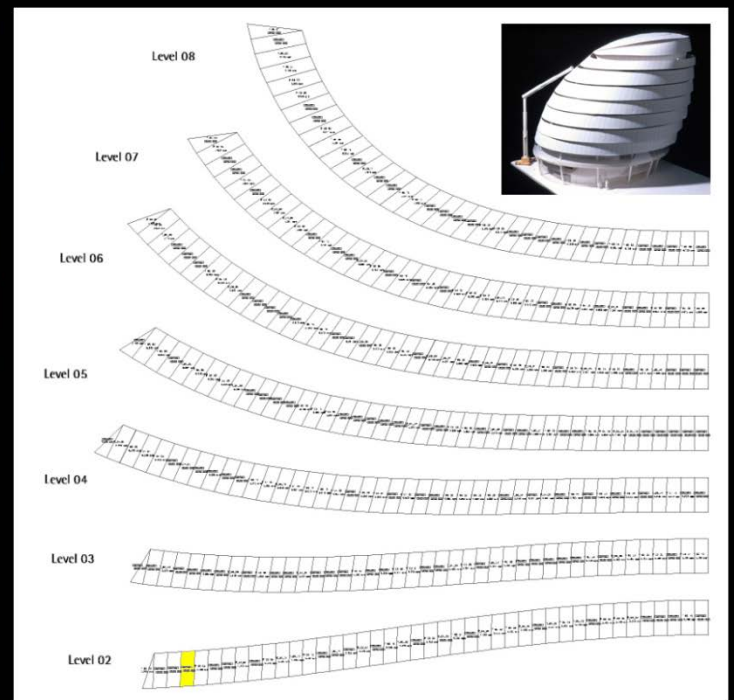
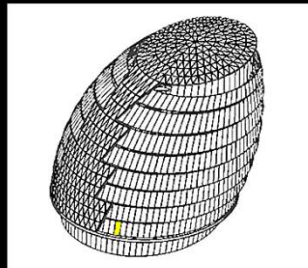
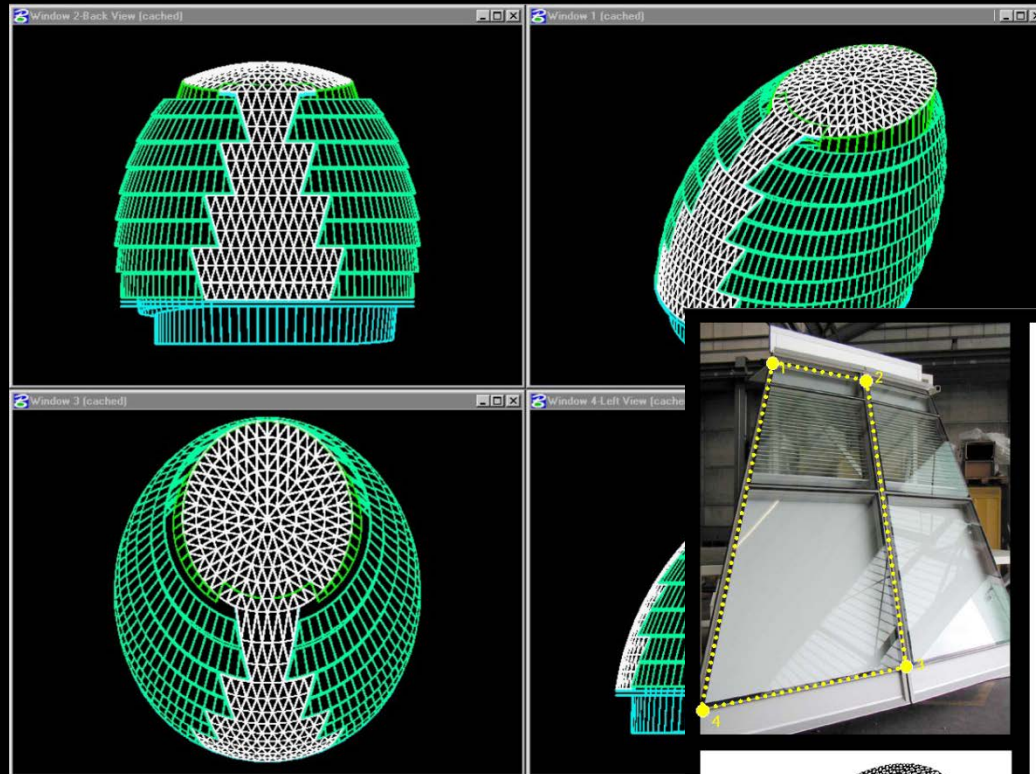


Inside BIM

Foster + Partners

Perspective

15 Years Ago

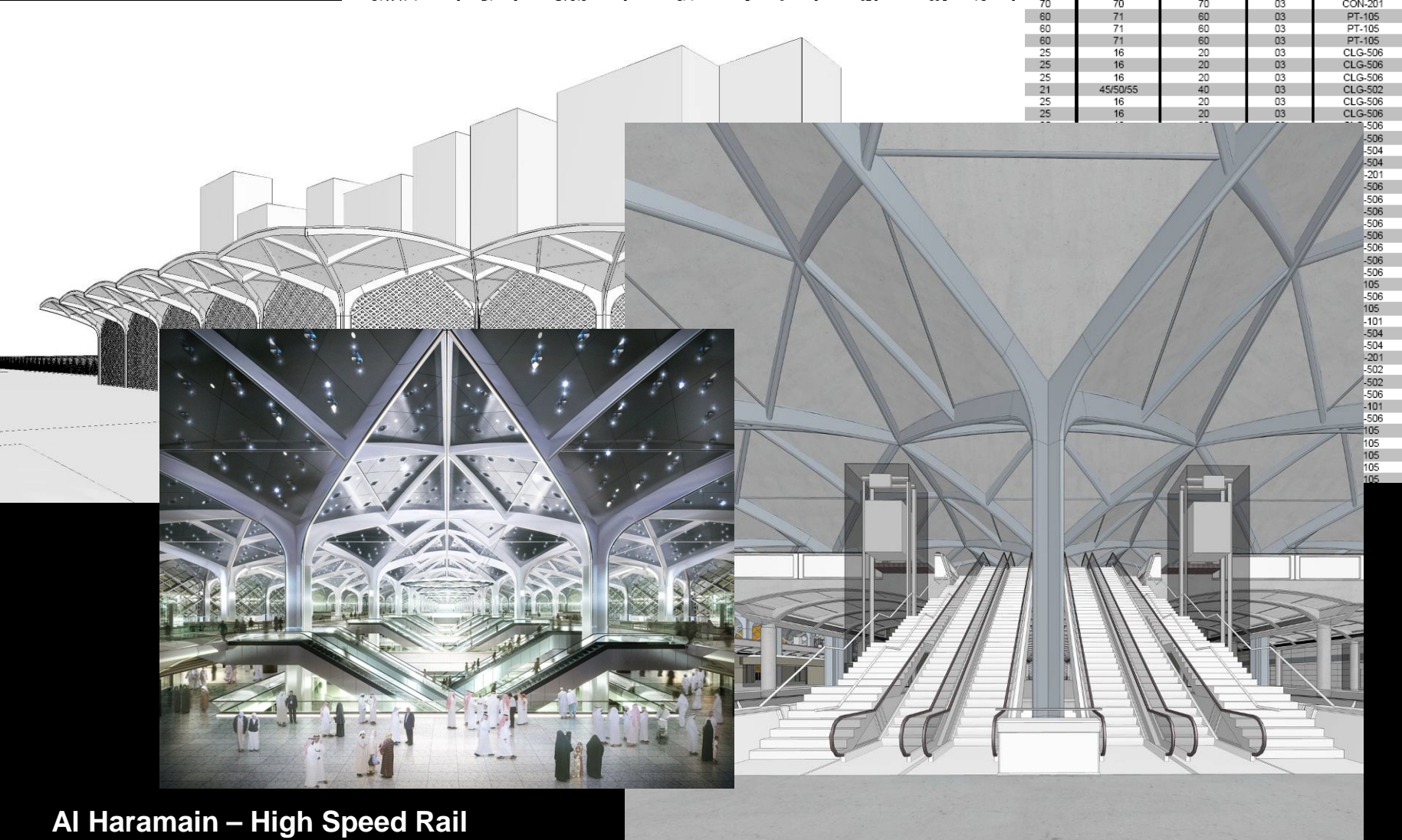


London – City Hall

	Corner 1			Corner 2			Corner 3			Corner 4			
Panel ID	X1	Y1	Z1	X2	Y2	Z2	X3	Y3	Z3	X4	Y4	Z4	
P_002_001	38.526778	71.225110	15.700000	37.240670	70.447647	15.700000	37.187501	71.182021	11.900000	38.478968	71.962724	11.900000	
P_002_002	37.240670	70.447647	15.700000	36.007043	69.589343	15.700000	35.948733	70.320140	11.900000	37.187501	71.182021	11.900000	
P_002_003	36.007043	69.589343	15.700000	34.830971	68.653727	15.700000	34.767761	69.380625	11.900000	35.948733	70.320140	11.900000	
P_002_004	34.830971	68.653727	15.700000	33.717292	67.644648	15.700000	33.649441	68.367342	11.900000	34.767761	69.380625	11.900000	
P_002_005	33.717292	67.644648	15.700000	32.670585	66.566256	15.700000	32.598373	67.284456	11.900000	33.649441	68.367342	11.900000	

5 Years Ago

Station Location	Floor Level	Room Number	Room Title	Secondary Description	Room Area Sqm	Room Perimeter m	Ceiling Height m	Ceiling Finish Code	Wall Finish Code	Floor Finish Code	Skirting Code	Ceiling T Code
S1 Makkah	B1	B1 001	Concourse		4,846	657	4.5	78	36	01 to 04	03	CON-202
S1 Makkah	B1	B1 002	Stair	1	37	25	4.5	70	70	70	03	CON-201
S1 Makkah	B1	B1 003	Store		169	65	4.5	01	71	70	03	CLG-101
S1 Makkah	B1	B1 004	Car Rental		109	55	4.5	24	36	01 to 04	03	CLG-505
S1 Makkah	B1	B1 005	Car Rental	office	85	39	4.5	24	36	01 to 04	03	CLG-505
S1 Makkah	B1	B1 006	Arrival Services	1	117	44	4.5	24	36	01 to 04	03	CLG-505
S1 Makkah	B1	B1 007	Arrival Services	2	109	55	4.5	24	36	01 to 04	03	CLG-505
S1 Makkah	B1	B1 008	Tour Operator Office		166	70	4.5	24	36	01 to 04	03	CLG-505
S1 Makkah	B1	B1 009	Store	(Retail)	266	111	4.5	01	71	70	03	CLG-101



Al Haramain – High Speed Rail

Today



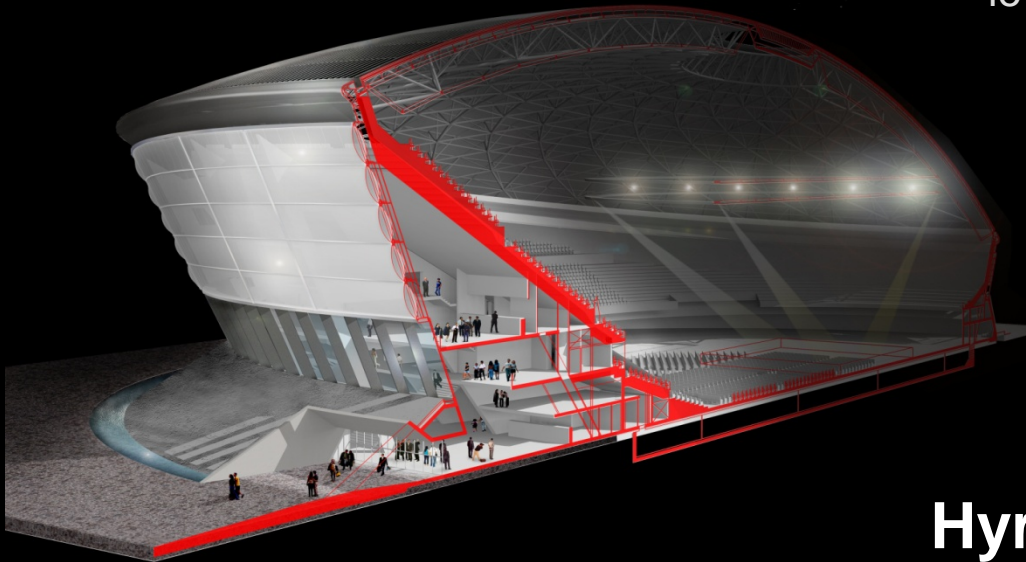
Scottish Exhibition Centre Ltd

2005 - Construction 2009,
Completion 2014

Gross External Area (m²) 25000 m²

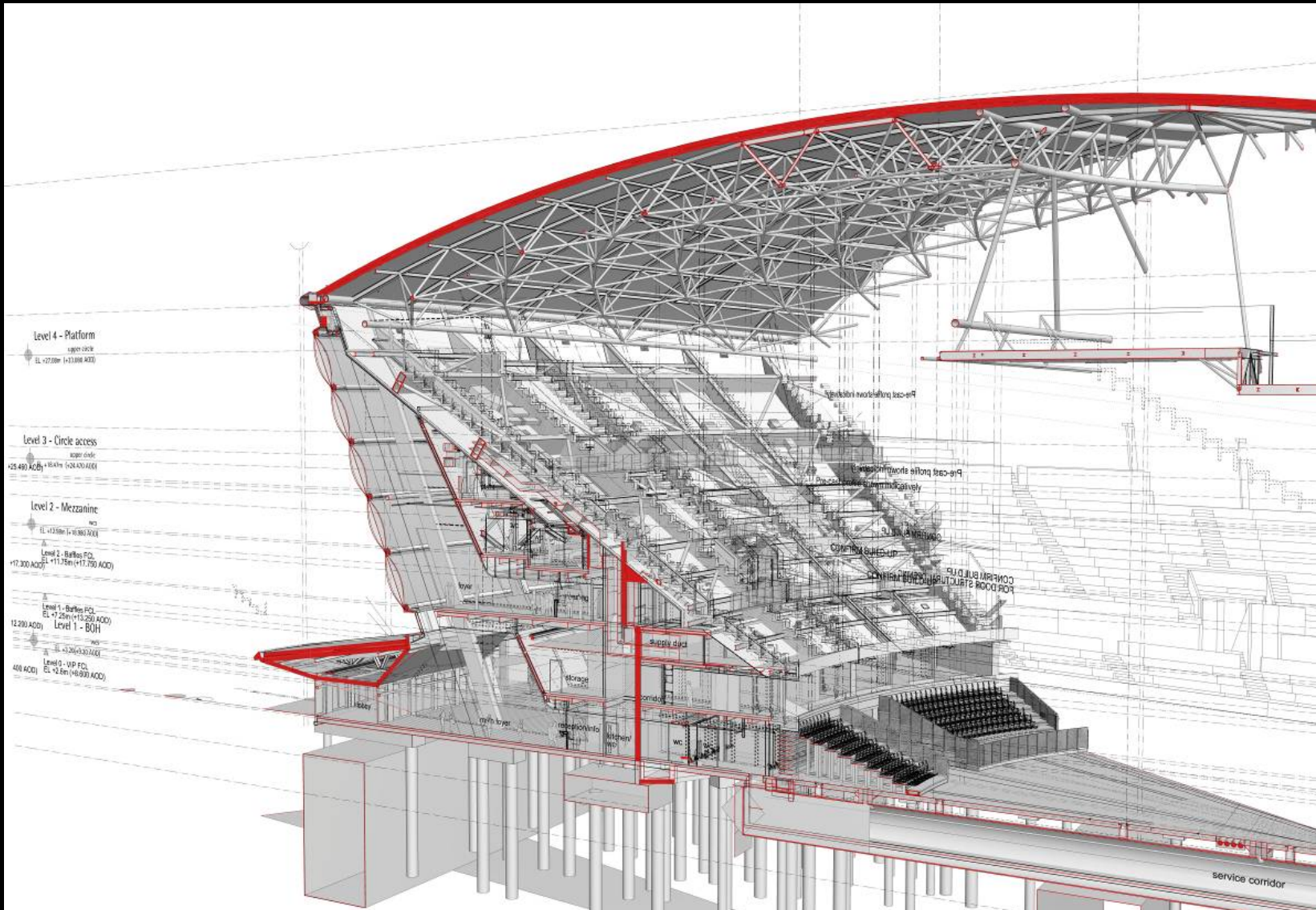
- 12,000 Seating Capacity

- 120 metre-span shallow dome, diagonally latticed steelwork.
- The dome is 45m above ground level at it's highest point.



Hyrdro Arena Glasgow

First Trials with AECOSim and Hyper modelling



The Hydro Glasgow

BIM – Where are we now

40 First Spoken Languages – London Office

52 Nationalities – London Office

6 Primary Offices

Projects in 30 countries

20+ different International BIM Standards

600+ Architects

50+ Engineers

Research Teams

BIM Specialist Team

Specialist Modeling Group

Applied Research and Development

Physical Modeling

Graphics Team

BIM – Where are we now

Transitioning our Engineering teams from 2D drafting to 3D BIM in 12 months

Re-Educating our Architects into new design Standards, Workflows and Processes

The Implementation Challenge

Educating our Partners and Senior Partners

Educating our Contracts and Support Teams

Re-Educating our Architects and Engineers into new design Standards, Workflows and Processes

Implementing a New Model Driven Process in 3 Years on all Projects

BS 1192

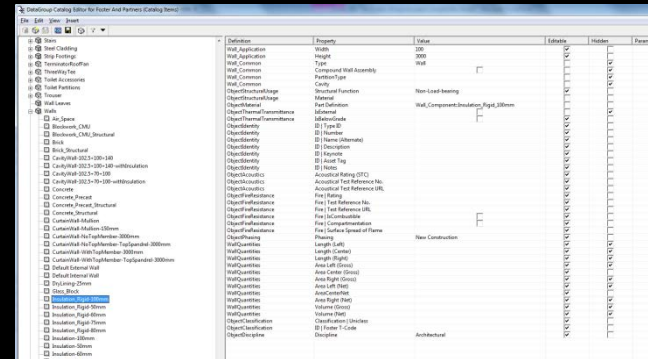
Systems BIM Integration

nbs Create



PAS 1192

New Design Standards



New Data Formats



COBie

New Software



PAS1192 – CIC BIM Protocols

Steering Group

BIM Execution Plan

BIM Project Protocol + Assessment Forms

Implementation - Support

BIM Manager

BIM Specialists

BIM Project Coordinator

BIM Discipline Coordinators

BS1192 CAD Standards extended to BIM

Workflow and Interchange Protocols

Coordination Protocols

Change Management

Implementation - Training

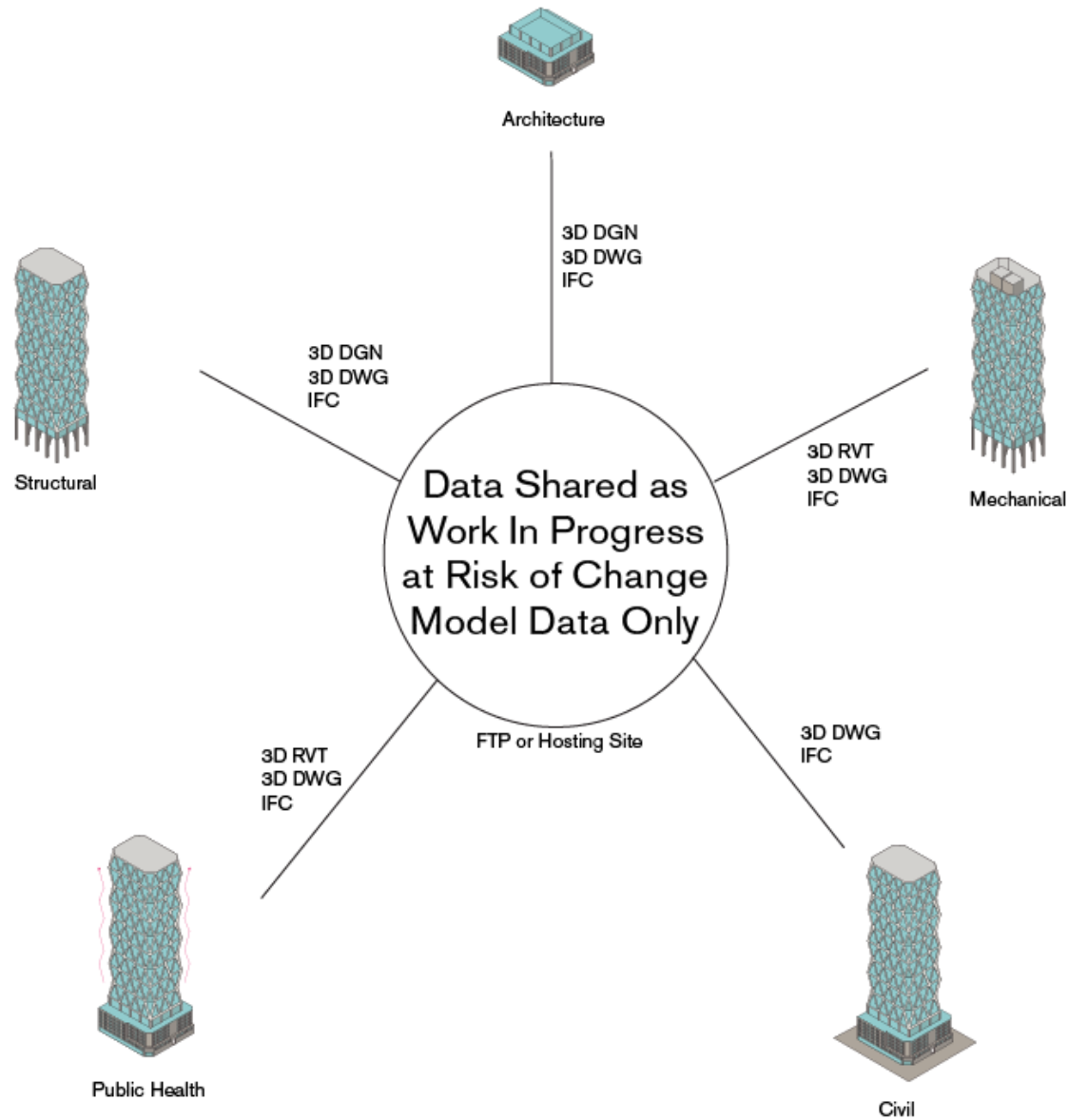
Train your teams well – minimum 3 days training

Train just in time

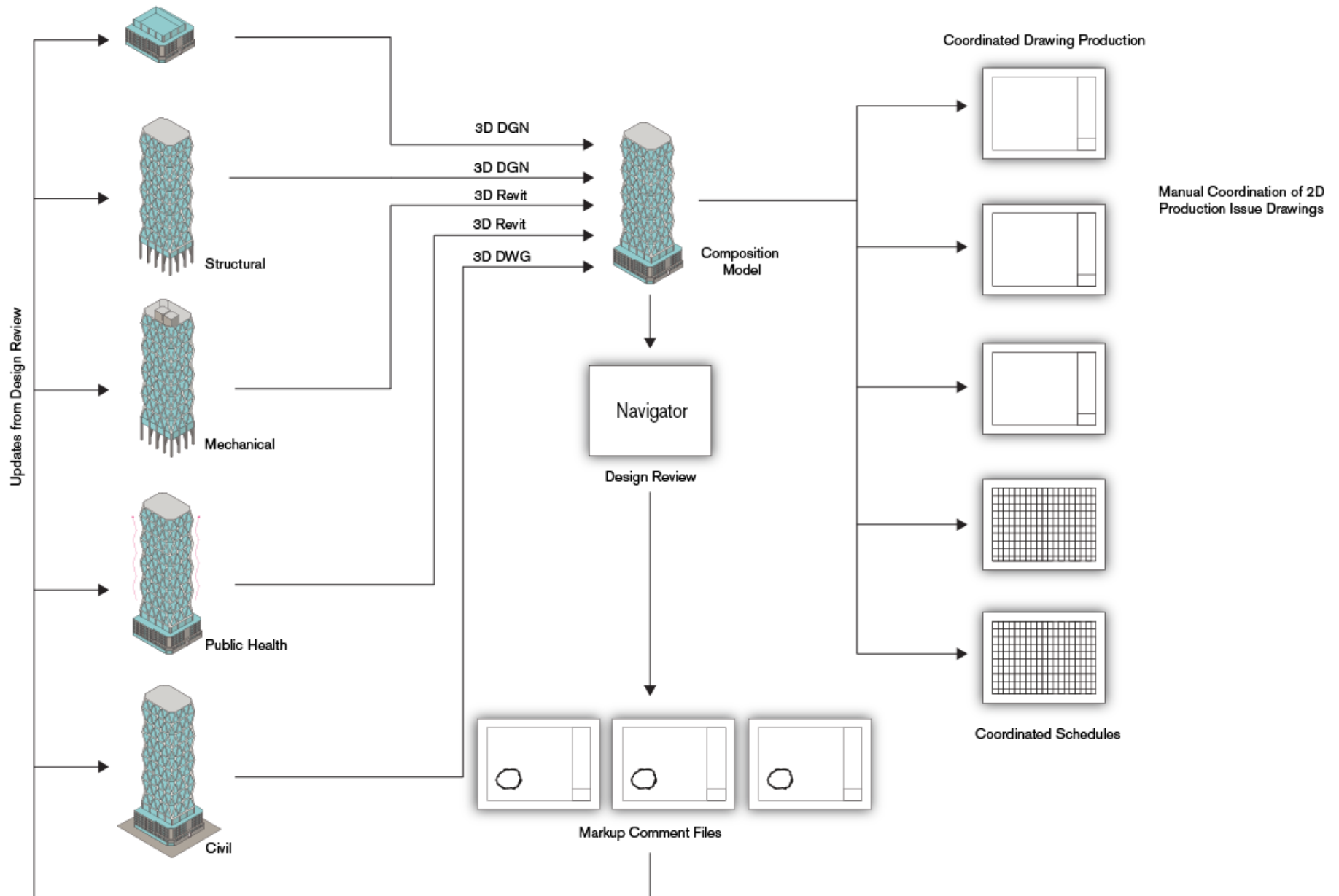
Train in context of their project

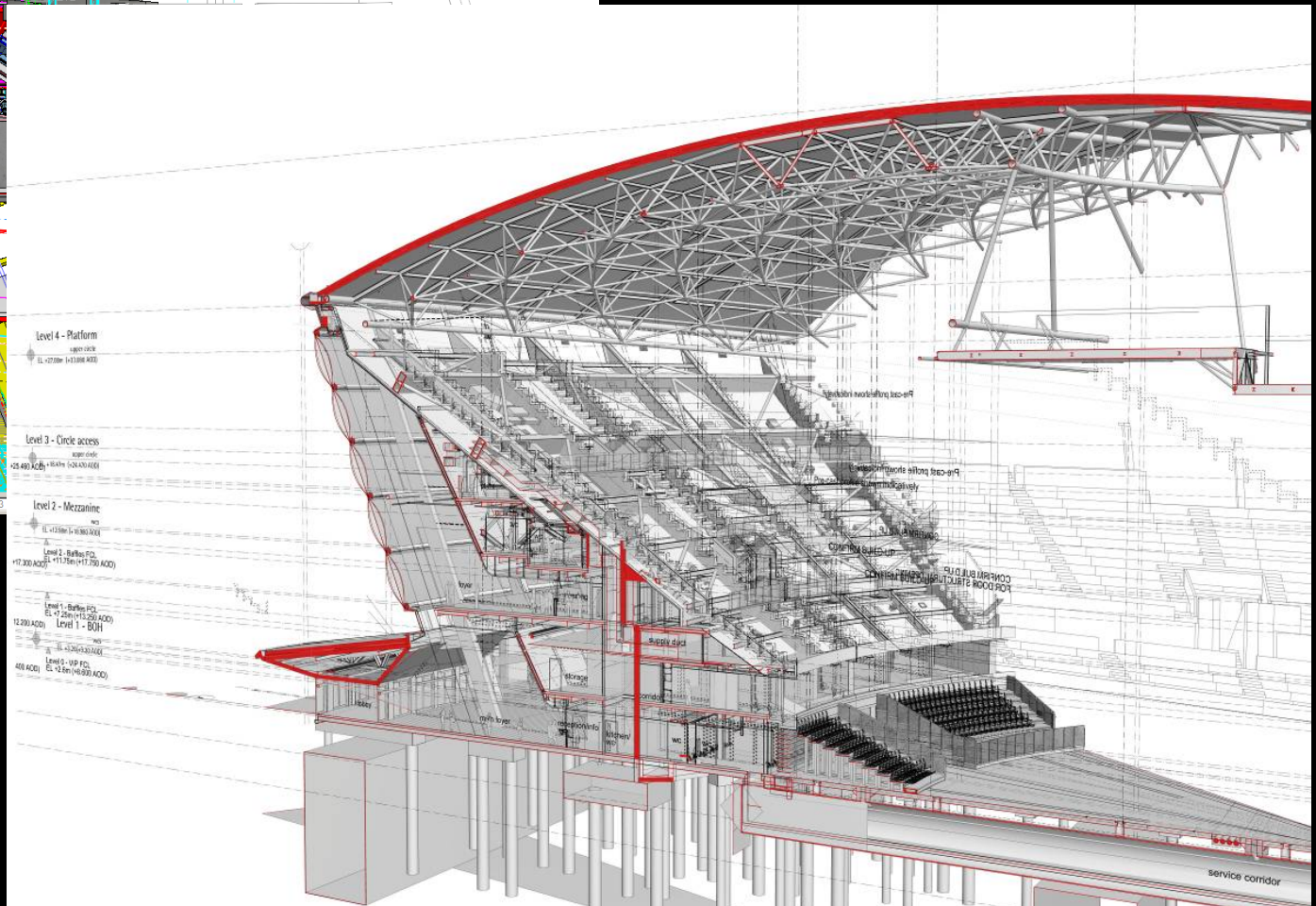
BIM Digital Design Coordinators

BIM Collaboration – Federation of Models – Sharing BIM Model Data



Managing Coordination





Hydro Arena - UK

The screenshot displays a CAD software interface with a 3D model of a stadium structure. The interface includes a top menu bar, a toolbar, and a left-hand panel with a 'Redline' tool palette. The main view shows a 3D model of a stadium structure with various annotations and a markup table at the bottom.

Annotations:

- Markup31 - Frameline 6**: Points to a specific structural element.
- Slab edge & balustrade set-out & details need confirming**: Points to a structural detail.
- Head height issue should be resolved around here but also bear in mind handrail/barriers**: Points to a structural detail.
- Frame 6**: Points to a structural element.
- Structural & Mechanical Clash - M&E Opening needs coordination with blockwork wall**: Points to a structural detail.

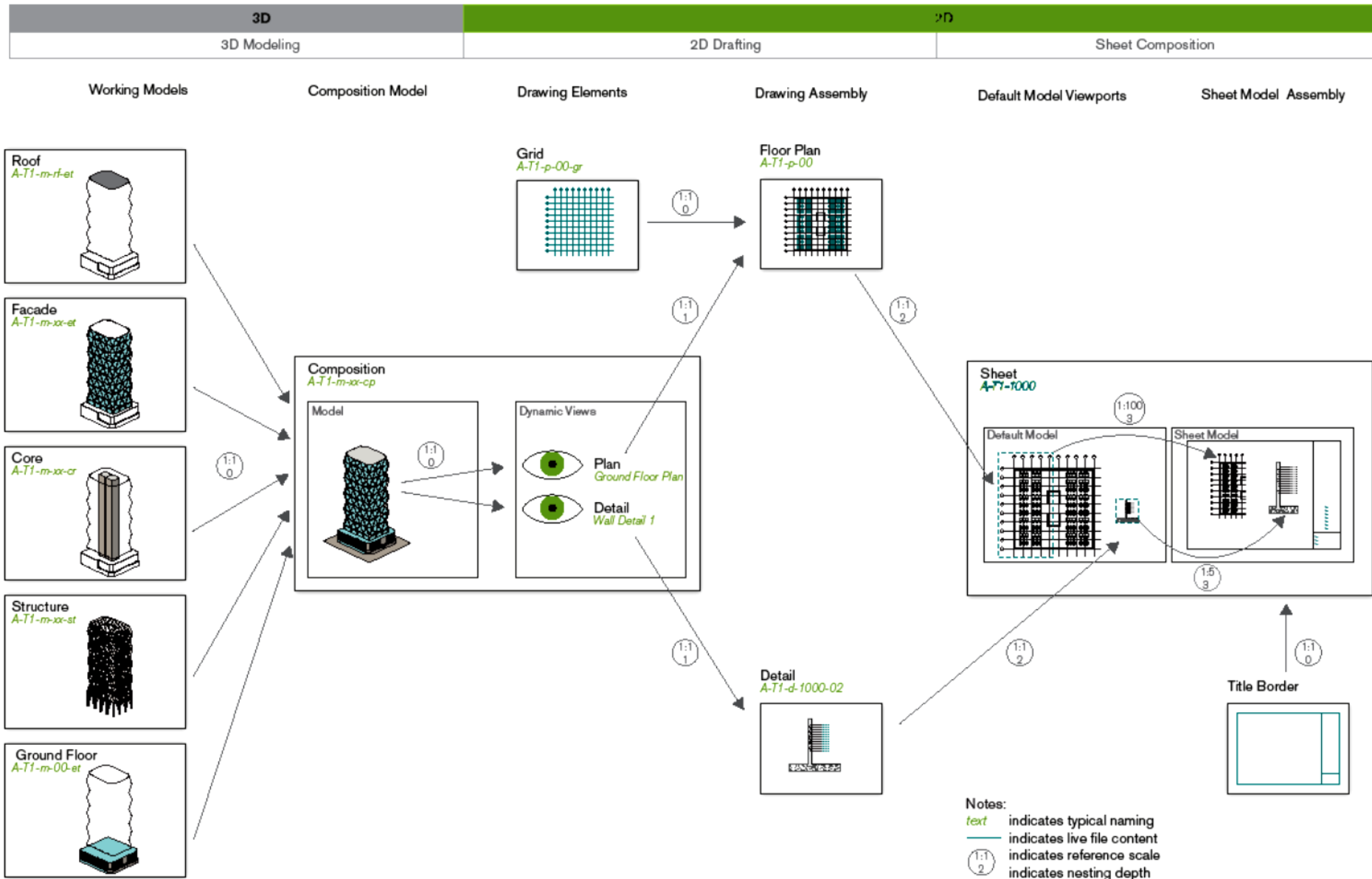
Markup Table:

Name	Description	Review Model	Created By	Date Created
Markup18		Default	dgillesp	08/11/2010 2
Markup19		Default	dgillesp	08/11/2010 2
Markup20		Default	dgillesp	08/11/2010 2
Markup21		Default	dgillesp	08/11/2010 2
Markup22		Default	dgillesp	08/11/2010 2
Markup23		Default	dgillesp	08/11/2010 2
Markup24		Default	dgillesp	08/11/2010 2

Hydro Stadium - UK

BIM Collaboration – Managing Documentation

Foster + Partners Typical Sheet Set-Up



Level of Development / Detail

LEVEL of DETAIL

G0



Schematic

DESCRIPTION:

Office Chair

WIDTH:

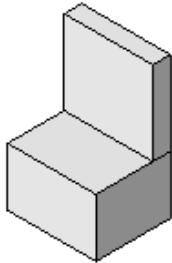
DEPTH:

HEIGHT:

MANUFACTURER:

MODEL:

G1



Concept

DESCRIPTION:

Office Chair

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

MODEL:

G2



Defined

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

Herman Miller, Inc

MODEL:

Mirra

G3



Rendered

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

Herman Miller, Inc

MODEL:

Mirra

LEVEL of DEVELOPMENT

LOD 100



Concept (Presentation)

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

Herman Miller, Inc.

MODEL:

Mirra

LOD:

100

LOD 200



Design Development

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

Herman Miller, Inc.

MODEL:

Mirra

LOD:

200

LOD 300



Documentation

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

700

DEPTH:

450

HEIGHT:

1100

MANUFACTURER:

Herman Miller, Inc.

MODEL:

Mirra

LOD:

300

LOD 400



Construction

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

685

DEPTH:

430

HEIGHT:

1085

MANUFACTURER:

Herman Miller, Inc

MODEL:

Mirra

LOD:

400

LOD 500



Facilities Management

DESCRIPTION:

Office Chair
Arms, Wheels

WIDTH:

685

DEPTH:

430

HEIGHT:

1085

MANUFACTURER:

Herman Miller, Inc

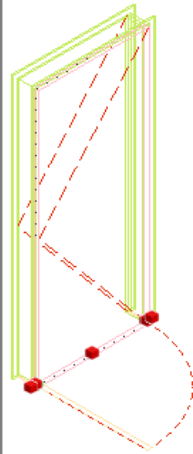
MODEL:

Mirra

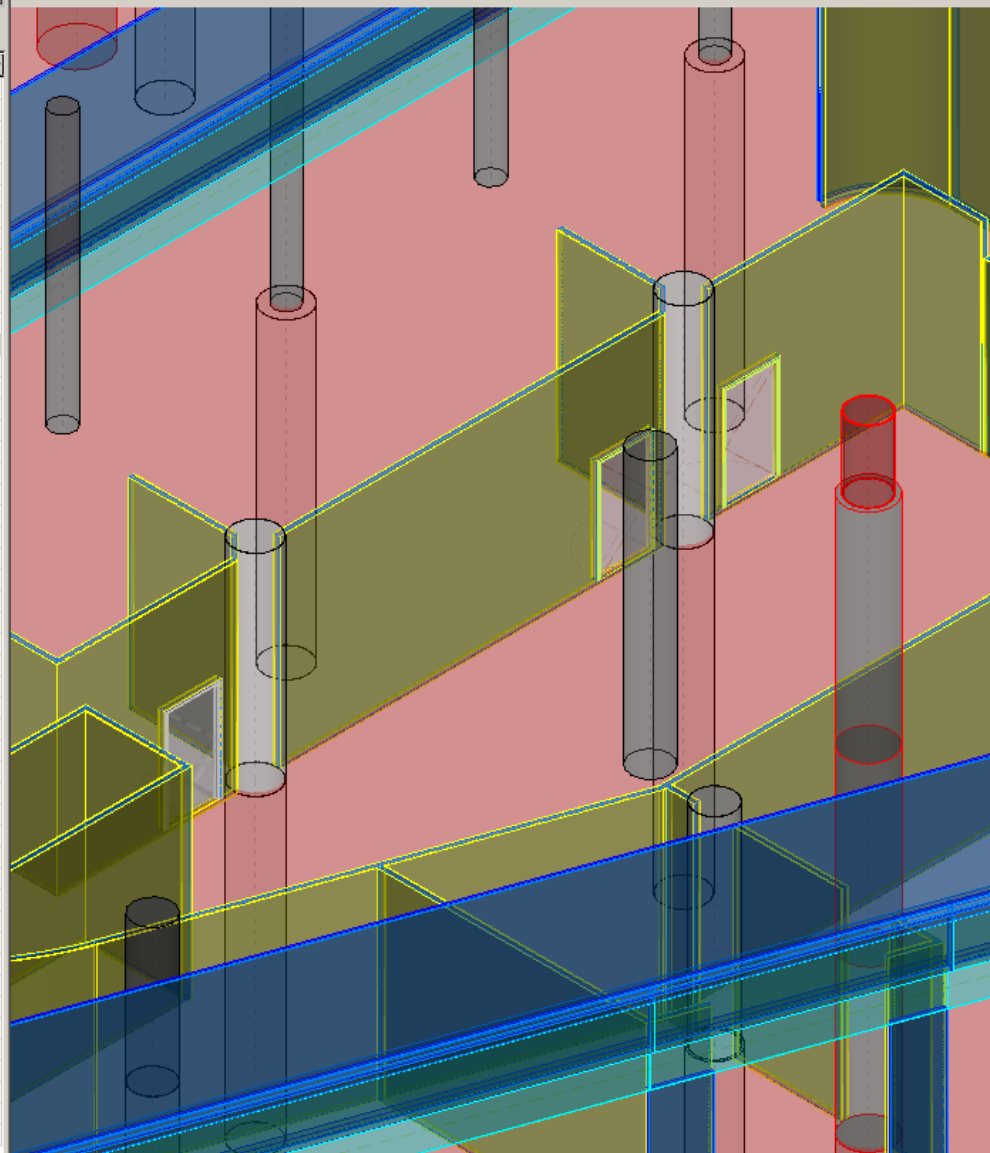
PURCHASE DATE:

01/02/2013

Level of Development / Detail



Active	Property	Value	Query
	Back Offset	-0.1239	
	Dimension Architrave Width	0.0000	
	Dimension Frame Depth	Match Wall	
	Dimension Height	2.1350	
	Dimension Leaf Thickness	0.0450	
	Dimension Width	1.1180	
	Front Offset	0.0000	
	Leaf1Angle	90.0000°	
	Leaf1Angle3d	0.0000°	
	LeafAngle3dMax	90.0000°	
	Sense Distance	0.5000	
	Sill/Head Height	-0.0000	
	Acoustic Rating	Unspecified	
	Configuration Action	Single	
✓	Configuration Disabled Access	Yes	
✓	Configuration Fire Route	Yes	
	Configuration Fixings	Hinged	
	Configuration Number of Full Leaves	1	
	Configuration Number of Half Leaves	0	
✓	Egress Door	false	
	Equipment Overhead Panel	Unspecified	
	Equipment Ventilation Grilles	Unspecified	
	Equipment Vision Panel	No	
	Finish Frame Closing Face (ISO 1)	Painted to Matc	
	Finish Frame Finish Opening Face (...)	Painted to Mat	
	Finish Frame Material	Metal	
	Finish Leaf Finish Closing Face (...)	Laminated	
	Finish Leaf Finish Opening Face (...)	Laminated	
	Finish Leaf Material	Metal	
	Geometry Clear Height		
	Geometry Clear Width	1042	
	Geometry Structural Height		
	Geometry Structural Width		
✓	ID Description	DRS201	
	ID Foster T-Code	DRS-710	
	T-Code Description	SPECIALIST AP...	
	ID Notes		
✓	ID Number	01	
✓	Location Building	Main Terminal	
✓	Location Floor	100	
✓	Location Room	301	
✓	Location Room Adjacent	320	
✓	Location Zone	Back Of House	
	Louver Size		
	Louvers	false	
✓	Performance Acoustic Rs. (dB Rw)	60db	
✓	Performance Air/Smoke Seal (A/S)	Smoke Seal	
✓	Performance Fire Rating (FD)	FD30	
✓	Performance Thermal Ratn.../m2k)	200	



Managing Information

Makkah Door Shedule

Doors Signage Finishes

**Windows
Areas
Equipment**

Door Number	Door Subtype	No of Leaves	Clear Opening (frame to leaf)	Structural Opening Width	Structural Opening Height	Elevation Drawing Number	Door Material	Vision Panel	Fire Rating (FD ...S) Air/Smoke Seal	Acoustic Rs (dB Rw)
00-000-00	DRS-601	1	900	1000	2150	A-60-XX-003-SX	Metal	FALSE	Not Rated	Not Rated
00-000-00	DRS-204	1	950	1110	2150	A-60-XX-001-SX	Metal	TRUE	90	30
B1-000-01	DRS-204	1	950	1110	2150	A-60-XX-001-SX	Metal	FALSE	90	40

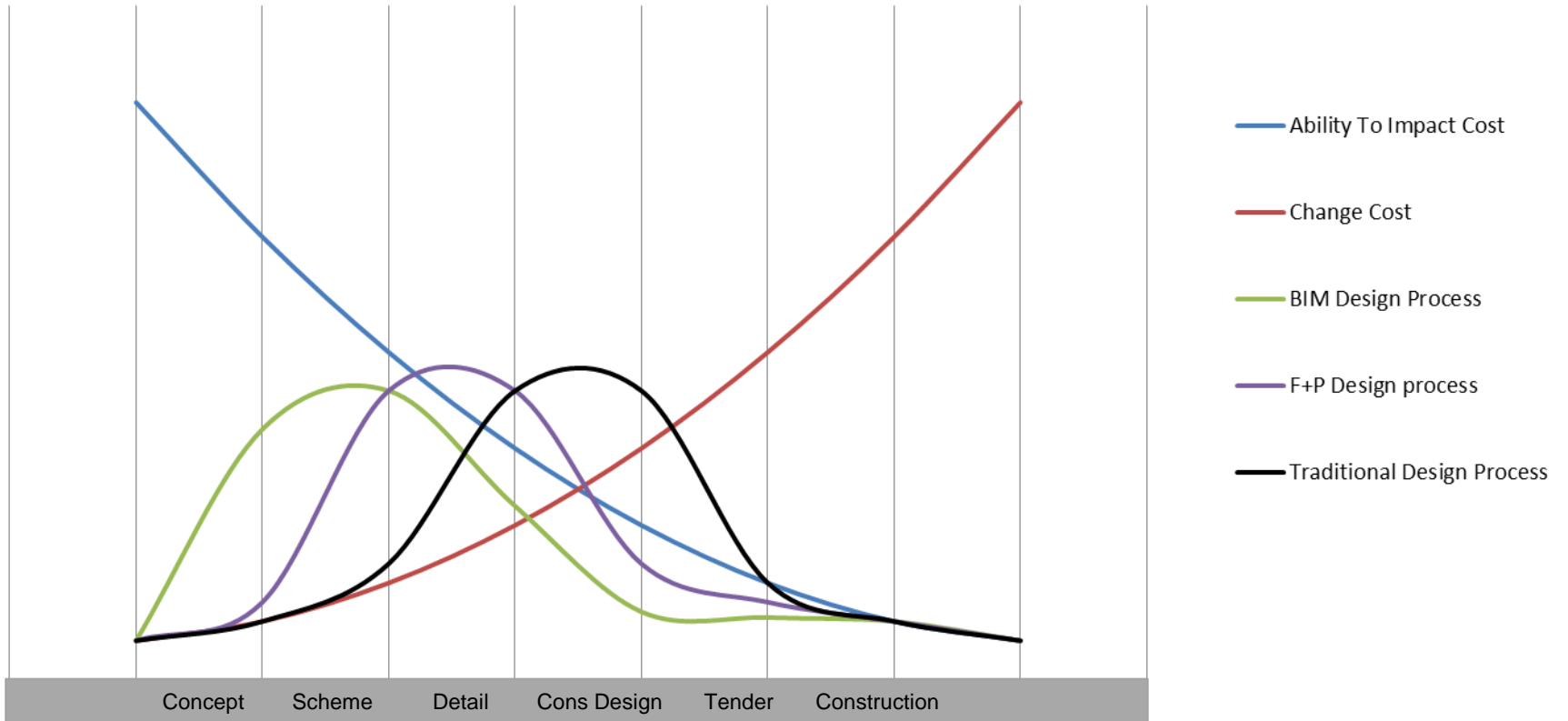
Foster + Partners

Space Schedule

B1-001-03	DRS-204	Room Number	Description	Secondary Description	Actual Area	Perimeter	Required Area	Ceiling Height	Finishes				Location				Notes
B1-001-04	DRS-601								Floor	Ceiling	Wall	Skirting	Site	Building	Floor	Department	
B1-002-01	DRS-204																
B1-003-01	DRS-101	L2 153	Workshop		11561 (Meters)	48.5395m	0.00 (Meters)	4.5000m									
B1-004-01	DRS-101	B1 001	Water Tanks		527.40 (Meters)	221.4300m	0.00 (Meters)	4.5000m									
		L3 209	VIP WC (M)		24.43 (Meters)	20.0005m	0.00 (Meters)	4.5000m									
B1-004-02	DRS-101	L3 288	VIP WC (F)		26.89 (Meters)	21.0331m	0.00 (Meters)	4.5000m									
B1-006-01	DRS-201	L4 249	VIP Reception		34.24 (Meters)	25.2664m	0.00 (Meters)	4.5000m									
B1-006-02	DRS-201	L3 208	VIP Reception		34.24 (Meters)	25.2700m	0.00 (Meters)	4.5000m									
B1-007-01	DRS-101	L1 101	VIP Reception		204.72 (Meters)	68.0715m	0.00 (Meters)	4.5000m									

[illegible]

BIM Collaboration – Change in Workload



BIM Capability

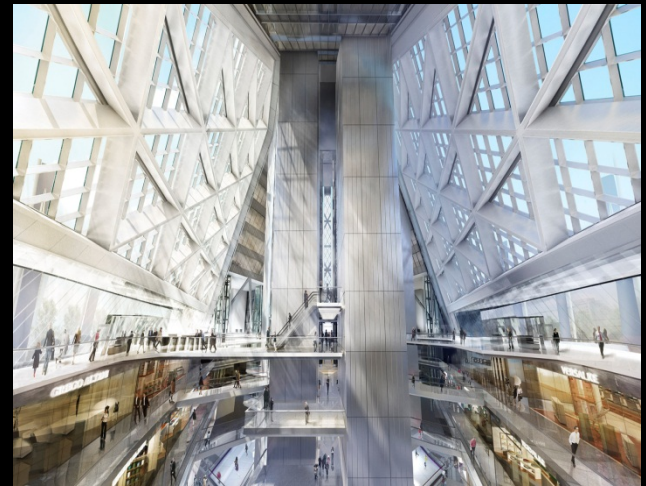
BIM Scope

Each level contains the previous level.

LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3
<i>no BIM</i>	<i>from Design BIM</i>	<i>from Construction BIM</i>	<i>BIM for FM</i>
			Cloud BIM model (iBIM)
			As-Surveyed BIM Model
			FM data COBie
			FM data IFC
			BIM Management Plan
		Federated BIM Model	
		Clash Detection	
		5D (costing)	
		As-Constructed BIM Model	
		Construction data COBie	
		Construction data IFC	
		Construction BIM Plan	
	Aggregated BIM Model		
	3D real-time Visual Review		
	As-Built BIM Model		
	Electronic schedules		
	Electronic O & M manuals		
	Design Intent Collaboration Plan		
Separate BIM Models			
As-Built CAD files			
Paper schedules			
Paper O & M manuals			
Participant BIM Plans			

How will BIM affect Architecture ?

- Technically** – Move to a 3D world + Cloud
- Aesthetically** – Better not degrade
- Functionally** – Help understand relationships
- Economically** – Reduced costs and Changes
- Sustainably** – Post Analysis to update baselines



Thank You

