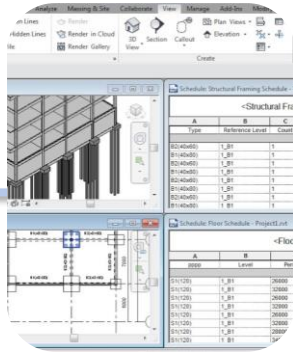
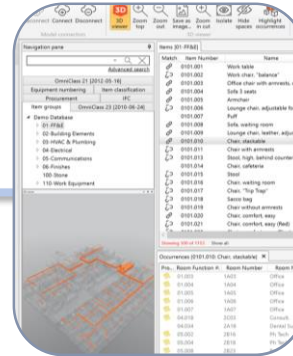
TOOLS USED?

- VIA REVIT – MODEL BUILDING
- VIA REVIZTO- MODEL USE
- VIA SOLIBRI – MODEL USE
- IA EXCEL - QTO AND ESTIMATION
- IA HENT-CORE – ISSUE MANAGEMENT
- IA HENT-CORE - SITE INSPECTION
- VIA DALUX – ONLY FOR PIPING
- (I)A AGRESSO – BUDGETING & REPORTING
- A IDA ICE – ENERGY SIMULATION

DIGITAL WORKFLOWS PHASE 1

BIM

SUSTAINABILITY

VR

VISUALIZATION

COORDINATION

DIALOG

QUANTITY TAKE-OFF

DATABASE

PHASE 2


VISION & AMBITION

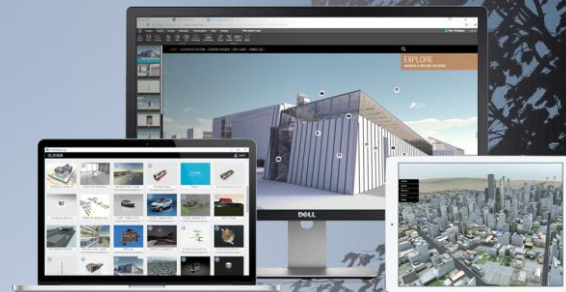
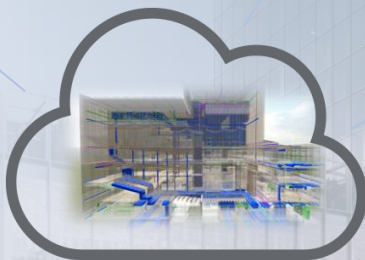
INVOLVING PROCESS OF REVIEWING
PAPER FREE CONSTRUCTION SITE
STRUCTURED & CORRECT INFORMATION

HENT

white



incoord



HENT

2.1 Ambitionsnivåer BIM

Under bygghandlingskedet skall BIM användas till följande aktiviteter och syften:

Kategori	Underkategori	Detaljer/Tilläg	Från i stadiet	PH	SH	BH
Introduktion	För att uppnå högsta möjliga värdet av BIM i de aktuella faserna är det viktigt att alla är införstådda i kraven och att speglerna är tydligt satta så tidigt som möjligt i det aktuella skedet. Involverade i projektet behöver också förstå vilka områden som BIM-modellerna ska rymmas inom för att kunna kvalitetsssäkra informationen under projekteringen.					
	Listan visar projektets ambitioner inom BIM. Detta ska analyseras och definieras så tidigt som möjligt i projektet. Listan fylls i av HENT.					
BIM ambitioner	Produktionsunderlag					
	As-Built modell					
	Modellsamordning 3D					■
	Kalkyl med BIM					
	Mängdtagning från modell					
	Inköp via modeller					
	Brandsimulering					
	Kostnadoptimering					
	4D - Tidplanering					■
	Leverantörspjätering	- Kök - AV-utrustning - His - Process - Fasad				■
Prefabrikation/Offsite produktion	- Manuset - Tekniska system				■	
Bygghetsanalys						
VR	- Projektioner - Bygget					
AR	Visualisering på bygget					
Robotteknologi & BIM	Borrning hålltagningar					
Areaplanering						
Ribningfritt	- Armering - Dörrförteckningar - Rumskrävning					

BIM

IN THE ARCTIC CIRCLE

IMPLEMENTATION

TREVITA | LIFE IS WOODEFUL



BRANDKONSULTEN

HENT

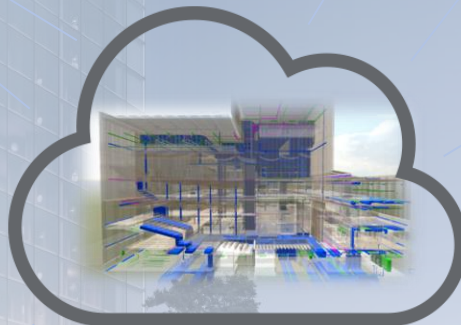
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FRAPONT
WOOD WORKS

WE MAKE WOOD HAPPEN



BREKKE STRAND



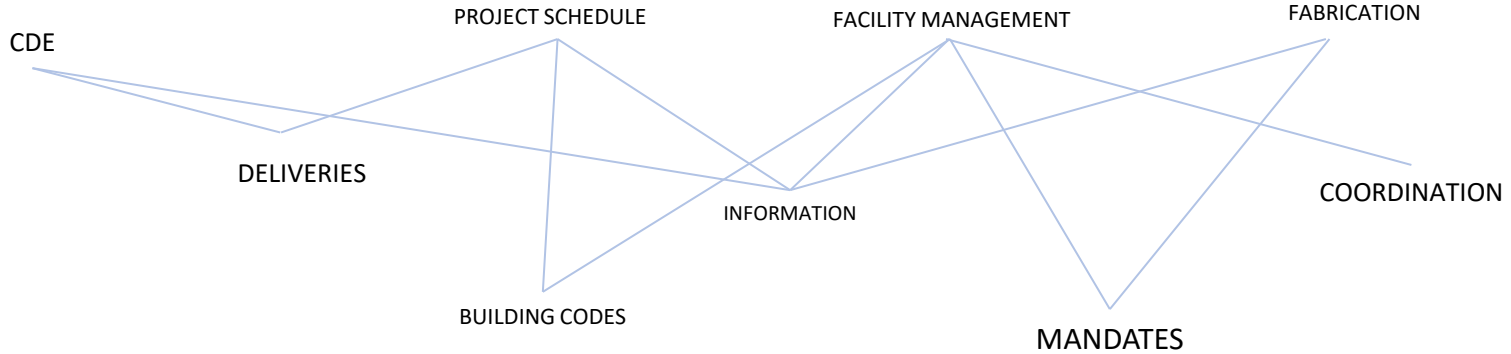
AIX

incoord



stokkan lys
LYS FOR DINE SANSE





PA-BOK FÖR PROJEKTERING
KMMIS - FAS 2 VERSION 0.2

Rev.	Datum	Ändringar	Skapad av	Godkänd av
1	10.01.2018	Utsesat 1	CHJ	BAK
2	12.01.2018	Utsesat 2	CHJ	BAK

www.hent.se | ... | ...

BIM-MANUAL (EIR + BEP)

BIM GENOMFÖRANDEPLAN
KMMIS - FAS 2 VERSION 0.2

Rev.	Datum	Ändringar	Skapad av	Godkänd av
1	10.01.2018	Utsesat 1	CHJ	BAK
2	12.01.2018	Utsesat 2	CHJ	BAK

www.hent.se | ... | ...

**BLAGA 1
LEVERANS-SPECIFIKATION**
KMMIS - FAS 2 VERSION 0.1

Rev.	Datum	Ändringar	Skapad av	Godkänd av
1	10.01.2018	Utsesat 1	CHJ	BAK
2	17.01.2018	Utsesat 2	CHJ	BAK

www.hent.se | ... | ...

**BLAGA 2
GRÄNSDRAGNINGSLISTA**
KMMIS - FAS 2 VERSION 0.2

Rev.	Datum	Ändringar	Skapad av	Godkänd av
1	10.01.2018	Utsesat 1	CHJ	BAK
2	17.01.2018	Utsesat 2	CHJ	BAK

www.hent.se | ... | ...

**BLAGA 3
METODBLAD REVIZTO**
KMMIS - FAS 2 VERSION 0.2

Rev.	Datum	Ändringar	Skapad av	Godkänd av
1	10.01.2018	Utsesat 1	CHJ	BAK
2	17.01.2018	Utsesat 2	CHJ	BAK

www.hent.se | ... | ...

ATTACHMENTS

+ / Δ

+ All work worked in Revit

+ Using Revizto reduced response time

Δ Unsuccessful with drawing-free building site

Δ We invested in BIM (VIA), without making better use of it