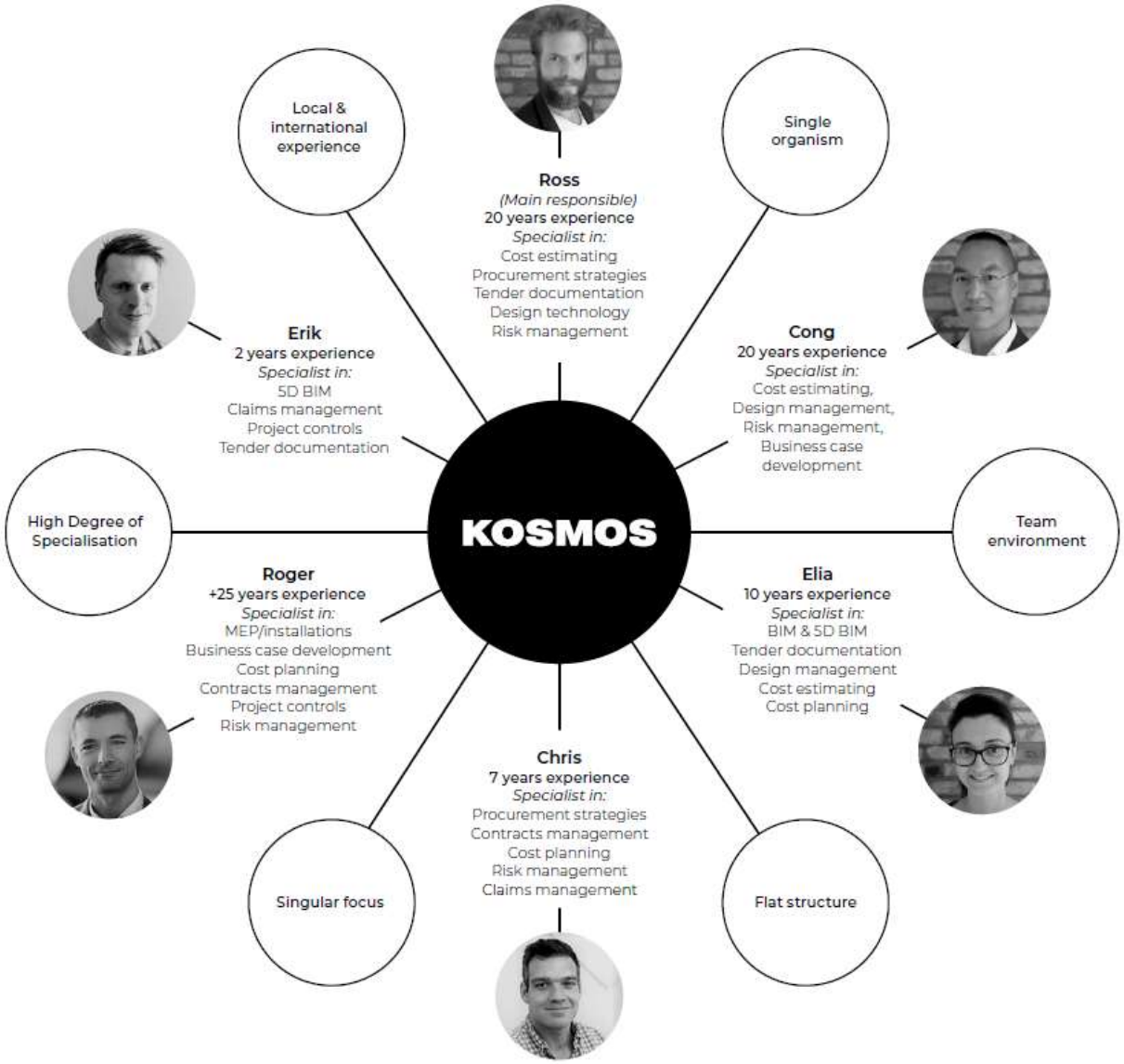
Ross Griffin & Elia González Salas – 18 March 2021

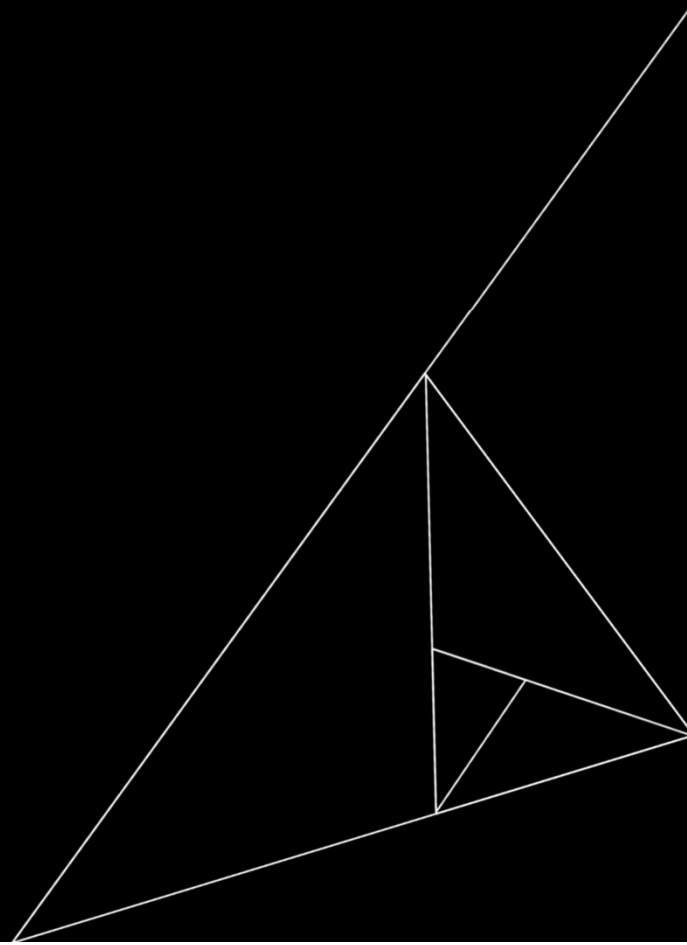
BIM an Integrated Collaborative Delivery – A KOSMOS EXPERIENCE

KOSMOS


KOSMOS
Local & international experience
Single organism
High Degree of Specialisation
Team environment
Singular focus
Flat structure
Ross
(Main responsible)
20 years experience
Specialist in:
Cost estimating
Procurement strategies
Tender documentation
Design technology
Risk management
Erik
2 years experience
Specialist in:
5D BIM
Claims management
Project controls
Tender documentation
Cong
20 years experience
Specialist in:
Cost estimating,
Design management,
Risk management,
Business case development
Roger
+25 years experience
Specialist in:
MEP/installations
Business case development
Cost planning
Contracts management
Project controls
Risk management
Elia
10 years experience
Specialist in:
BIM & 5D BIM
Tender documentation
Design management
Cost estimating
Cost planning
Chris
7 years experience
Specialist in:
Procurement strategies
Contracts management
Cost planning
Risk management
Claims management

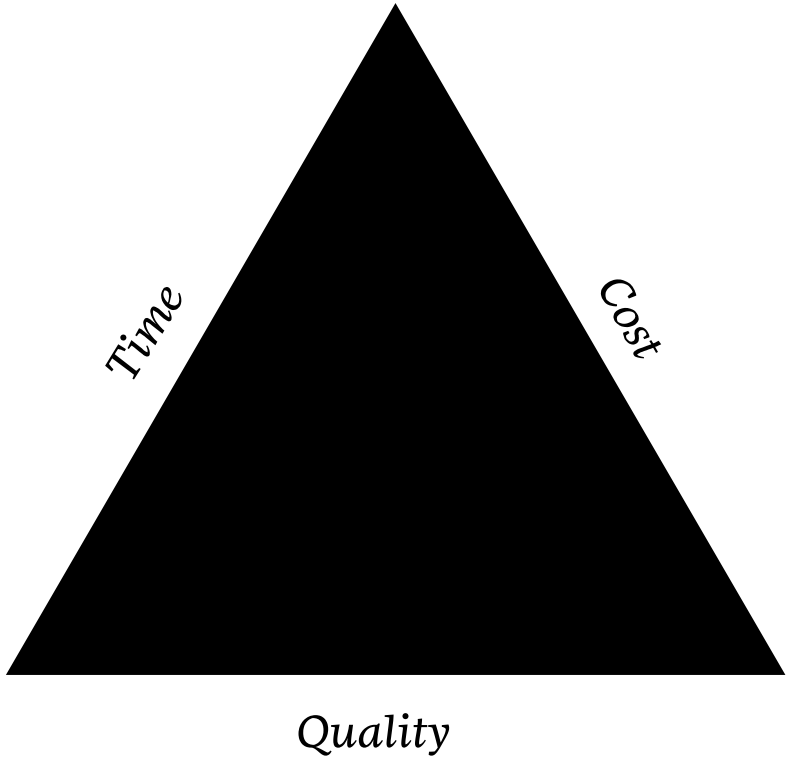
Value Driven Cost Management

is an integrated collaborative approach to designing to cost, as well as continuous cost follow up & control

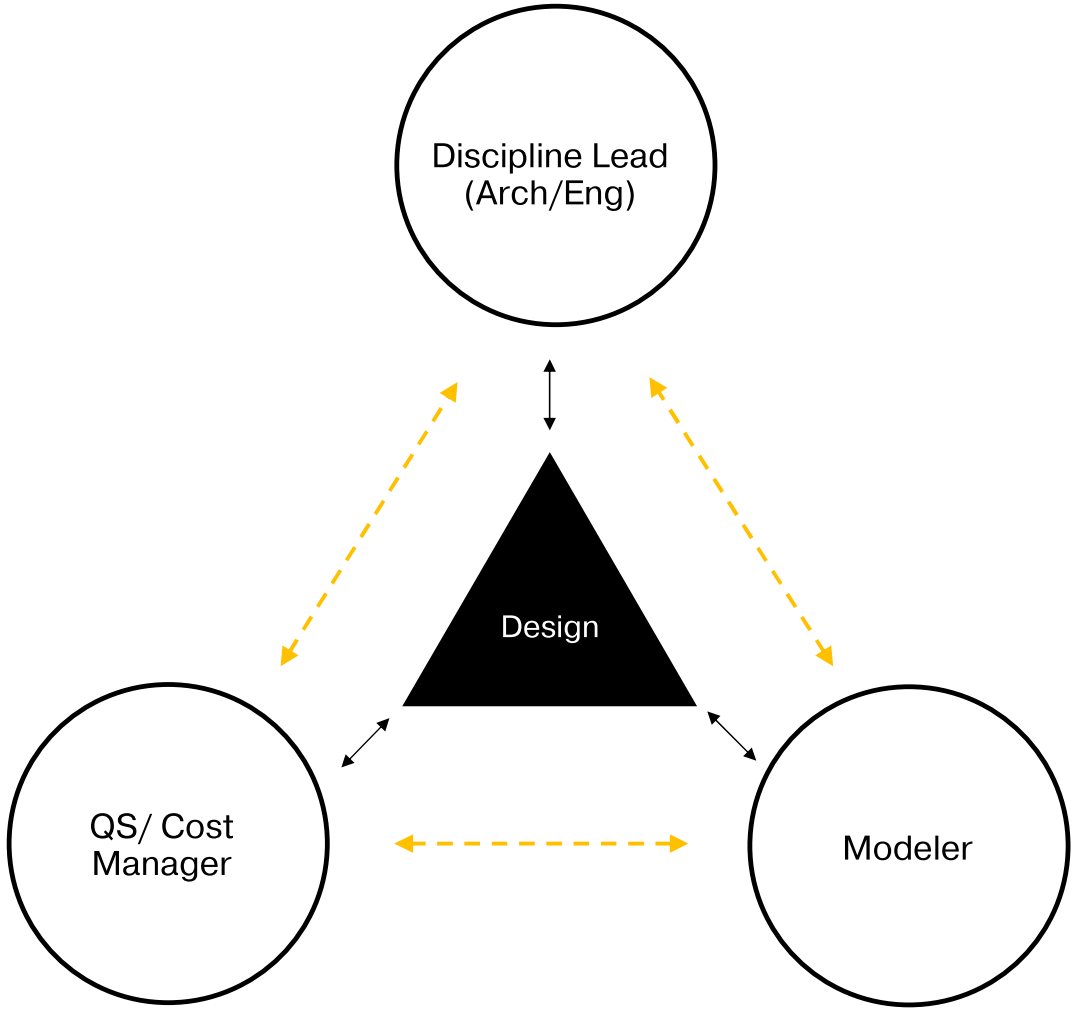


KOSMOS

- Quality is everyone's responsibility

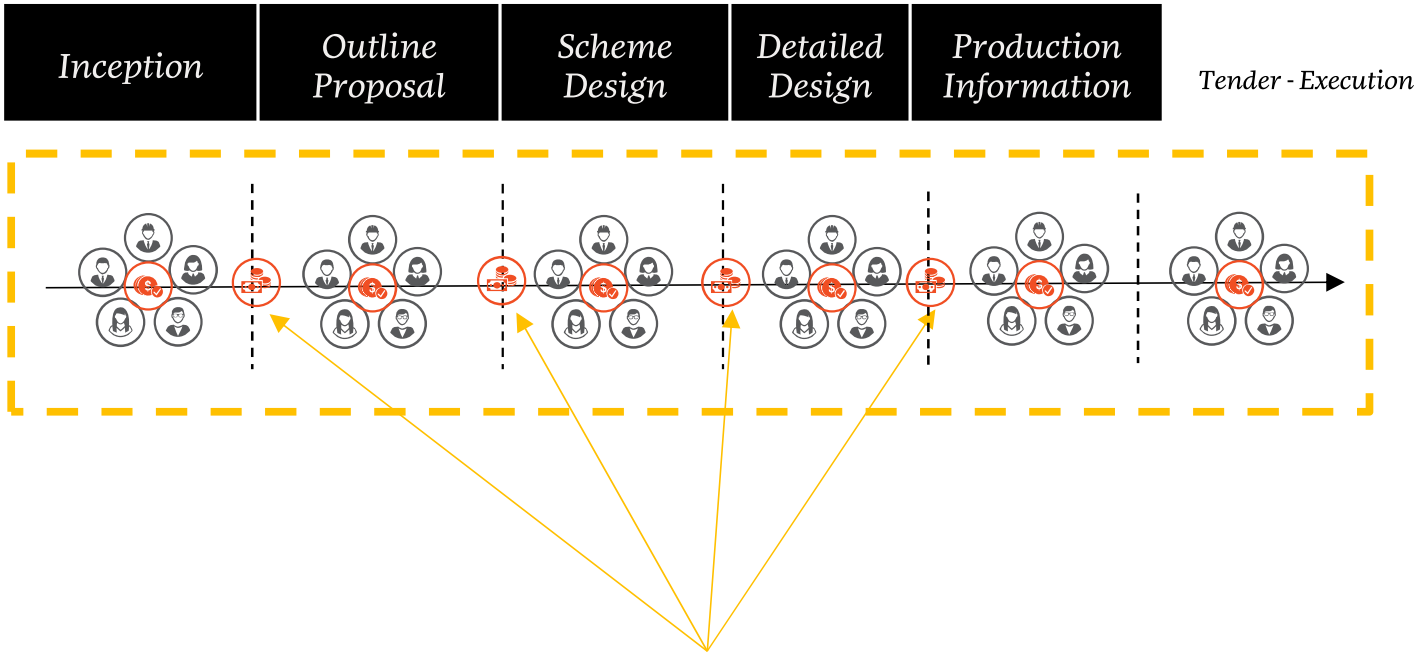


- Integrated 3D design where the QS and design team design together



KOSMOS

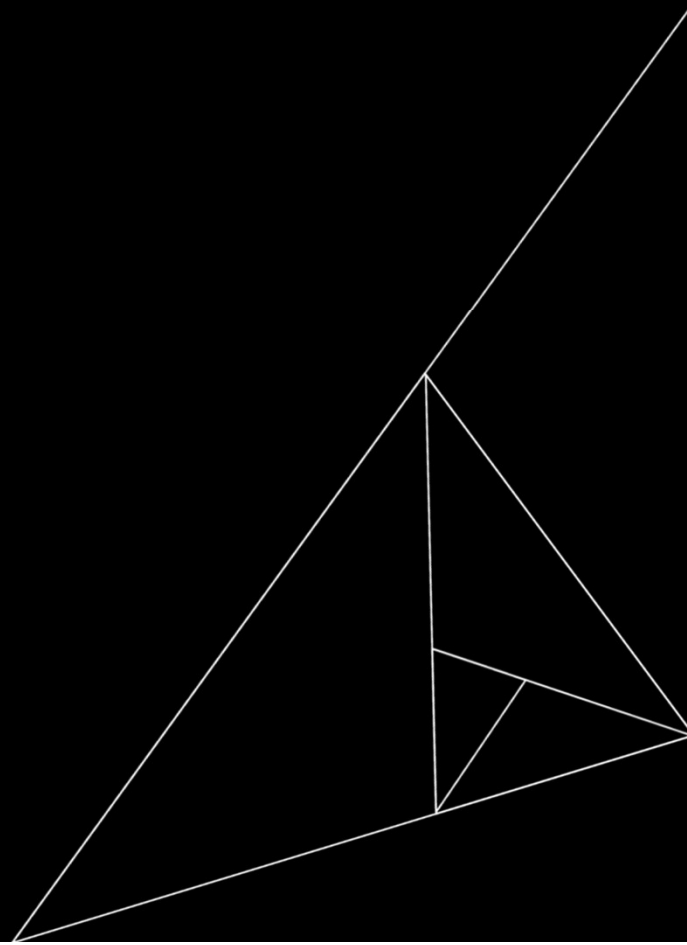
Design Process:



KOSMOS

The Digital QS´s BIM world

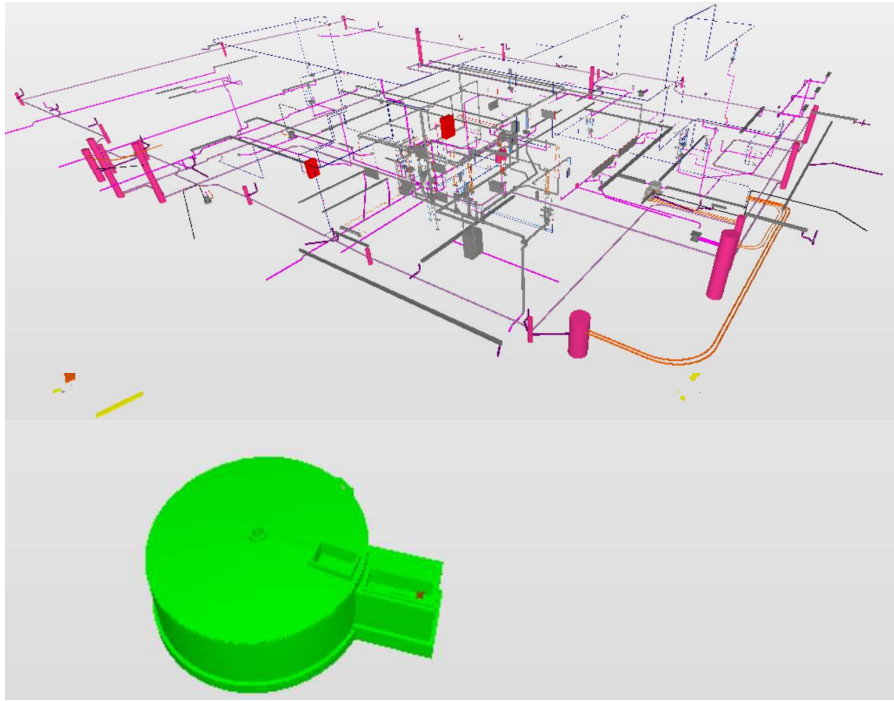
Without integrated collaborations you cannot succeed



KOSMOS

The QS now needs to understand the digital design process for each discipline

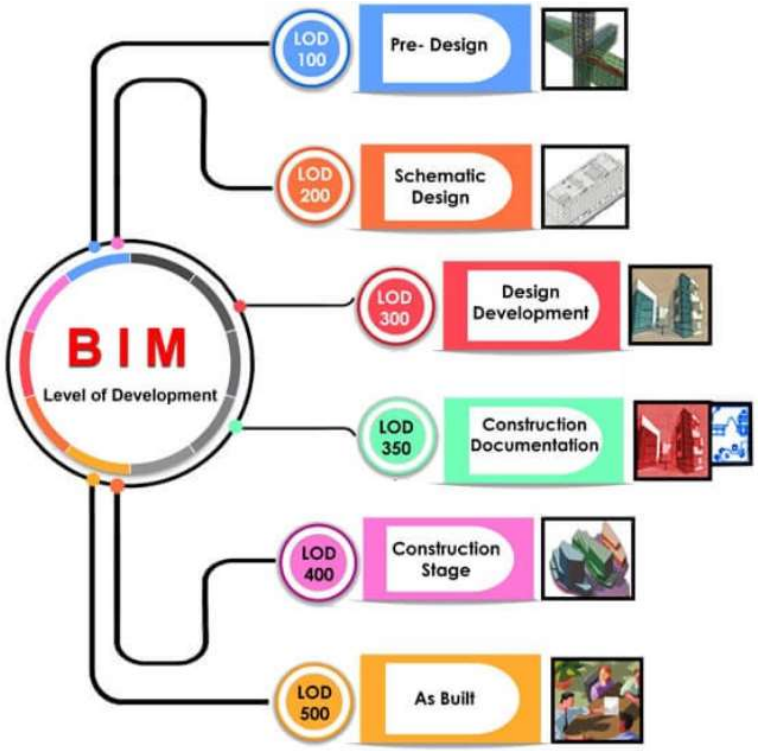
(modelling, Revit, ArchiCad, Tekla, Solibri, Navisworks, Costx, CUBIT ….)



KOSMOS

The QS also needs to understand:

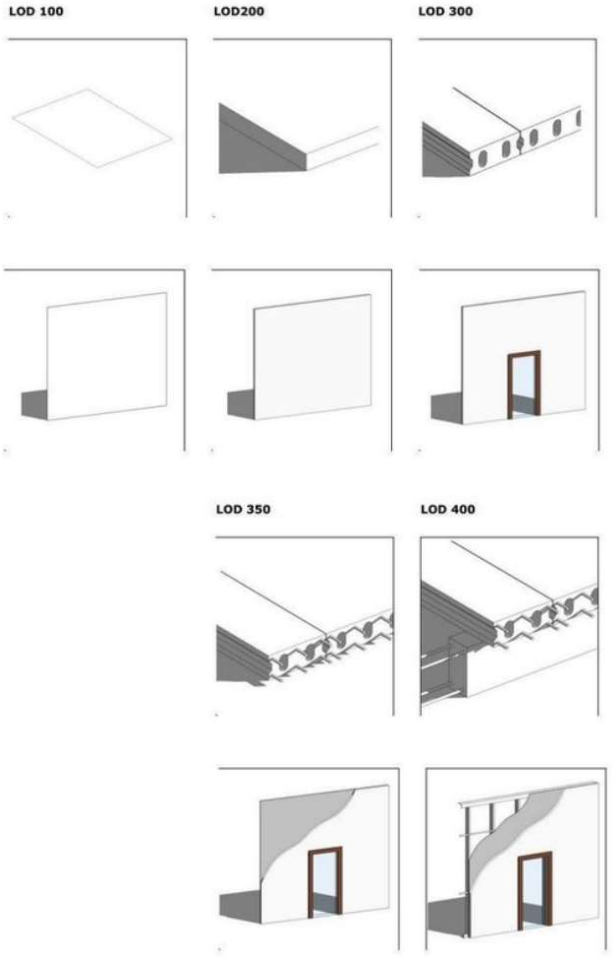
- What **level of detail** to expect in the models at each stage/gateway *(LOD 100, 200, 300, 350, 400, 500)*



KOSMOS

The QS also needs to understand:

- What **level of detail** to expect in the models at each stage/gateway *(LOD 100, 200, 300, 350, 400, 500)*



KOSMOS

ID		Inception (Budget)	Outline Proposal	Scheme Design	Detailed Design	Tender
		€	€	€	€	€
		xxxx	xxxx	xxxx	xxxx	xxxx
	Demolition and Preliminary works	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Substructure	m2 price and/or quantities and unit prices	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Superstructure	m2 price and/or quantities and unit prices	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Completions	m2 price and/or quantities and unit prices	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Finishes	m2 price and/or quantities and unit prices	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Mechanical & Ventilation	m2 price	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices
	Electrical	m2 price	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices
	FF&E	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Works to Existing Buildings	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	Prefabricated Buildings	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
	External and surface works	m2 price	m2 price and/or quantities and unit prices	quantities and unit prices	quantities and unit prices	quantities and unit prices
I alt	**Direct works**	-	-	-	-	-

The QS also needs to understand what level of detail to expect in the models at each stage/gateway *(this might differ by discipline)*

The QS also needs to understand:

- What **information** will be available
  (parameters, schedules linked to design elements,…)

Size	System Abbreviation	System Classification	System Name	System Type	Tag	Theta	Type Mark	Type Name
		Hydronic Return,Hydronic Supply	KR 1,KR 15 (5),KF 1,KR 23,KF 14				001	5516001_Accumulation_Tank_Ø2000
		Hydronic Supply,Hydronic Return,Hydronic Supply	KF 1,KR 15 (3),KR 22,KR 21				002	5516002_Accumulation_Tank_Ø3750
		Hydronic Supply	KR 15 (2),KR 10,KR 15 (2)				001	5336001_Bag_Filter_Hiflux
		Hydronic Supply	KR 15 (1),KR 11,KR 15 (1)				001	5336001_Bag_Filter_Hiflux
		Hydronic Supply,Other,Hydronic Supply	AP 4,AP 5,AP 3				002	5434002_Buffer_Vessel_Ø2000
		Hydronic Return,Hydronic Supply	KF 1,KR 5,KR 8,KF 7		09.10-1.01-CH04		001	5532001_CW_Chiller_SAB_233
		Hydronic Return,Hydronic Supply	KF 1,KR 5,KR 13,KF 11		09.10-1.01-CH02		001	5532001_CW_Chiller_SAB_233
		Hydronic Return,Hydronic Supply,Hydronic Return	KR 7,KF 6,KF 1,KR 5		09.10-1.01-CH03		002	5532002_CW_Chiller_SAB_T116
		Hydronic Return,Hydronic Supply,Hydronic Return	KR 9,KF 8,KF 1,KR 5		09.10-1.01-CH01		002	5532002_CW_Chiller_SAB_T116
		Other	AP 3				002	5410002_Compressed_air_Filter
		Hydronic Supply,Hydronic Return,Hydronic Supply	KR 15 (2),AP 3				002	5431002_Compressor_ZR_300_425
		Hydronic Supply,Hydronic Return,Hydronic Supply	KR 15 (2),AP 3				002	5431002_Compressor_ZR_300_425
		Hydronic Return,Hydronic Supply,Hydronic Return,H	KR 13,KF 11,KR 13				001	5536001_Condenser_AGVD
		Hydronic Return,Hydronic Supply,Hydronic Return,H	KR 13,KF 11,KR 13				001	5536001_Condenser_AGVD
		Hydronic Return,Hydronic Supply,Hydronic Return,H	KR 13,KF 11,KR 13				001	5536001_Condenser_AGVD
		Hydronic Return,Hydronic Supply,Hydronic Return,H	KR 13,KF 11,KR 13				001	5536001_Condenser_AGVD
		Hydronic Return,Hydronic Supply,Hydronic Return,H	KR 7,KF 5,KR 7				001	5536001_Condenser_AGVD

The QS also needs to understand:

- What **level of detail** to expect in the models at each stage/gateway *(LOD 100, 200, 300, 350, 400, 500)*
- What **information** will be available *(parameters, schedules linked to design elements,…)*

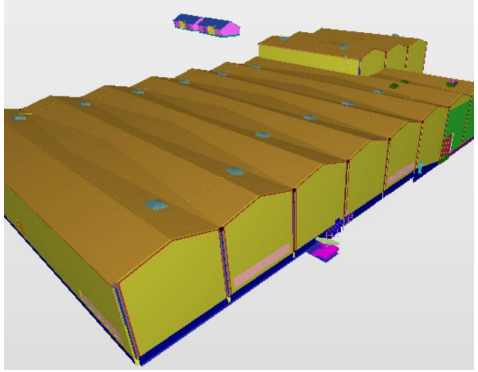
Both "Level of detail" & "Parameters/Information" might differ by discipline

Identity Data	
Description	Rendered 215mm Concrete Block
Type Name	Rendered 215mm Concrete Block
Family Name	Basic Wall
Structural Material	Masonry Concrete Block
Keynote	2.1 External Walls
Assembly Code	2.1.1
Dimensions	
Width	240mm (215mm + 25mm Render)
Area	7.43m2
Length	6750.00mm
Volume	1.782m3
Constraints	
Base Constraint	Level 01
Base Offset	0
Unconnected Height	2700mm
Analytical Properties	
Heat Transfer Coefficient	6.791 W/(m²K)
Thermal Mass	20.47KJ/K
Thermal Resistance	0.1593 (m²K)/W
Fire Rating	60min
Structural	
Structural Usage	Non-Load Bearing
Strength	30N
System Properties	
GUID	uB12345tY87654345
Instance ID	3432542178

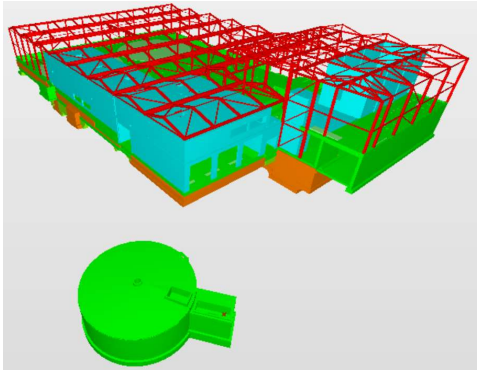
KOSMOS

It is also important to understand that there might be more than one model. Each discipline might have their own model

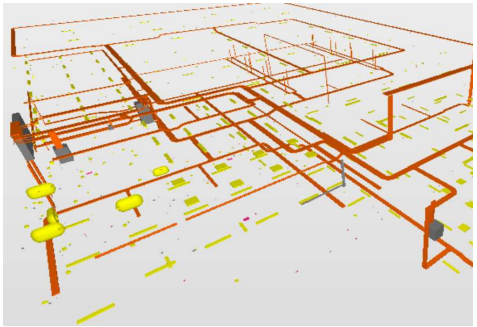
Arch



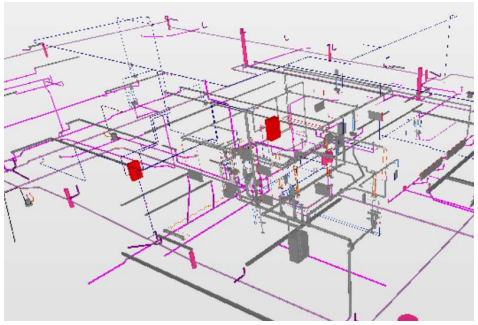
Cons.



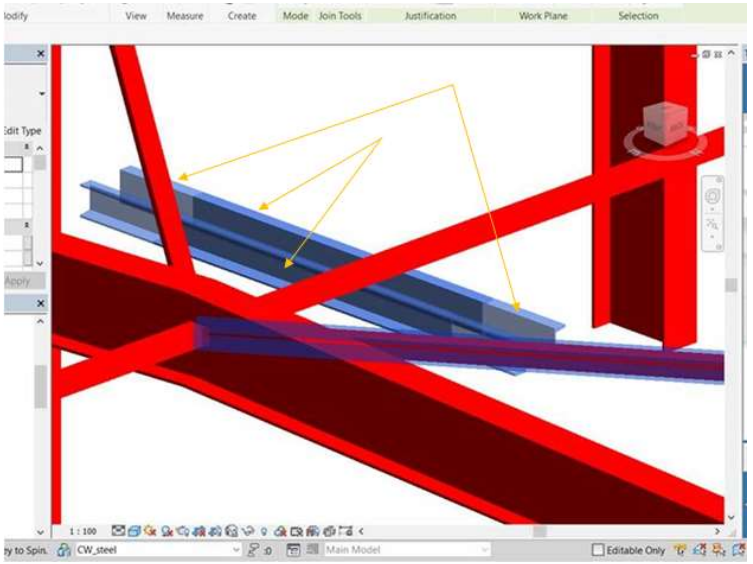
El



Mech



But more importantly we need to **understand the quality and accuracy of the information** we are looking at

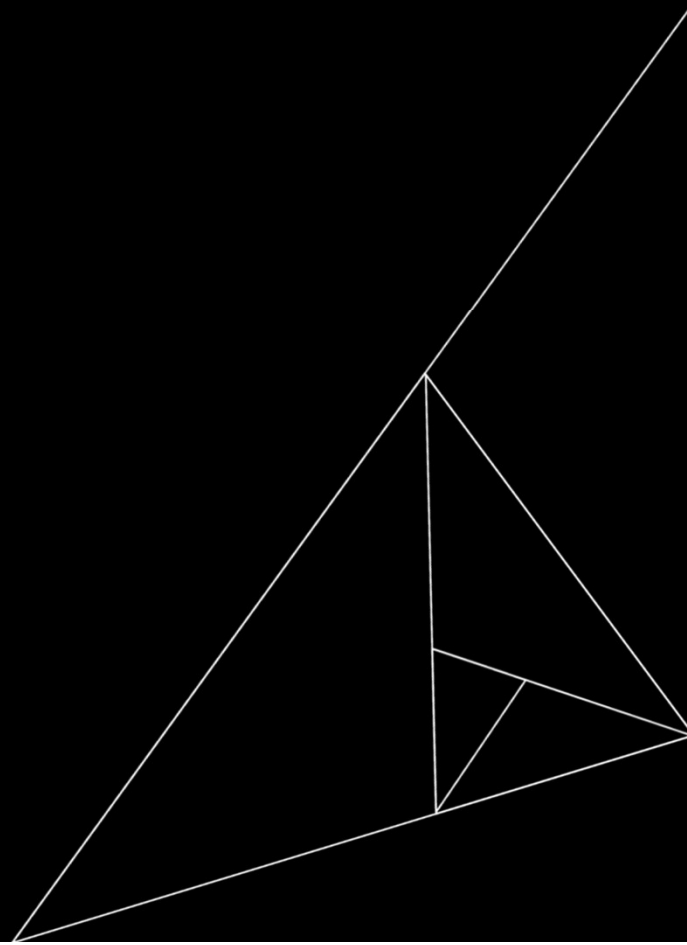


The QS needs to understand:

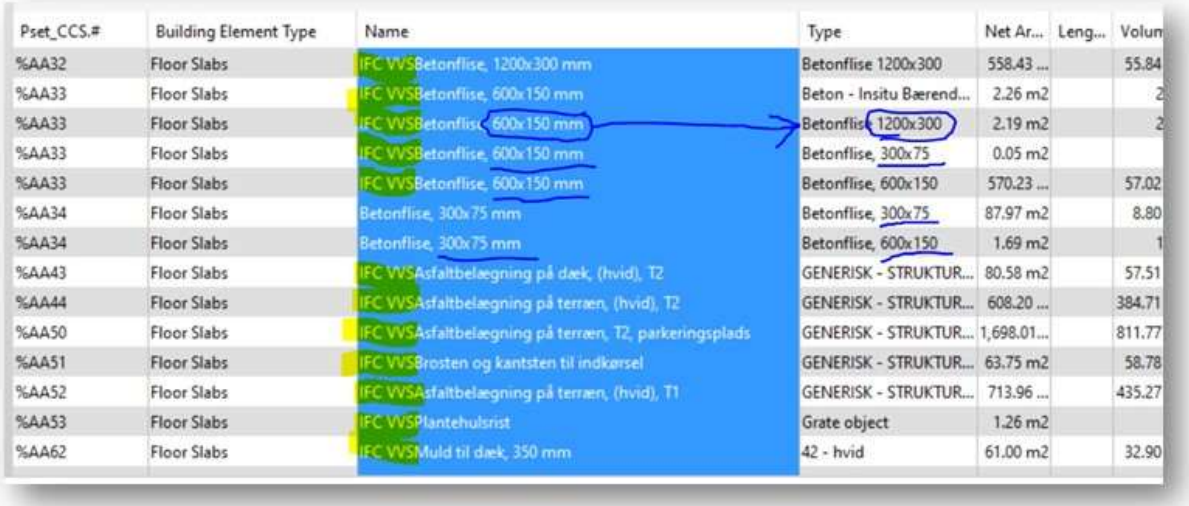
- *The interfaces between the different discipline's models,*
- *Possible duplicates between disciplines,*
- *Overlaps or missing elements*
- *Wrong labels*

Part of the Design Team

You are there to support the design team and they are there to support you



KOSMOS



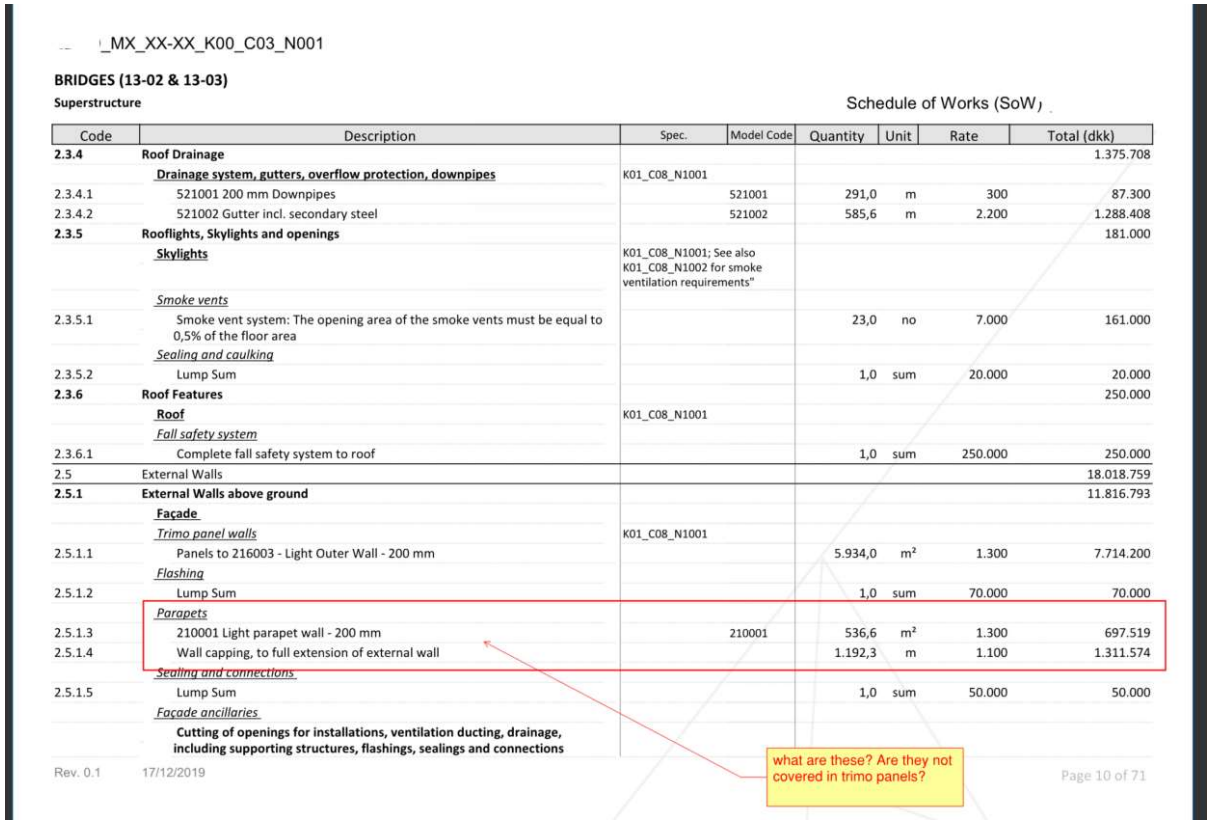
Pset_CCS.#	Building Element Type	Name	Type	Net Ar...	Leng...	Volum
%AA32	Floor Slabs	IFC VVSBetonflise, 1200x300 mm	Betonflise 1200x300	558.43 ...		55.84
%AA33	Floor Slabs	IFC VVSBetonflise, 600x150 mm	Beton - Insitu Bærend...	2.26 m2		2
%AA33	Floor Slabs	IFC VVSBetonflise, 600x150 mm	Betonflise, 1200x300	2.19 m2		2
%AA33	Floor Slabs	IFC VVSBetonflise, 600x150 mm	Betonflise, 300x75	0.05 m2		
%AA33	Floor Slabs	IFC VVSBetonflise, 600x150 mm	Betonflise, 600x150	570.23 ...		57.02
%AA34	Floor Slabs	Betonflise, 300x75 mm	Betonflise, 300x75	87.97 m2		8.80
%AA34	Floor Slabs	Betonflise, 300x75 mm	Betonflise, 600x150	1.69 m2		1
%AA43	Floor Slabs	IFC VVSAsfaltbelægning på dæk, (hvid), T2	GENERISK - STRUKTUR...	80.58 m2		57.51
%AA44	Floor Slabs	IFC VVSAsfaltbelægning på terræn, (hvid), T2	GENERISK - STRUKTUR...	608.20 ...		384.71
%AA50	Floor Slabs	IFC VVSAsfaltbelægning på terræn, T2, parkeringsplads	GENERISK - STRUKTUR...	1,698.01...		811.77
%AA51	Floor Slabs	IFC VVSBrosten og kantsten til indkørsel	GENERISK - STRUKTUR...	63.75 m2		58.78
%AA52	Floor Slabs	IFC VVSAsfaltbelægning på terræn, (hvid), T1	GENERISK - STRUKTUR...	713.96 ...		435.27
%AA53	Floor Slabs	IFC VVSPlantehulsrist	Grate object	1.26 m2		
%AA62	Floor Slabs	IFC VVSMuld til dæk, 350 mm	42 - hvid	61.00 m2		32.90

As the design progresses the QS needs to take **weekly meetings** with the BIM coordinator & discipline leads to make sure the information in the models are correct.

Do NOT wait until the end, it will be too late.

- The design team/disciplines need to review the cost estimates & BoQ

- Collaborative delivery offers overall greater value, through higher quality



_MX_XX-XX_K00_C03_N001

BRIDGES (13-02 & 13-03)

Superstructure

Schedule of Works (SoW)

Code	Description	Spec.	Model Code	Quantity	Unit	Rate	Total (dkk)
2.3.4	**Roof Drainage**						1.375.708
	Drainage system, gutters, overflow protection, downpipes	K01_C08_N1001					
2.3.4.1	521001 200 mm Downpipes		521001	291,0	m	300	87.300
2.3.4.2	521002 Gutter incl. secondary steel		521002	585,6	m	2.200	1.288.408
2.3.5	**Rooflights, Skylights and openings**						181.000
	Skylights	K01_C08_N1001; See also K01_C08_N1002 for smoke ventilation requirements"					
	Smoke vents						
2.3.5.1	Smoke vent system: The opening area of the smoke vents must be equal to 0,5% of the floor area			23,0	no	7.000	161.000
	Sealing and caulking						
2.3.5.2	Lump Sum			1,0	sum	20.000	20.000
2.3.6	**Roof Features**						250.000
	Roof	K01_C08_N1001					
	Fall safety system						
2.3.6.1	Complete fall safety system to roof			1,0	sum	250.000	250.000
2.5	External Walls						18.018.759
2.5.1	**External Walls above ground**						11.816.793
	Façade						
	Trimo panel walls	K01_C08_N1001					
2.5.1.1	Panels to 216003 - Light Outer Wall - 200 mm			5.934,0	m²	1.300	7.714.200
	Flashing						
2.5.1.2	Lump Sum			1,0	sum	70.000	70.000
	Parapets						
2.5.1.3	210001 Light parapet wall - 200 mm		210001	536,6	m²	1.300	697.519
2.5.1.4	Wall capping, to full extension of external wall			1.192,3	m	1.100	1.311.574
	Sealing and connections						
2.5.1.5	Lump Sum			1,0	sum	50.000	50.000
	Façade ancillaries						
	Cutting of openings for installations, ventilation ducting, drainage, including supporting structures, flashings, sealings and connections						

what are these? Are they not covered in trimo panels?

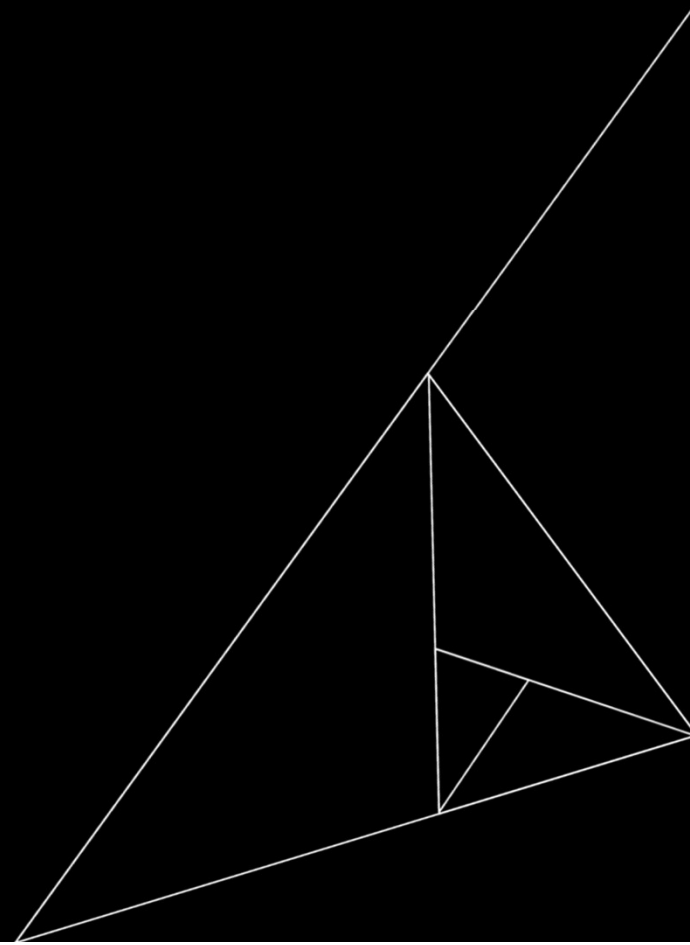
Rev. 0.1 17/12/2019

Page 10 of 71

KOSMOS

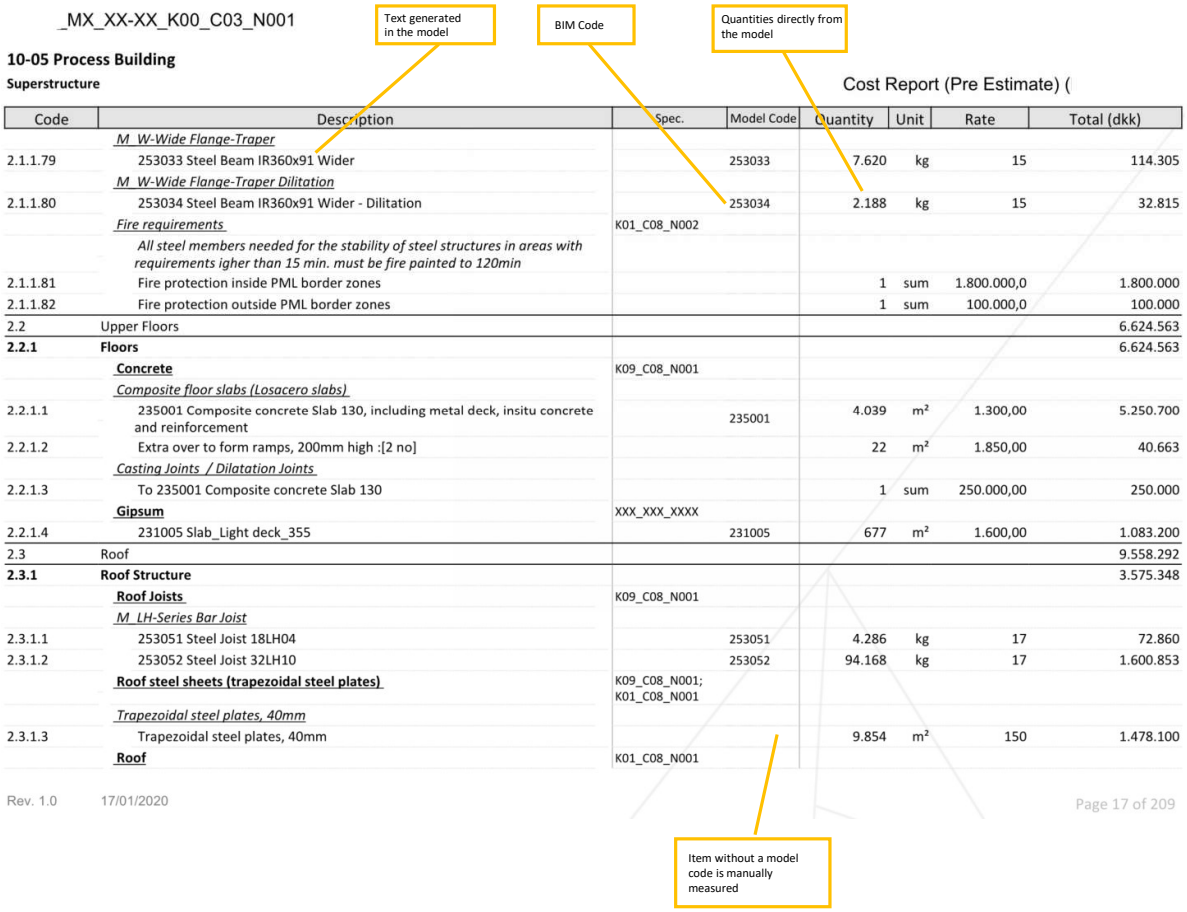
Final output

Qualified and coordinated design material, designed to cost



KOSMOS

- The cost plan, cost estimate, BoQ, Schedule of works identifies what is modelled and what is manually measured



_MX_XX-XX_K00_C03_N001

Text generated in the model

BIM Code

Quantities directly from the model

10-05 Process Building

Superstructure

Cost Report (Pre Estimate) (

Code	Description	Spec.	Model Code	Quantity	Unit	Rate	Total (dkk)
	M_W-Wide Flange-Traper						
2.1.1.79	253033 Steel Beam IR360x91 Wider		253033	7.620	kg	15	114.305
	M_W-Wide Flange-Traper Dilitation						
2.1.1.80	253034 Steel Beam IR360x91 Wider - Dilitation		253034	2.188	kg	15	32.815
	Fire requirements	K01_C08_N002					
	All steel members needed for the stability of steel structures in areas with requirements igher than 15 min. must be fire painted to 120min						
2.1.1.81	Fire protection inside PML border zones			1	sum	1.800.000,0	1.800.000
2.1.1.82	Fire protection outside PML border zones			1	sum	100.000,0	100.000
2.2	Upper Floors						6.624.563
2.2.1	**Floors**						6.624.563
	Concrete	K09_C08_N001					
	Composite floor slabs (Losacero slabs)						
2.2.1.1	235001 Composite concrete Slab 130, including metal deck, insitu concrete and reinforcement		235001	4.039	m²	1.300,00	5.250.700
2.2.1.2	Extra over to form ramps, 200mm high :[2 no]			22	m²	1.850,00	40.663
	Casting Joints / Dilatation Joints						
2.2.1.3	To 235001 Composite concrete Slab 130			1	sum	250.000,00	250.000
	Gipsum	XXX_XXX_XXXX					
2.2.1.4	231005 Slab_Light deck_355		231005	677	m²	1.600,00	1.083.200
2.3	Roof						9.558.292
2.3.1	**Roof Structure**						3.575.348
	Roof Joists	K09_C08_N001					
	M_LH-Series Bar Joist						
2.3.1.1	253051 Steel Joist 18LH04		253051	4.286	kg	17	72.860
2.3.1.2	253052 Steel Joist 32LH10		253052	94.168	kg	17	1.600.853
	Roof steel sheets (trapezoidal steel plates)	K09_C08_N001; K01_C08_N001					
	Trapezoidal steel plates, 40mm						
2.3.1.3	Trapezoidal steel plates, 40mm			9.854	m²	150	1.478.100
	Roof	K01_C08_N001					

Rev. 1.0 17/01/2020

Page 17 of 209

Item without a model code is manually measured

KOSMOS

Conclusion:

- Value driven cost management is an integrated collaborative process
- The Digital QS needs to understand the 3D process and the tools used but does not need to be the expert
- Regular communication is key, help each other to succeed
- Do not wait until the design is delivered to you, work parallel with the design to make sure you get what you need
- Quality is everyone's responsibility, cost is everyone’s responsibility, together it is achievable, alone it is impossible
- Use your network for help and advice. Write to us here in KOSMOS, we are more than happy to help

Ross Griffin & Elia González Salas – 18 March 2021

KOSMOS

www.KOSMOS.company

18 March 2021

Ross Griffin
Founder of KOSMOS - Providing commercial control to your project

Elia González
Co-Founder & Commercial manager / Quantity Surveyor ...

Save our contact on your phone

Join us on Linkedin
(Remember to click on "Follow us")

KOSMOS

www.KOSMOS.company