BIM - Defining the Clients and users needs

Defining the Employers Information Requirements

- What?
- How?
- How much?
- When?
- What for?

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BIM – The Master Production Delivery Table

	Drop 1 Stage 1		Drop 2a Stage 2		Drop 2b Stage 2		Drop 3 Stage 3		Drop 4 Stage 6	
	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail	Model Originator	Level of Detail
Overall form and content										
Space planning	Architect	1	Architect	2	Contractor	2	Contractor	3	Contractor	6
Site and context	Architect	1	Architect	2	Contractor	2	Contractor	3	Contractor	6
Surveys							Contractor	3		
External form and appearance			Architect	2	Contractor	2	Contractor	3	Contractor	6
Building and site sections					Contractor	2	Contractor	3	Contractor	6
Internal layouts					Contractor	2	Contractor	3	Contractor	6
Design strategies										
Fire			Architect	2	Contractor	2	Contractor	3	Contractor	6
Physical security			Architect	2	Contractor	2	Contractor	3	Contractor	6
Disabled access			Architect	2	Contractor	2	Contractor	3	Contractor	6
Maintenance access			Architect	2	Contractor	2	Contractor	3	Contractor	6
BREEAM					Contractor	2	Contractor	3	Contractor	6
Performance										
Building	Architect	1	Architect	2	Contractor	2	Contractor	3		
Structural	Architect	1	Str Eng	2	Contractor	2	Contractor	3		
MEP systems	Architect	1	MEP Eng	2	Contractor	2	Contractor	3		
Regulation compliance analysis							Contractor	3	Contractor	6
Thermal Simulation							Contractor	3	Contractor	6
Sustainability Analysis							Contractor	3	Contractor	6
Acoustic analysis							Contractor	3	Contractor	6
4D Programming Analysis										
5D Cost Analysis										
Services Commissioning							Contractor	3	Contractor	6
Elements, materials components										
Building			Architect	2	Contractor	2	Contractor	3	Contractor	6
Specifications			MEP Eng	2	Contractor	2	Contractor	3	Contractor	6
MEP systems					Contractor	2	Contractor	3	Contractor	6
Construction proposals										
Phasing							Contractor	3		
Site access							Contractor	3		
Site set-up							Contractor	3		
Health and safety										
Design							Contractor	3		
Construction							Contractor	3		
Operation							Contractor	3	Contractor	6

LOD definitions (from PAS 1192)

1 Brief
2 Concept
3 Developed Design
4 Production
5 Installation
6 As constructed
7 In use

Stage definitions (from APM)

0 Strategy
1 Brief
2 Concept
3 Definition
4 Design (production information)
5 Build & Commission
6 Handover & Closeout
7 Operation and end of life

Model Originators identified by name

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BIM - The Master Production Delivery Table

FaulknerBrowns — **MODEL PRODUCTION DELIVERY TABLE - EIR APPENDIX A**

Project: Menai Science Park | Number: 3224 | Issue Date: 03.08.15 | Rev: P1.1

RIBA Stage		Stage 2				Stage 3				Stage 4a				Stage 4b				Stage 5				Stage 6				
Element		LOD	LOI	Dup LOD	Model Owner	LOD	LOI	Dup LOD	Model Owner	LOD	LOI	Dup LOD	Model Owner	LOD	LOI	Dup LOD	Model Owner	LOD	LOI	Dup LOD	Model Owner	LOD	LOI	Dup LOD	Model Owner	Comments
10-XX-XX	**Preparatory Systems**																									
10-10-45	Ground Investigation																									
10-10-75	Site surveys																									
10-10-95	Underground services survey																									
10-20-30	Building Fabric Survey																									
10-20-60	Building Performance survey																									
10-20-75	Engineering services survey																									
10-35-XX	Ground excavations, retaining and stabilisation																									
10-45-20	Demolitions																									
10-60-35	Ground gas venting systems																									
10-70-XX	Cleaning, repair and rennovations																									
10-85-15	Shoring and façade retention																									
	Miscellaneous																									
	Spaces					2	2	✓	M&E	3	3		M&E	4	4	✓	CONTR	5	5	✓	CONTR		6	✓	CONTR	
	Rooms	2	-		ARCH	2	2	✓	ARCH	3	3		ARCH	4	4	✓	CONTR	5	5	✓	CONTR		6	✓	CONTR	
15-XX-XX	**Structure**																									
15-05-XX	Foundations					2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
15-65-75	Structural frame	2	-		ARCH	2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
20-XX-XX	**Roof, Floor and Paving systems**																									
20-00-75	Roof structure	2	-		ARCH	2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
20-05-80	Structural decks / floors	2	-		ARCH	2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
20-05-95	Water retention sheet lining systems					2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
20-10-XX	Ceilings	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-15-XX	Paving	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-25-75	Rooflights, roofglazing and roof ventilators	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-50-XX	Roofs	2	-		ARCH	2	2		ARCH	3	3		ARCH	4	4	✓	CONTR	5	5	✓	CONTR		6	✓	CONTR	
20-55-XX	Floors	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-55-10	Screeds	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-55-70	Raised access floors	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
20-75-30	Floor damp proofing systems					2	2		STRUCT	3	3		STRUCT	4			CONTR	5			CONTR				CONTR	
20-85-45	Kerb and channel systems					2	2		LAND	3	3		LAND	4			CONTR	5			CONTR				CONTR	
25-XX-XX	**Wall and Barrier Systems**																									
25-05-60	Panel cubicle systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-05-65	Panel partition systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-05-75	Structural glass wall systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-10-55	Masonry wall systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-15-25	Framed partition systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-15-35	Framed wall structure systems	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-20-30	Fencing					2	2		LAND	3	3		LAND	4	4	✓	CONTR	5	5	✓	CONTR		6	✓	CONTR	
25-25-10	Balustrades and handrails	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-25-60	Pedestrian barriers and guarding					2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-50-20	Doors	2	-		ARCH	2	2		ARCH	3	3		ARCH	4	4	✓	CONTR	5	5	✓	CONTR		6	✓	CONTR	
25-50-95	Windows	2	-		ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	
25-55-45	Louvres and shading devices				ARCH	2	2		ARCH	3	3		ARCH	4			CONTR	5			CONTR				CONTR	

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APPENDIX B

LIST OF "MAINTAINED ASSETS TO BE INCLUDED IN COBie DATA DROPS

Asset Definitions provided by Bangor University to suit current Planon CAFM assets.
Model elements defining these assets should be included within the COBie Data Drop at each stage, with data tagged as set out in Appendix A & C

Roof	Guttering	Electrical Asset	Lift Asset
Boiler Asset	Lighting Asset	Master M&E Asset	Control Panel
Fire Safety System	Master Electrical System	Meter	Flume Cupboard
Master Ventilation System	Master Heating System	Portable Appliance	Emergency Lighting System
Isolation Point	Central Battery	Gas Heater	Compressor
BMS	Lighting Conductor	Calorifier	Extract System
Cold Water Tank	Feed & Expansion tank	Oil Tank	Master Water System
Ladder	Input-Extract Fan	Document	Fire Exit
Document Folder	Radioactive Materials	Flammable Substance	EMF Hazard
Cryogenic Gas	Animal Welfare Area	Lab Chemical	Bio Hazard
X-Ray Unit	Compressed Gas	Laser	Fragile / Sensitive Equipment
Asbestos	M&E Asset	Flat Roof	Vehicle
Sensor	Door	Server	Fire Safety Asset
Door access system	Pressure Regulator	Water Meter	Building Asset
Pump	Pipe	Tap	Shower
Pressure Vessel	Air Conditioner	Water Filter	Water Heater
Fencing	PPE Items	CCTV	Filter
Autoclave	Expansion Vessel	Dry Riser	Comms Device
Software	Network Component	Drinks Dispenser	Sanitaryware

BIM – Defining the Level of Information

Project:
Building:
Revision:
Date:

Element

Uniclass 2015				Description	Name	CreatedBy	CreatedOn	Category	Description	AssetType	Manufacturer	ModelNumber	WarrantyGuarantorParts	WarrantyDurationParts	WarrantyGuarantorLabor	WarrantyDurationLabor	WarrantyDurationUnit	ExtSystem	ExtObject	ExtIdentifier	ReplacementCost	Expected Life	DurationUnit	WarrantyDescription	NominalLength	NominalLength	NominalHeight	ModelReference	Shape	Size	Colour	Finish	Grade	Material	Constituents	Features	AccessibilityPerformance	CodePerformance	SustainabilityPerformance	Area	Length
					Note : the number in the table below indicates the Data Drop at which the above COBie outputs are required																																				
Ss_30_40	30	40		Roof and balcony covering and finish systems	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4							3	3	3	3							
Ss_30_42	30	42		Floor covering and finishing systems	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4							3	3	3	3							
Ss_40_25_75	40	25	75	Scientific FF&E systems	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b				3	3	3	3							
Ss_80_50_60	80	50	60	Passenger and goods lift systems	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4									3								
Pr_25_30_86	25	30	86	Surface level traffic control products	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_30_36_08	30	36	8	Bolting, latching and locking hardware	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_30_59_24	30	59	24	Doorsets	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3			3	3	3				3	3	3		
Pr_30_59_59	30	59	59	Operable vehicular barriers	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_20_06	40	20	6	Bathing fittings	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_20_60	40	20	60	Packaged sanitary fittings	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_20_87	40	20	87	Taps and water supply outlet fittings	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_20_93	40	20	93	Urinal and WC fittings	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_20_96	40	20	96	Wash basins, sinks and troughs	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_30_25	40	30	25	Display and presentation fittings	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_50_28	40	50	28	Extinguishers and fire blankets	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_70_65	40	70	65	Preparation catering equipment	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_40_70_75	40	70	75	Safety access equipment	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_60_50_96	60	50	96	Water tanks and cisterns	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_60_60_08	60	60	8	Boilers	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_60_60_13	60	60	13	Chillers and cooling towers	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_60_60_36	60	60	36	Heat recovery distribution equipment	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		
Pr_60_60_38	60	60	38	Calorifiers and plate heat exchangers	2a	2a	2a	2a	2a	3	3	3	4	4	4	4	4	2a	2a	2a		4		4	2b	2b	2b	3					3				3	3	3		

COBie TYPE FIELDS

BIM – The BIM Execution Plan

RIBA 2013 Workstage		Planon Ref	3D Required	Data Required	Technical Design 4			Construction 5			Handover 6		
New Rules of Measurement (NRM) Elemental Breakdown					LOD	Author	LOI	LOD	Author	LOI	LOD	Author	LOI
1 Substructure													
1 Substructure	1 Standard Foundations		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	2 Specialist Foundations		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	3 Lowest Floor Construction		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
2 Superstructure													
1 Frame	1 Steel frames		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	2 Space frames/decks		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	3 Concrete casings to steel frames		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	4 Concrete frames		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	5 Timber frames		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	6 Specialist frames		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
2 Upperfloors	1 Floors		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
3 Roof	1 Roof structure		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	2 Roof coverings	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Specialist roof systems	4.04	Yes	Yes	4	Civil/Structure Engineer	4	5	Contractor	5	6	Contractor	6
	4 Roof drainage		Yes	Yes	4	Civil/Structure Engineer	4	5	Contractor	5	6	Contractor	6
	5 Rooflights, skylights and openings	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	6 Roof features	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
4 Stairs and ramps	1 Stair/ramp structures		Yes	No	4	Civil/Structure Engineer		5	Contractor		6	Contractor	
	2 Stair/ramp finishes		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Stair/ramp balustrades and handrails		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	4 Ladders/chutes/slides		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
5 External walls	1 External enclosing walls above ground level	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 External enclosing walls below ground level	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Solar/rain screening	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	4 External soffits	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	5 Subsidiary walls, balustrades and proprietary balconies	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	6 Facade access/cleaning systems (if required)	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
6 Windows and external doors	1 External windows	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 External doors	4.04	Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
7 Internal walls and partitions	1 Walls and partitions		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 Balustrades and handrails		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Moveable room dividers		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	4 Cubicles		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
8 Internal doors	1 Internal doors		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
3 Internal finishes													
1 Wall finishes	1 Wall finishes		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
2 Floor finishes	1 Finishes to floors		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 Raised access floors		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
3 Ceiling finishes	1 Finishes to ceilings		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 False ceilings		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Demountable suspended ceilings		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
4 Fittings, furnishings and equipment													
1 Fittings, furnishings and equipment	1 General fittings, furnishings and equipment		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	2 Domestic kitchen fittings and equipment		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	3 Special purpose fittings, furnishings and equipment		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	4 Signs/notices		No	No	2	Architect		2	Contractor		2	Contractor	
	5 Works of art		No	No	2	Architect		2	Contractor		2	Contractor	
	6 Non-mechanical and non-electrical equipment		Yes	Yes	4	Architect	4	5	Contractor	5	6	Contractor	6
	7 Internal planting		No	No	2	Architect		2	Contractor		2	Contractor	
	8 Bird and vermin control	4.11	No	Yes	4	Architect	4	6	Contractor	5	6	Contractor	6

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Key Design Concepts

- Benchmarking and testing design against appropriate precedents
- Flexibility – Meeting tenant's requirements and expectations, and maximising adaptability
- Location – Maximising the benefits of a unique site
- Creating a landmark building – somewhere people want to come to work
- Open Innovation Space – maximising the USP and creating a place for collaboration and creativity
- Rentable accommodation – tenancy size, fit-out and flexibility
- Landscape Strategy – creating a sense of place in the initial development phases
- Sustainability Strategy – minimising energy use, maximising biodiversity
- Material and Elevation Strategy – creating an eye catching, efficient and robust building

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Benchmarking Analysis

Space Type	Salford Innovation Centre	Science Central	Exeter Science Park	QMB Innovation Centre	Imperial Incubator	NetPark Incubator	BioCity	AVERAGE, % of GIA
Lettable Area	55%	45%	61%	64%	56%	54%	63%	**57%**
Support Space	20%	19%	11%	11%	16%	11%	3%	**13%**
Balance	25%	36%	28%	25%	28%	35%	34%	**30%**
Unit Size Range								
XSmall (0-15 sqm)	1.9%	0.0%	0.0%		1.9%	10.2%		**2.8%**
Small (15-25 sqm)	6.6%	9.7%	6.1%		0.0%	5.9%		**5.7%**
Medium (25-50 sqm)	16.7%	11.8%	20.4%	no info	17.1%	29.8%	no info	**19.2%**
Large (50-100 sqm)	9.5%	11.9%	23.6%		6.1%	10.0%		**12.2%**
XLarge (100+ sqm)	17.9%	14.1%	29.3%		30.9%	0.0%		**18.4%**
Support Space								
Meeting rooms	0.8%	0.7%	0.0%	1.7%	3.6%	2.5%	0.0%	**1.3%**
Café/Reception/Informal working	6.4%	9.1%	9.9%	2.1%	10.9%	8.0%	2.5%	**7.0%**
Incubator breakout	6.5%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	**1.6%**

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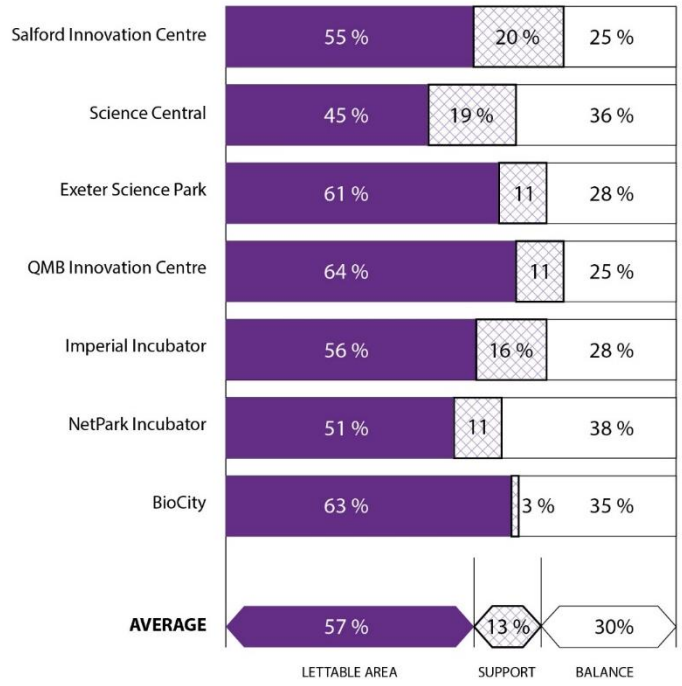
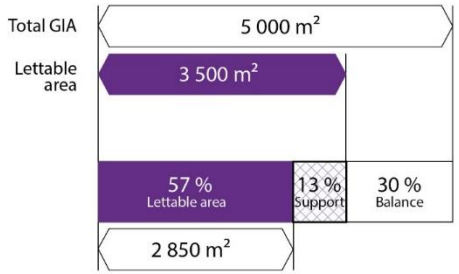
Benchmarking - Comparison

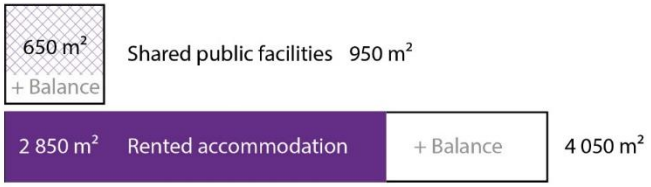
BENCHMARK STUDY



BRIEF REQUIREMENTS



ACCOMMODATION REQUIREMENTS



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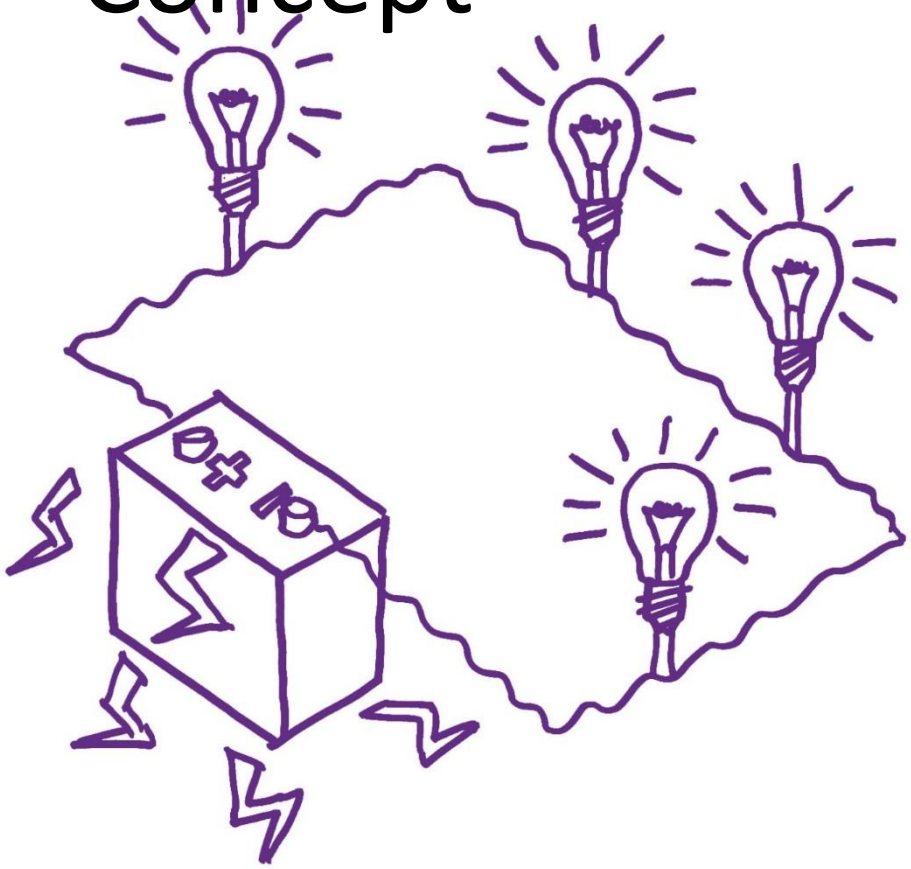
Brief - ‘Spark’ Building Concept



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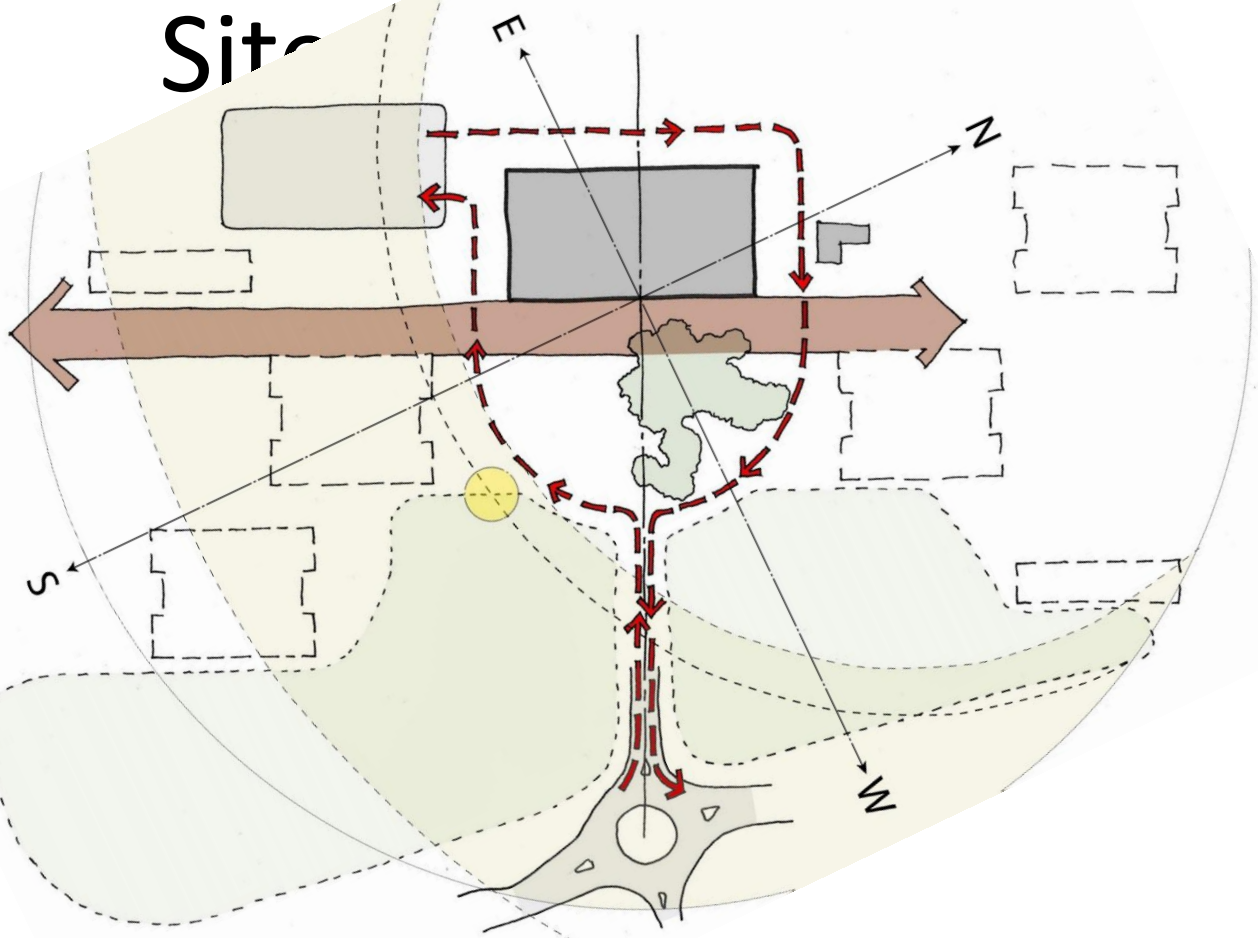
Site



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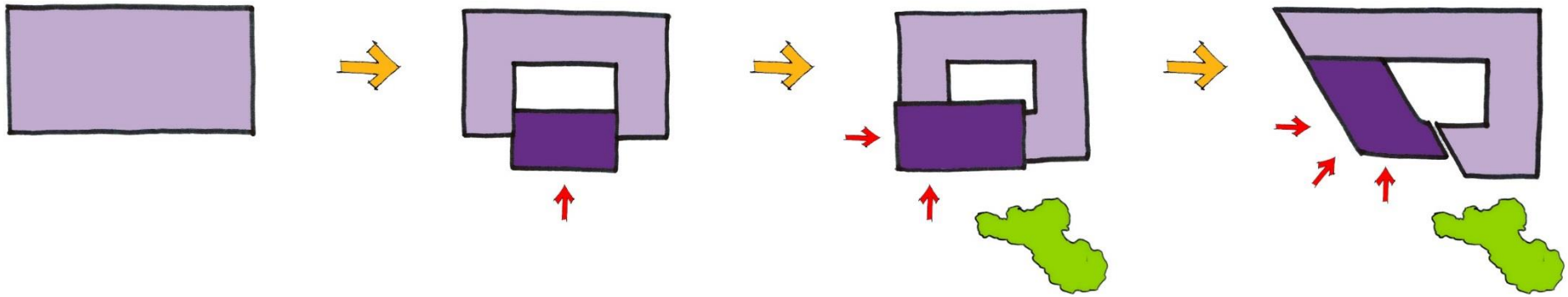
Massing Development



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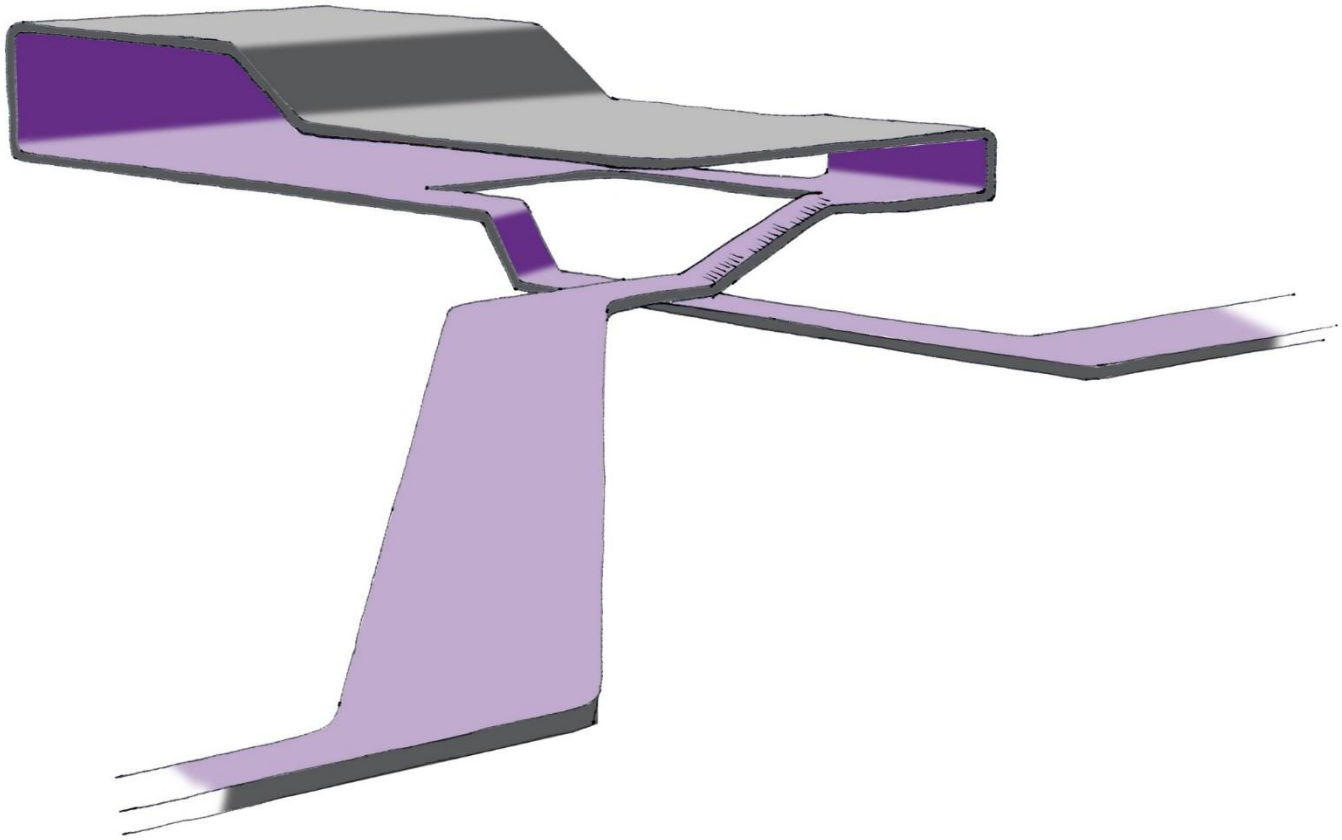
Massing Concept – "Ribbon"



Landscape Concept

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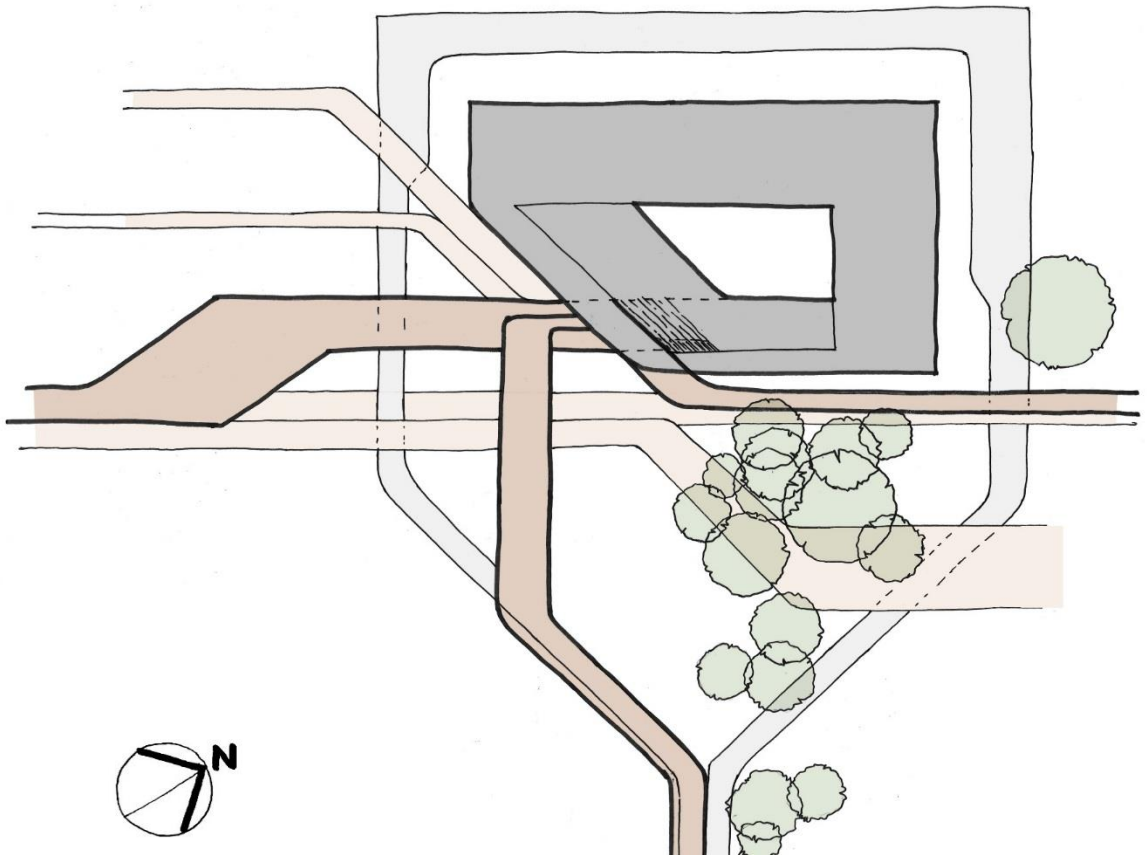

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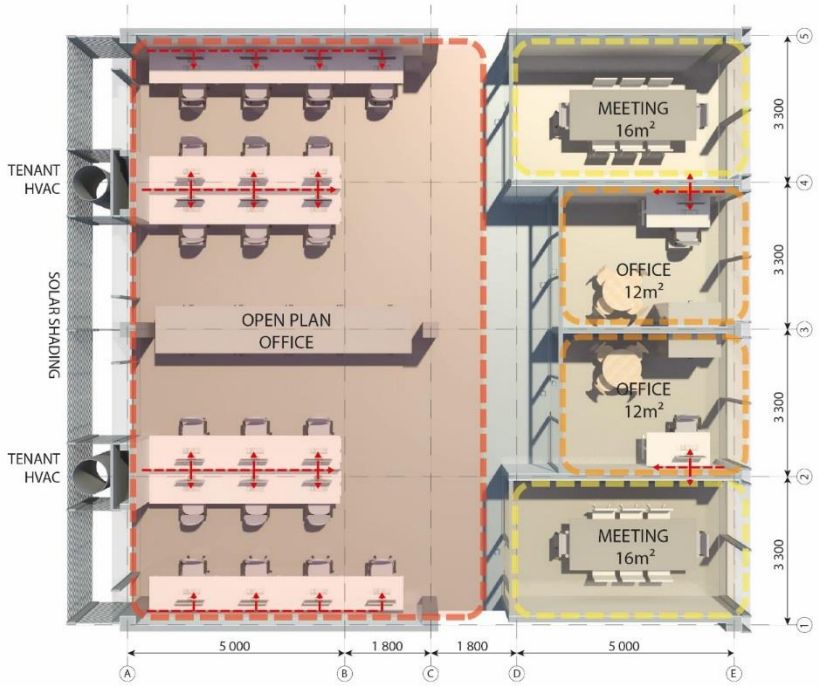
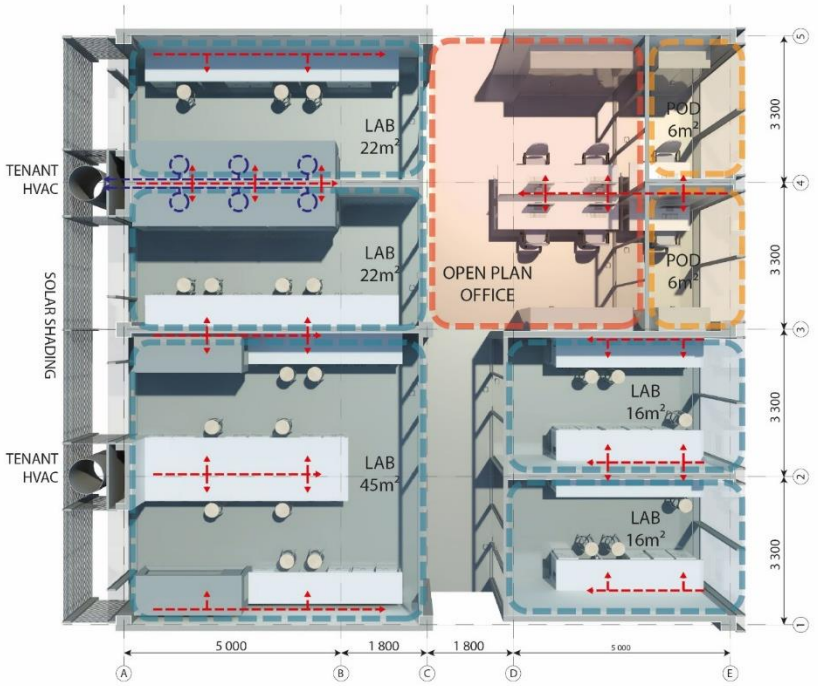
Concept - Flexible Office :



100 %
OFFICE



70% / 30%
LAB / OFFICE

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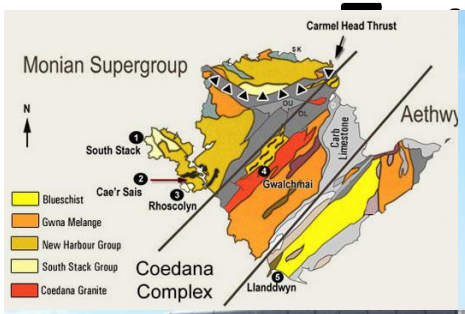

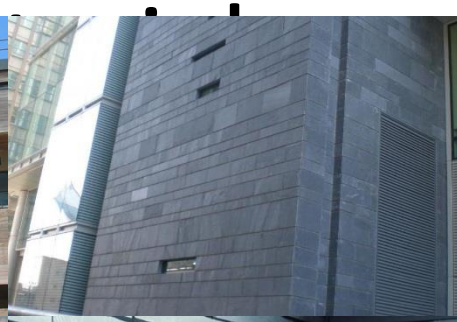

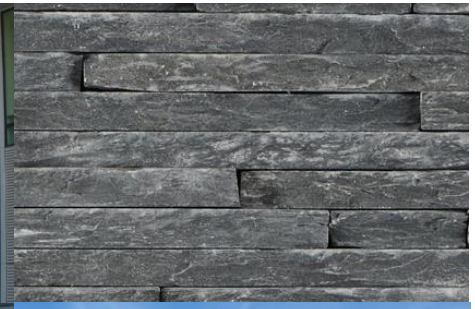

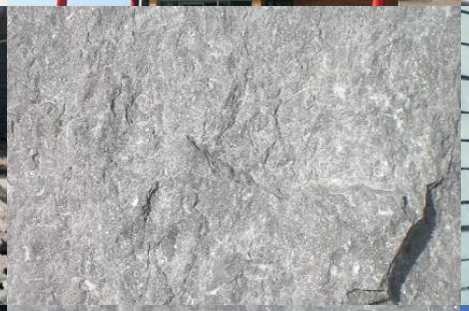

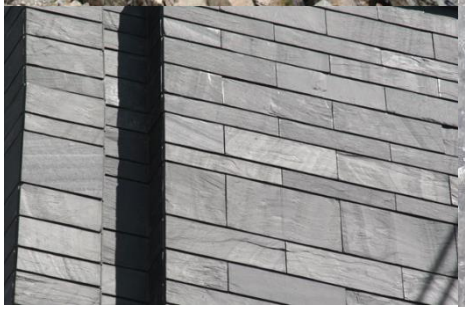

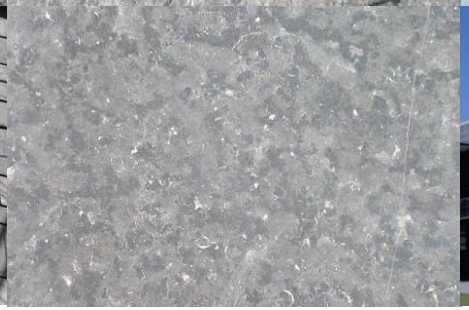

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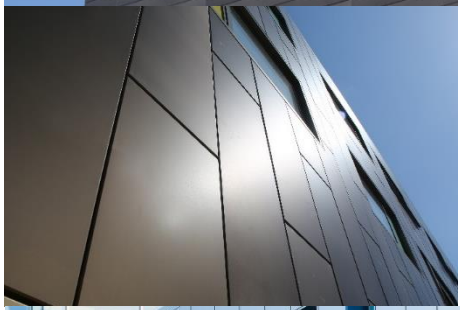
Material Refinement



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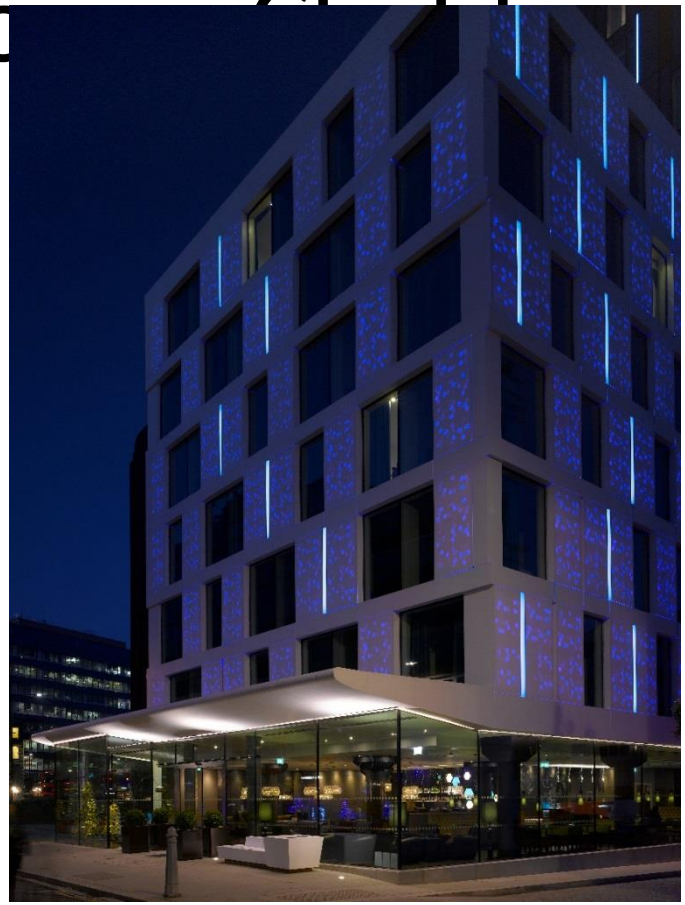
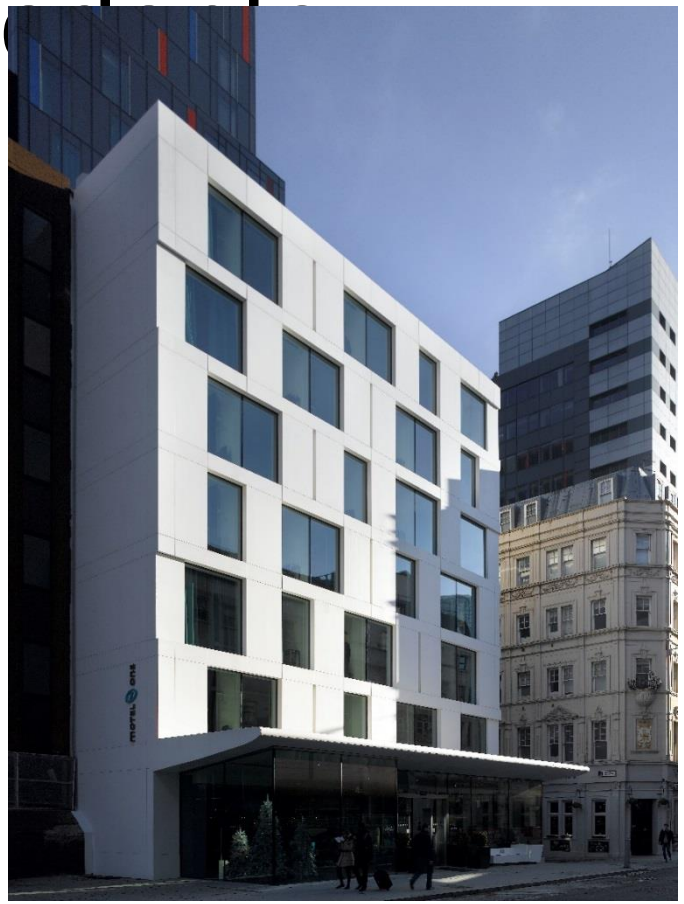
Co[illegible] Cladding Prec[illegible]





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Cerion Cladding

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Corian Cladding - Alternative Products - Comparison

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	DuPont Corian	LG Hi-Macs	Samsung Staron	Porcelenosa Krion
Approved For External Application?	YES	YES	YES	YES
Material Warranty	10 Years (20 years for swelling / delamination / peeling	10 years (colour leeching) (20 years for swelling / delamination / peeling	10 years (not clear if this includes external applications)	10 Years
Installation Warranty	10 Years through installer network	Not defined	Not defined	Not defined
Colour Warranty	10 Years	5 Years	Not Defined	Not defined
UV / Colour fade resistance ASTM Method	≤ 5 (ΔE / 10 years)	(ΔE3 - ΔE4 / 5 years)	≤ 5 (ΔE / 10 years)	ΔE0.55 / (84 week test)
Gloss Loss	≤ 40 % 10 years	≤ 40 % 10 years	No Information available	No Information available
Max sheet Size	3.65m x 1.3m	3.68m x 1.36m	3.68 x 0.76m	3.67 x 0.75m 3.59 x 1.34m
Sheet Thickness	12mm	12mm	12mm	12mm
Theromoformed corners	YES	YES	YES	YES
Fixing Method	Kiel Anchors	Kiel Anchors	Undercut Anchor + adhesive	Surface fixings, plugged and sanded in situ
Panel Joints	Open Joint Overlap joint Free-floating strip	Open Joint Overlap joint Free-floating strip	No Information available	Overlap joint Tongue and Groove
Density DIN ISO 1183 (g/cm³)	1.58-1.75	1.71	1.74	1.71 – 1.76
Flexural Modulus DIN EN ISO 178 (Mpa)	8040-9220	8900	9030	8596-8724

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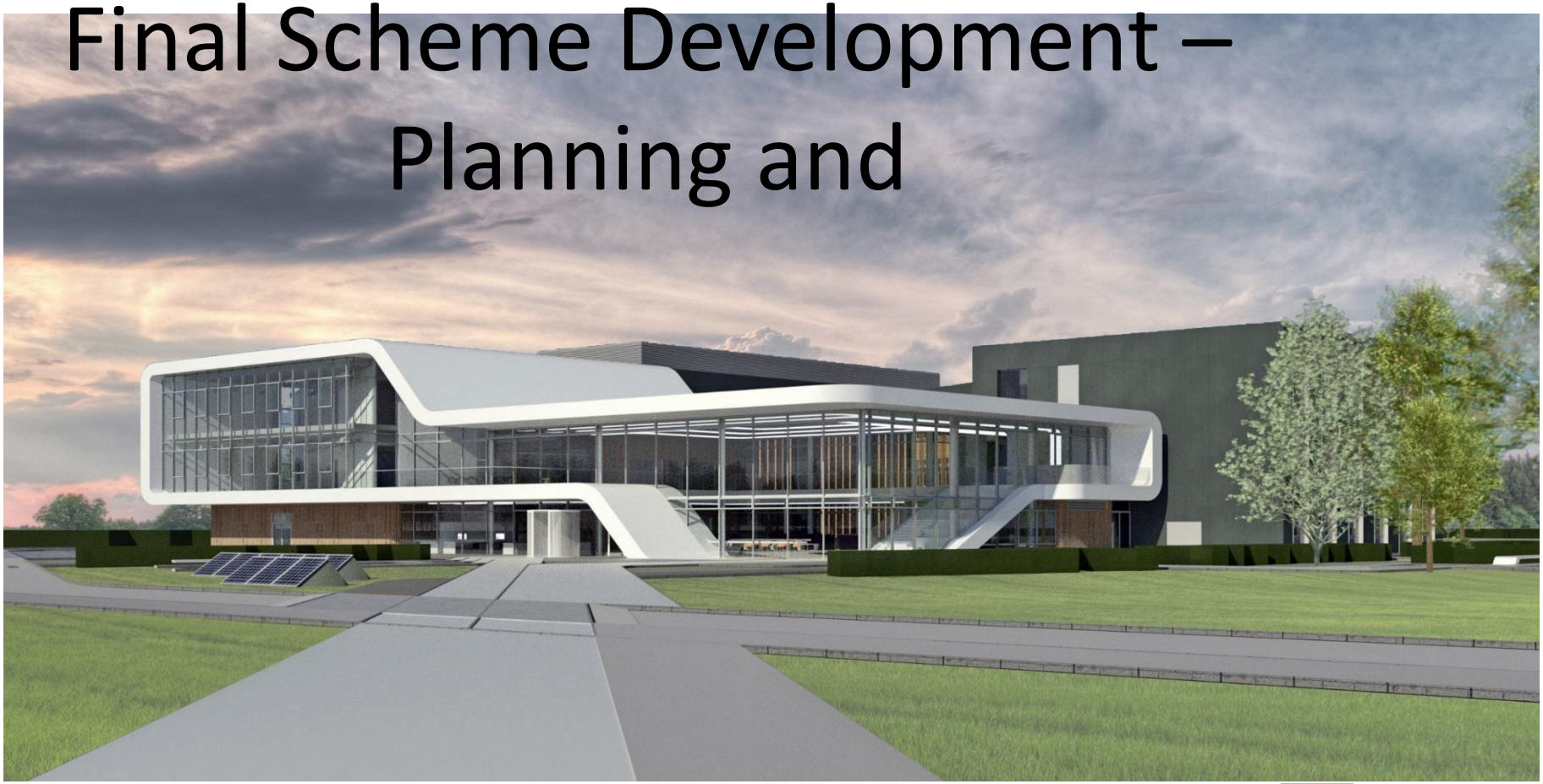
Final Scheme Development – Planning and



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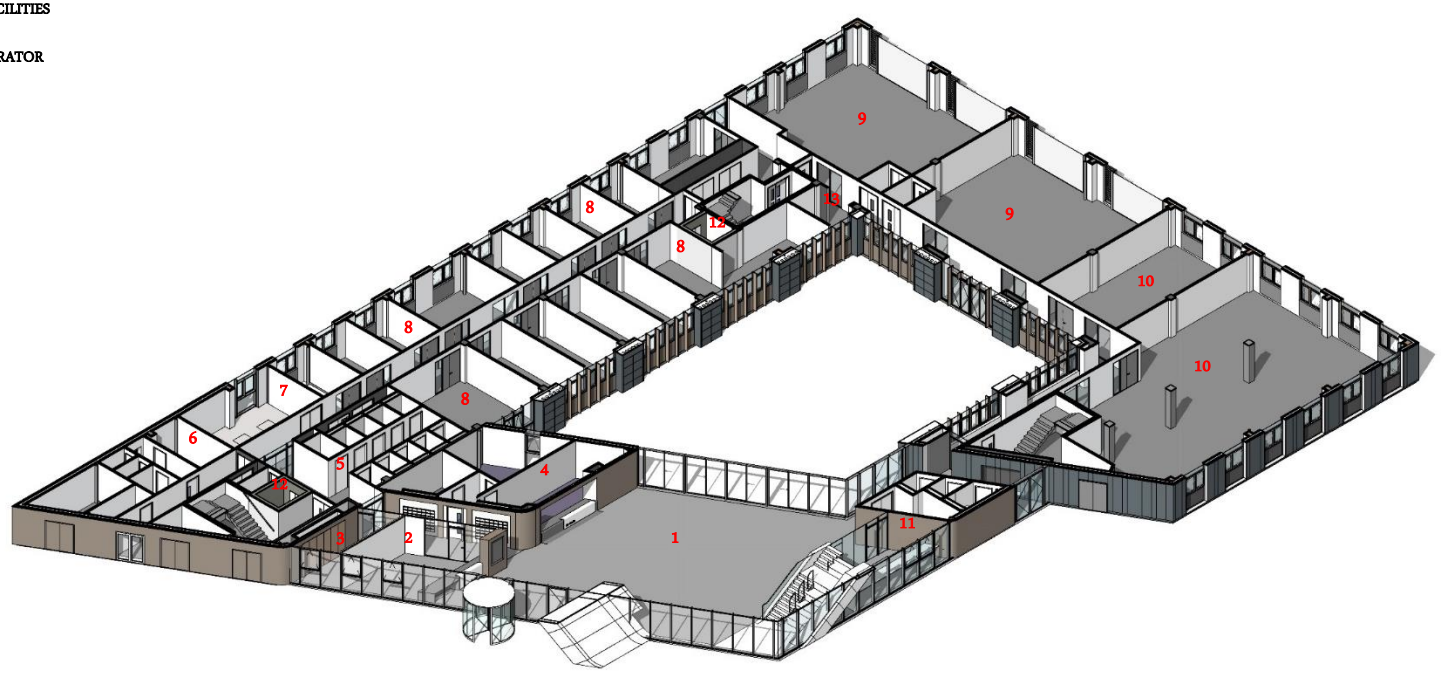
Level 00 (Ground)

1 – OPEN INNOVATION SPACE
2 – RECEPTION / M-SPARC OFFICE
3 – DIRECTORS OFFICE
4 – CAFÉ
5 – WCs
6 – SHOWERS & CYCLISTS FACILITIES
7 – SERVER ROOM
8 – HIGH GROWTH / ACCELERATOR
9 – CLEAN WORKSPACE
10 – GROW ON
11 – HOT DESK OFFICE
12 – LIFT
13 – TEA POINT



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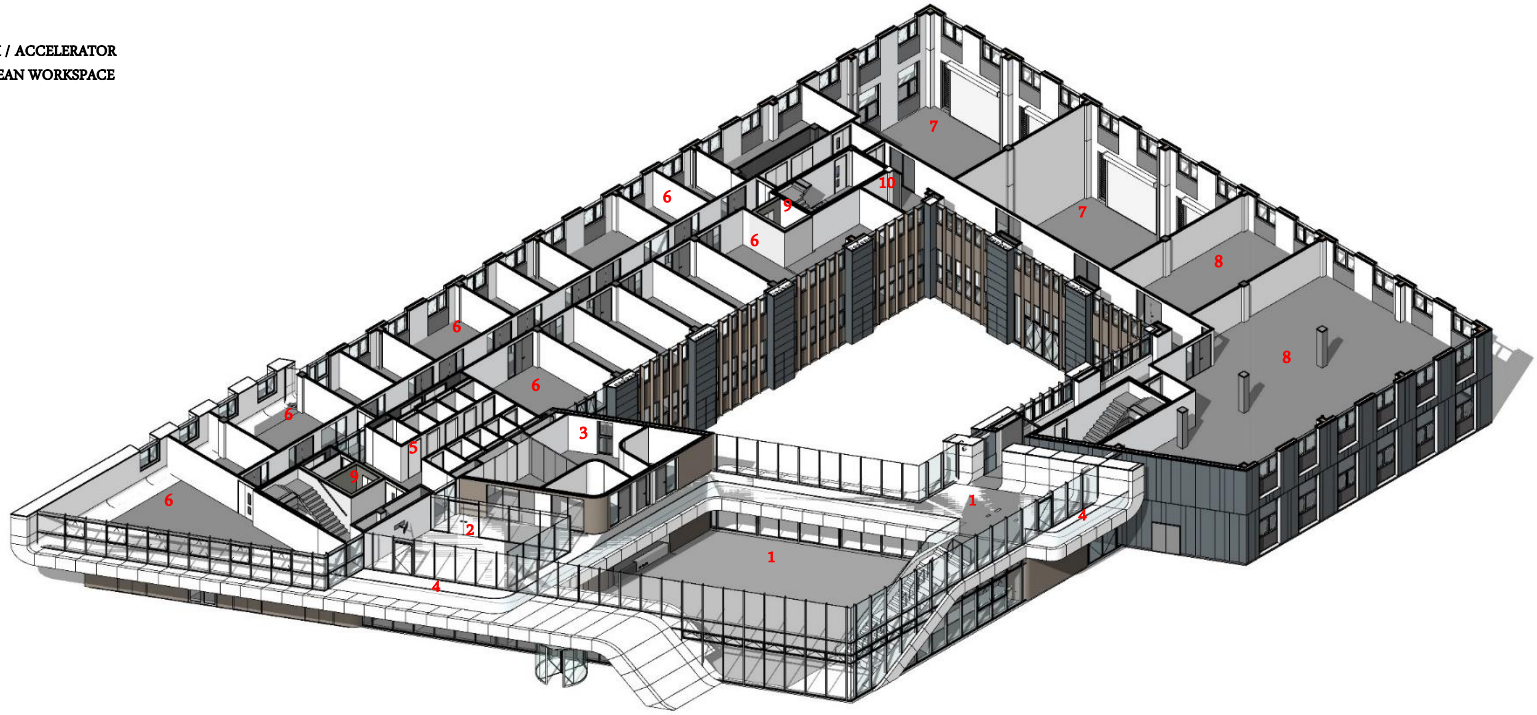
Level 01 (First Floor)

1 – OPEN INNOVATION SPACE
2 – CONFERENCE ROOM
3 – INTERVIEW ROOM / MEETING ROOM
4 – TERRACE
5 – WCs
6 – HIGH GROWTH / ACCELERATOR
7 – VOID OVER CLEAN WORKSPACE
8 – GROW ON
9 – LIFT
10 – TEA POINT



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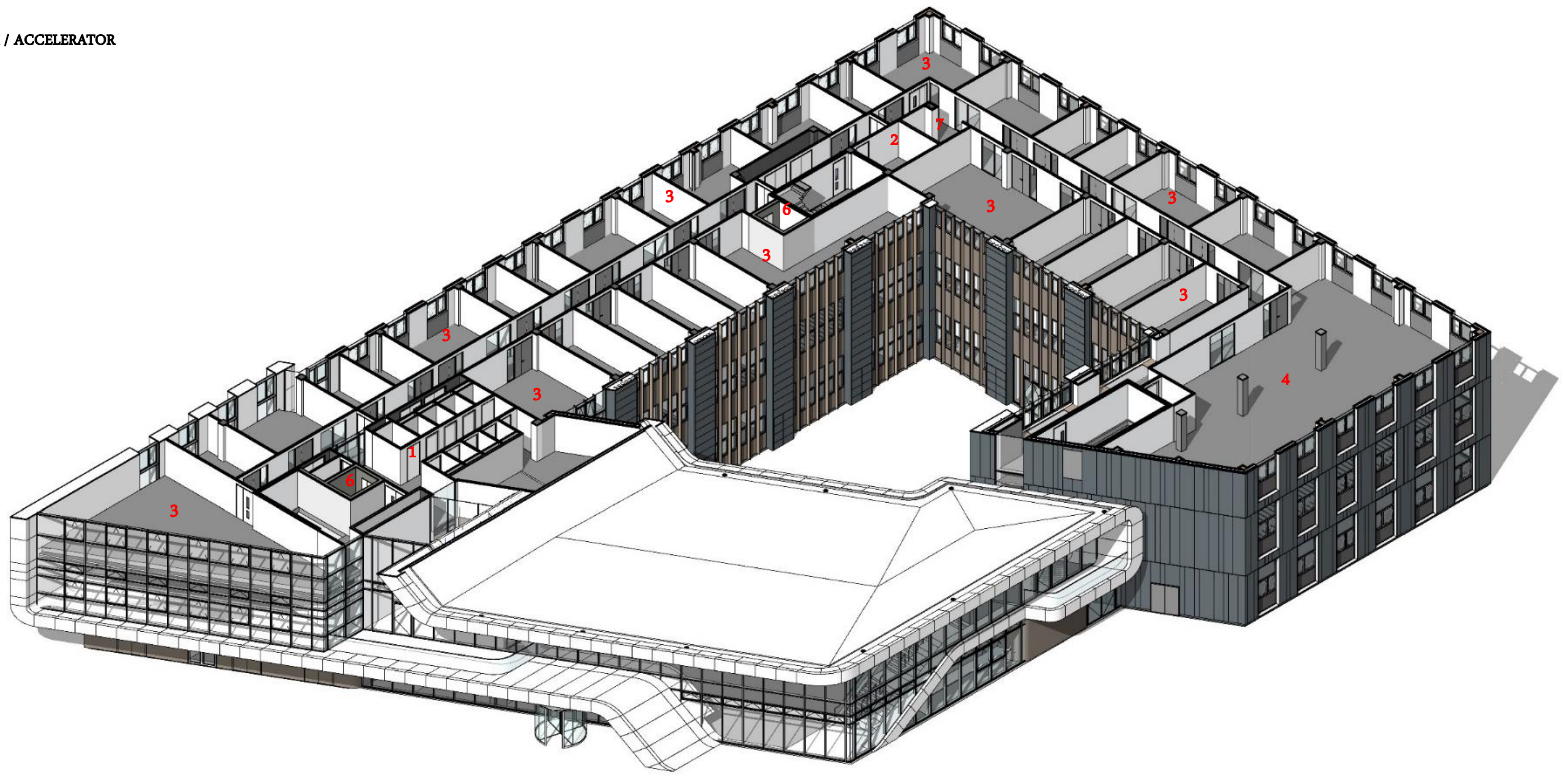
Level 02 (Second Floor)

1 – WCs
2 – SERVER ROOM
3 – HIGH GROWTH / ACCELERATOR
4 – GROW ON
5 – SERVER ROOM
6 – LIFT
7 – TEA POINT



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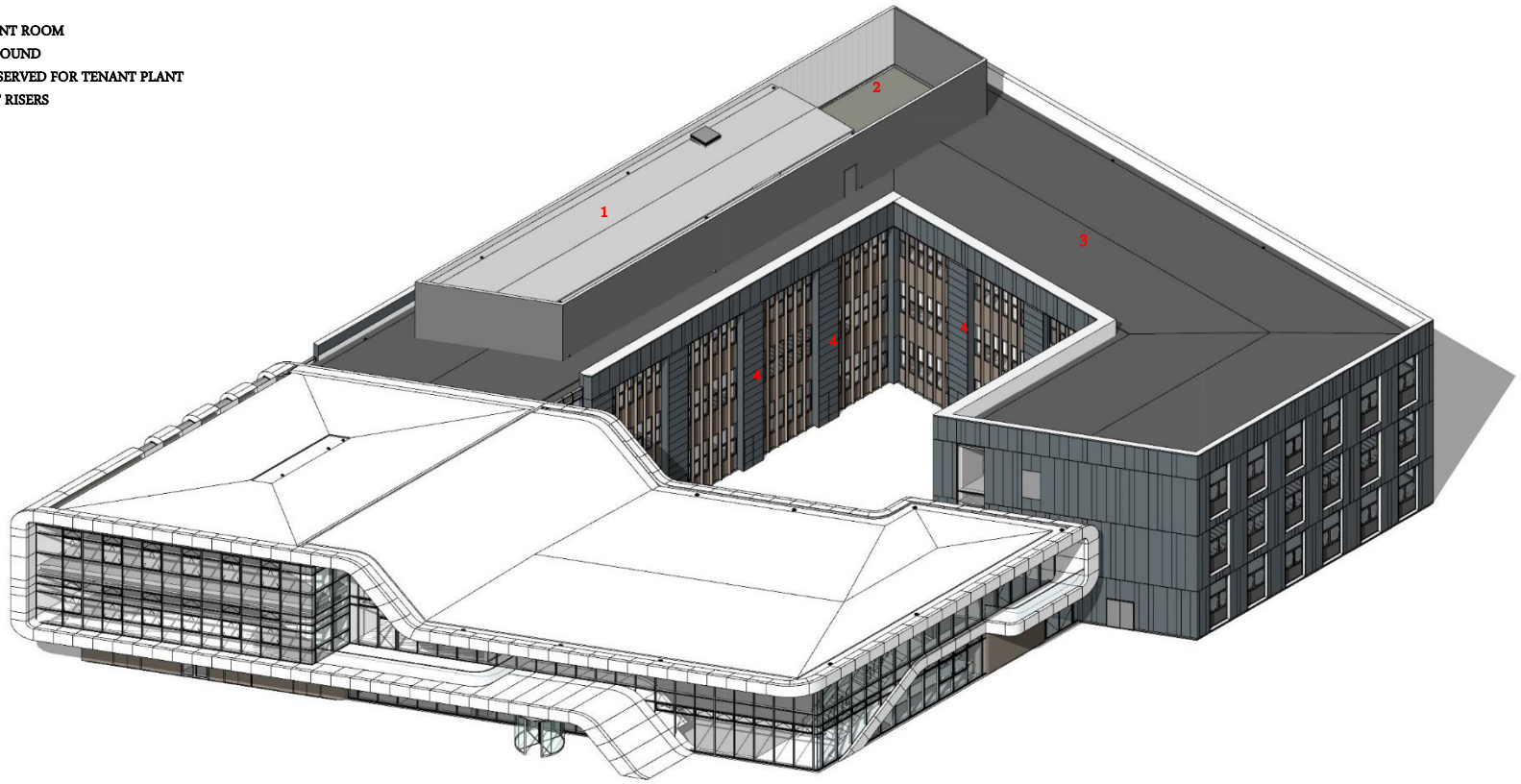
Level 03 (Roof)

1 – ENCLOSED PLANT ROOM
2 – CHILLER COMPOUND
3 – ROOF AREA RESERVED FOR TENANT PLANT
4 – TENANT PLANT RISERS



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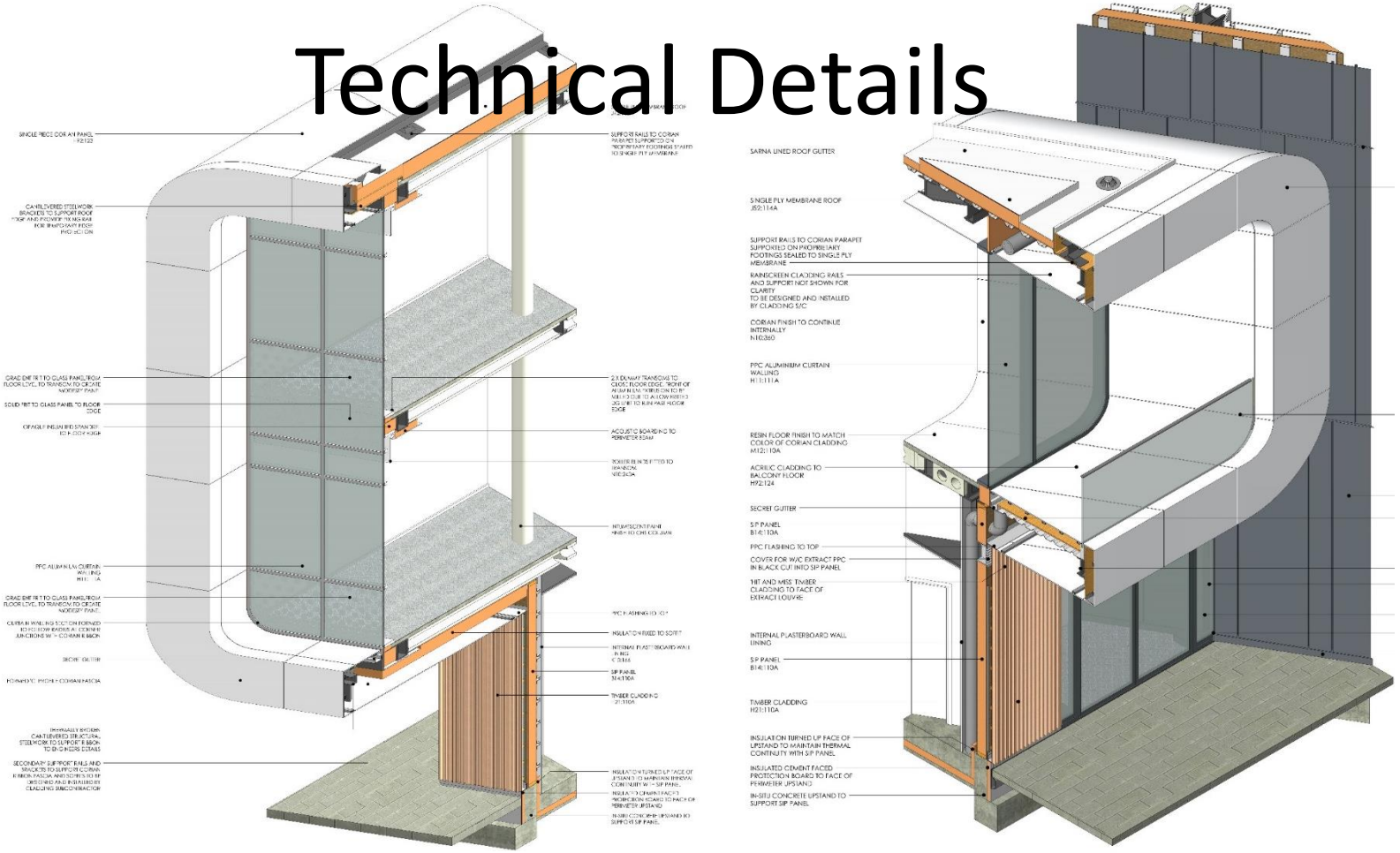
Technical Details



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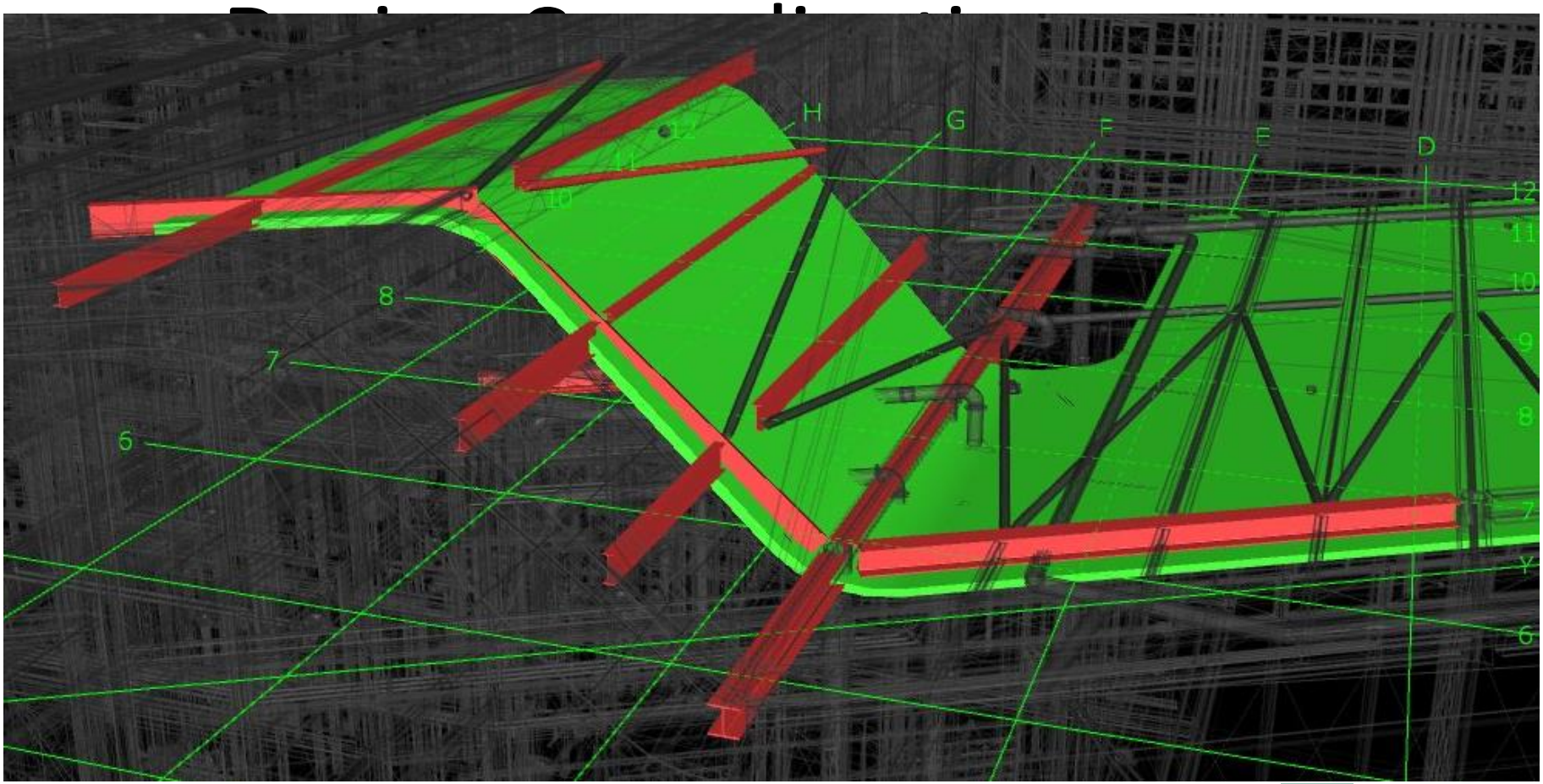

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Enabling
ZERO WASTE
Galluogi
DYFODOL
DIWASTRAFF

Menai Science Park
M-SParc

Keith Watts

EZW Project Delivery Officer

Enabling ZERO WASTE Galluogi DYFODOL DIWASTRAFF

What is Enabling Zero Waste?

- Constructing Excellence in Wales (CEW) initiative working with construction projects to achieve zero waste
- Provides practical, positive and proactive assistance to construction, demolition and civil engineering projects in Wales
- Aim to establish if, and how, the construction industry can achieve the zero waste targets established in the Welsh Government's waste strategy, Towards Zero Waste
- Following a waste hierarchy approach

Successes in the past
Canteen / Office Waste

- In the past EZW has seen 18% of all site waste (by volume) reported as canteen/office waste;
  - disposed of in mixed waste skips
  - end destination; landfill

- Separate collections allows;
  - fewer collections of mixed waste; less traffic
  - reduces weight of mixed waste skips; lower cost
  - end destination; anaerobic digestion and recycling
- Aim for this to be the industry norm in Wales

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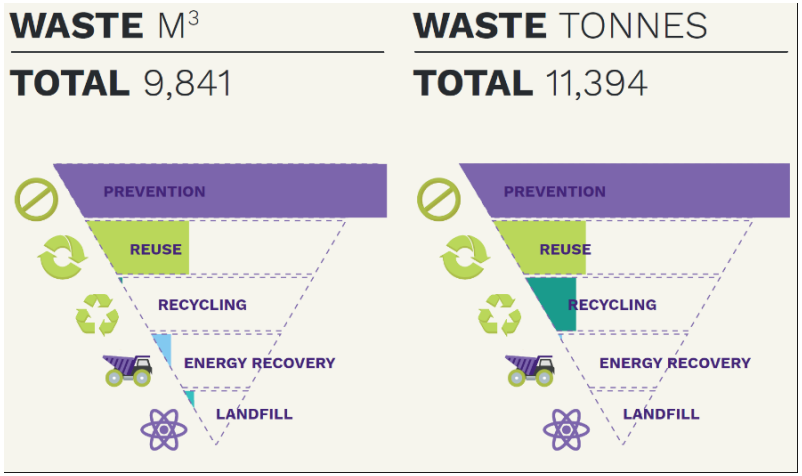
Consideration of the Waste Hierarchy

- Prevention of waste is key to reducing waste
- Consideration of waste at the design stage is important to waste prevention
  - "80% of buildings waste is determined by decisions made at the design stage"; Environmental Change Institute
- Reduces waste management costs
  - EZW has shown 2.8% of project value can be saved
- Most sites have existing resources on them. There may be existing infrastructure which could be utilised;
  - buildings
  - roads
  - sewerage & utilities



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Waste as a Resource

Reframing all waste as a resource with a value

- Use of waste slate - 5,225 tonnes
  - Possible further 1000 tonnes
- Crushing existing buildings for fill material
- Segregation of waste to maintain recyclate value
- Donation of trees to the local community

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EZW at M-SParc

- Opportunity to work with an exciting and unique new build project
- EZW team first met with the team in late 2016
- Involvement;
  - Site visits; a fresh pair of eyes
  - Research into disposal options
  - Waste data analysis; spotting trends and finding the reasons

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EZW at M-SParc

- Develop solutions to prevent and minimise the generation of on-site waste, leading to a reduction in;
  - time spent on waste management
  - disposal costs
- Provide learning and information on alternative waste management techniques which can be used on future projects;
  - ensuring continual benefits

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EZW at M-SParc

- Support changes to behaviour and process that encourage prevention and minimisation of waste

- Share the solutions and opportunities arising from effective waste management strategies;
  - case study
  - events like this
  - regular updates; via newsletter, tweets etc.

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