



**MitchellBrandtman**

5D Quantity Surveyors & Construction Expert Opinion

# LODs for the 5D QS

David Mitchell – Partner & 5D Quantity Surveyor

BrisBIM Gathering

20<sup>th</sup> August 2014



# Discussion

- **The No. 1 Feature of 5D**
  - **Skills & Processes**
  - **Modeling Fundamentals**
- **What LOD is Required for 5D?**



## The No 1. Feature of 5D?

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# SCPUIH: Re-visioning (ArchiCAD)



Home Drawings Dimensions Revisions Workbooks

Properties Promote Reports Add Export Workbook Generate

Microsoft Sans Serif 8

Find & Replace Rows Columns Copy Recalculate Workbook Spelling Highlighting Off Function AutoComplete AutoSum

Format Editing Review Workbook Tools

Dimension View Costing View

Workbooks

Name	Total
Box	0

Dimension Groups Dimensions Codes Constants Rates Values Workbook Values Phraseologies

Click to Filter

Name	Quantity	UOM
L01_PT1.F4 - 3x16FRPB+92ST+3x16FRPB 4hr -(240/240) 1...	6 m	
L01_PT1.F4 - 3x16FRPB+92ST+3x16FRPB 4hr -(240/240) 1...	4 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_2800.0 mm hig...	0 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	3 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	6 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	1 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	11 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	4 m	
L01_PT1.S - 13PB+92ST+13PB Smoke 120_4075.0 mm hig...	15 m	
L01_PT1.S.A38 - 13PB+92ST+13PB Smoke Ru38 120_407...	3 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_27...	2 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	6 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	63 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	17 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	1 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	6 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_28...	75 m	
L01_PT2 - 13PB+92ST+13PB to 100mm above FCL 120_30...	1 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	59 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	16 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	21 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	2 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	10 m	
L01_PT2.A35 - 13PB+92ST+13PB Ru35 to 100mm above F...	164 m	
L01_PT2.A38 - 13PB+92ST+13PB Ru38 to 100mm above F...	61 m	

D1 Cell = Total = 0

	A:Code	B:Description	C:Quantity	D:Unit	E:Rate	F:Subtotal	G:Factor	H:Total	I:Element	J:Level	K:Department	L:Heading	M:
1		LEVEL 01 PARTITIONS				0		0					
2		LEVEL 01 PARTITIONS - PROVISIONAL				0		0					
3		ITEMS											
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GFA = 0.00 m2 0.0000 Text



# Re-visioning - Skills & Processes

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# 1. Mapping Skills - No Codes or Conventions

**Model Map**

Properties: Rotate 90°, Rotate 180°, Rotate 270°, Zoom Area, Zoom In, Zoom Extents, Zoom Out, Wireframe, Shaded, Transparent, Show Text, Show Hatching, Close

**Name**

- Structural Columns
  - AUR\_CONC\_ROUND\_COLUMN
  - AUR\_CONC\_SQ\_REC\_COLUMN
- Structural Foundations
  - AUR\_F\_Ground beam-Length drags\_2009
  - AUR\_PILE CAP\_TYPE 1A

**Mapping Definition**

Folder: IF ([LL\_CostingCode\_1] = "0423", "SUBSTRUCTURE - NOT PART OF THIS PACKAGE", "5.2\_STCL\_" + [LL\_Building])

Dimension Group: [LL\_Building] + " " + [Base Level] + " " + [Level3] + "mm\_Type " + [AUR\_COLUMN TYPE] + " " + [LL\_Concrete Strength (MPa)] + " RC In " + [Level4] + " Reo: " + [LL\_Reo Rate (kgperm3)] + "kg/m3 "

Measure Type: Volu

Dimension:

Zone:

Count:

Length:

Height:

Area:

Wall Area:

Volume: [Volume]

Weight Value:

Weight UOM:

Custom 1 Name: "Reo Rate"

Custom 1 Value: [LL\_Reo Rate (kgperm3)] \* .001 \* [Length] \* .001 \* ((NUMBER([Type Name])/1000) \* (NUMBER([Type Name], 2)/1000))

Custom 1 UOM: "t"

Custom 2 Name: "Surface Area Formwork"

Custom 2 Value: (((((NUMBER([Type Name]) \* 2) + (NUMBER([Type Name], 2) \* 2))) / 1000) \* [Volume]) / ((NUMBER([Type Name])/1000) \* (NUMBER([Type Name], 2)/1000))

Custom 2 UOM: "m2"

Custom 3 Name:

Custom 3 Value:

Custom 3 UOM:

**3D Model**

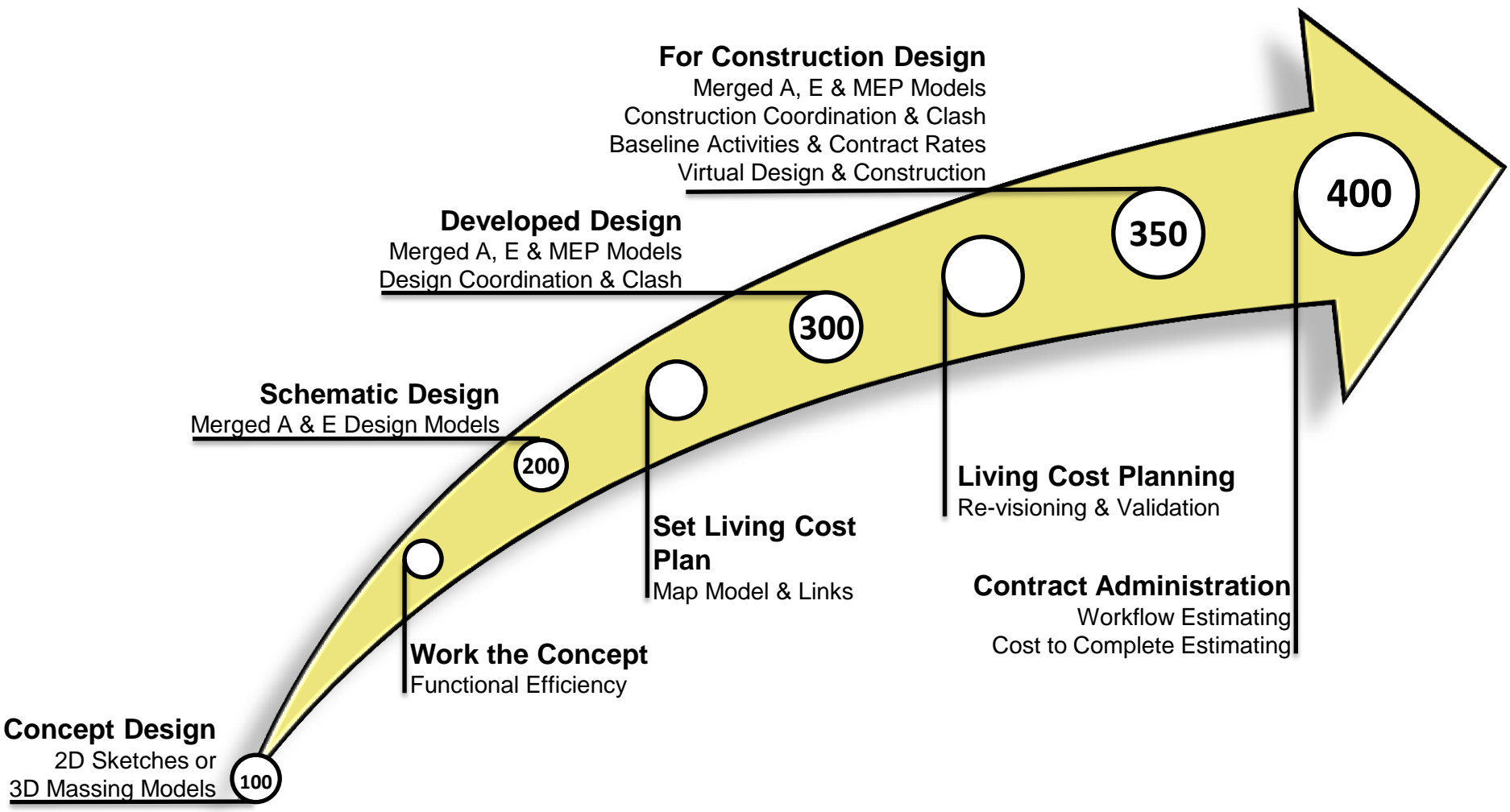
**Table**

	LL_Building	LL_Concrete Strength (MPa)	LL_CostingCode_1	LL_Reo Rate (kgperm3)	Top Level	Volu
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.1'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.2'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.2'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.1'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.1'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.2'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.2'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.2'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	1.1'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	0.9'
SQ_REC_COLUMN	M01	N65		250	LEVEL 02	0.9'
SQ_REC_COLUMN	M01	N65		275	LEVEL 01	1.2'
SQ_REC_COLUMN	M01	N65		275	LEVEL 01	1.2'

Creating Cost Certainty



## 2. Process - 5D QS Workflow





# 3a. 5D BEP – High Level Model LOD



## ANNEXURE B – 5D BIM Execution Plan

INSERT PROJECT NAME AND CLIENT

Commercial in



## ANNEXURE B –

INSERT PROJECT NAME AND

	Quantity Surveying Tasks & Deliverable	Carried out by MB	Phase Requirements – Mitchell Brandtman				
			MP	SD	DD	CD	CA
OBJECTIVE	The 5D objective during design is to create a living cost plan that provides a transparent framework for making early cost decisions. The living cost plan must be able to be revised and shared (on a weekly / fortnightly / or monthly cycle) using the current model information.						
	The 5D objective during construction is to provide a transparent framework for letting and administering construction contracts. The model map which created the cost plan becomes more detailed as the model LOD progresses to become the basis for quantity take-off for letting and tendering, the valuation of variations, change orders and progress payments during construction and replacement work during operation of the building.						
	The 5D objective on completion is to create a cost integrated as built model that can be synchronised with the FM system to transfer replacement costs, base dates, expected and effective lives, estimated running and maintenance costs.						
The model disciplines and minimum level of development (LOD) that are to be used for 5D at each project stage are as follows:							
	Architectural		LOD100	LOD100	LOD200	LOD300	LOD300
	Structural				LOD200	LOD300	LOD350
	Mechanical				LOD200	LOD200	LOD400
	Electrical				LOD200	LOD200	LOD400
	Hydraulic				LOD200	LOD200	LOD400
	Fire				LOD200	LOD200	LOD400
	Transportation					LOD200	LOD400
	Civil			LOD100	LOD200	LOD300	LOD350
	Temporary and false work						LOD400

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Quantity Surveying	
	The model map will be capable of disseminating
	Element
	Trade or work package
	Level
	Space
	Work break down structure
	Activity
1.0	ESTIMATING & COST PLANNING
1.1	Prepare estimates utilising the agreed 5D breakdown structure; map the model information in a way that the first estimate becomes the base alternative designs during MP; alternative engineering systems during SD; alternative alternative construction methods, material estimate type will state the following: <ul style="list-style-type: none"><li>• MP - elemental unit, rate and quantity</li><li>• SD - generic construction materials, rate and quantity.</li><li>• DD - specific construction materials, rate and quantity.</li><li>• CD - specific construction materials, trade units, rate and quantity. The CD format as an alternative to element.</li></ul>
1.2	Identify any work that is not modelled and from sketches, room data sheets, design project scope.





# 3b. 5D BEP – Model Map Dissection



## ANNEXURE B – 5D BIM Execution Plan

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Quantity Surveying Tasks & Deliverable		Carried out by MB	Phase Requirements – Mitchell Brandtman				
			MP	SD	DD	CD	CA
The model map will be capable of dissecting quantities by:							
Element		✓		✓	✓	✓	✓
Trade or work package		✓				✓	✓
Level		✓		✓	✓	✓	✓
Space		✓			✓	✓	✓
Work break down structure		✓			✓	✓	✓
Activity		✓				✓	✓
<b>1.0 ESTIMATING &amp; COST PLANNING</b>							
1.1	Prepare estimates utilising the agreed 5D authoring tool, classification system and cost breakdown structure; map the model information into the elemental estimate template in such a way that the first estimate becomes the basis for value management and recompiling to consider alternative designs during MP; alternative designs, construction methods, materials and engineering systems during SD; alternatives, options and cost studies for improved designs, alternative construction methods, materials and engineering systems during DD and CD. Each estimate type will state the following: <ul style="list-style-type: none"><li>• MP - elemental unit, rate and quantity.</li><li>• SD - generic construction materials, finishes, services specifications, elemental unit, rate and quantity.</li><li>• DD - specific construction materials, finishes, services specifications, sub-elemental unit, rate and quantity.</li><li>• CD - specific construction materials, finishes, services specifications, sub-elemental and trade units, rate and quantity. The CD estimate is to be capable of presentation in trade format as an alternative to element.</li></ul>	✓	✓	✓	✓	✓	✓
1.2	Identify any work that is not modelled and supplement 3D measurement with 2D measurement from sketches, room data sheets, design brief and authority requirements to establish the entire project scope.	✓	✓	✓	✓	✓	NA

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## ANNEXURE B –

INSERT PROJECT NAME AND

Quantity Sur	
1.3	Overlay each model via a collaborative a sets to identify inconsistencies and inco contract administration. Create a report a action is for the purpose of estimating an
1.4	Suggest cost savings and drive functiona inefficiencies via benchmarking the conc measurement of other projects.
1.5	Revise estimates for each alternative des 5D authoring tool (re-mapping and re-pri estimate.
1.6	Progressively re-estimate, conduct cost b budget limits. Coordinate the budget to in reports that indicate the cost implications
1.7	Improve the model information by adding elemental codes, sub-elemental codes, f project specific classifications and coding families or objects of the native model file
1.8	Attend design and coordination meetings each estimate that allows visualisation of dimension, work book and rate library lev
<b>2.0 LIFE CYCLE COST ANALYSIS</b>	
2.1	Utilise the model map to perform life cycl alternatives to refine the design and enab overall cost of ownership consistent with <ul style="list-style-type: none"><li>• Initial costs—purchase, acquisition and</li><li>• Operation, maintenance, and repair cos</li><li>• Replacement costs</li><li>• Residual values—resale or salvage val</li><li>• Finance charges— interest charges</li><li>• Non-monetary considerations</li></ul>
2.2	Attend value management meetings and each LCCA that allows visualisation of the dimension, work book and rate library lev
<b>3.0 CASHFLOW &amp; 4D INTERFACE</b>	
3.1	Attach work breakdown structure and oth within the 5D authoring tool and round tri families or objects of the native model file
3.2	Calculate the estimated cost of each acti progressively revise the project cashflow



# 3c. 5D BEP – Step by Step



## ANNEXURE B – 5D BIM Execution Plan

INSERT PROJECT NAME AND CLIENT

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	Quantity Surveying Tasks & Deliverable	Carried out by MB	Phase Requirements – Mitchell Brandtman				
			MP	SD	DD	CD	CA
1.3	Overlay each model via a collaborative authoring tool to create a federated model and use search sets to identify inconsistencies and incomplete model extents for the purposes of estimating and contract administration. Create a report and circulate to the design team for resolution. (This action is for the purpose of estimating and does not replace design and clash detection).	✓	✓	✓	✓	✓	NA
1.4	Suggest cost savings and drive functional efficiency by identifying functional and massing inefficiencies via benchmarking the concept design against the "as built" functional performance measurement of other projects.	✓	✓	✓	✓	✓	NA
1.5	Revise estimates for each alternative design by importing the revised model information into the 5D authoring tool (re-mapping and re-pricing new families or objects) and re-compile each estimate.	✓	✓	✓	✓	✓	NA
1.6	Progressively re-estimate, conduct cost checks (in whole or in part) during design to maintain budget limits. Coordinate the budget to include the total cost of the project scope and provide reports that indicate the cost implications and variances at completion of each phase.	✓	✓	✓	✓	✓	NA
1.7	Improve the model information by adding parameters within the 5D authoring tool and round trip elemental codes, sub-elemental codes, functional codes, trade codes, cost codes and other project specific classifications and coding systems by pushing the agreed information into the families or objects of the native model files.	✓	✓	✓	✓	✓	NA
1.8	Attend design and coordination meetings and produce reports with executable reader versions of each estimate that allows visualisation of the estimated quantities and provide transparency at dimension, work book and rate library level.	✓	✓	✓	✓	✓	NA
<b>2.0 LIFE CYCLE COST ANALYSIS</b>							
2.1	Utilise the model map to perform life cycle cost analyses (LCCA) for comparison of selected alternatives to refine the design and enable selection of the design that will provide the lowest overall cost of ownership consistent with its quality and function. The LCCA will consider: • Initial costs—purchase, acquisition and construction costs • Operation, maintenance, and repair costs • Replacement costs • Residual values—resale or salvage values or disposal costs • Finance charges—interest charges • Non-monetary considerations	✓	NA	NA	✓	✓	NA
2.2	Attend value management meetings and produce reports with executable reader versions for each LCCA that allows visualisation of the estimated quantities and provide transparency at dimension, work book and rate library level.	✓	NA	NA	✓	✓	NA
<b>3.0 CASHFLOW &amp; 4D INTERFACE</b>							
3.1	Attach work breakdown structure and other project activity coding systems by adding parameters within the 5D authoring tool and round trip the information by pushing the agreed data set into the families or objects of the native model files	✓	NA	NA	✓	✓	NA
3.2	Calculate the estimated cost of each activity within the project program, maintain and progressively revise the project cashflow and produce a cashflow animation for each revision.	✓	NA	NA	NA	✓	NA

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## ANNEXURE B –

INSERT PROJECT NAME AND

	Quantity Surveying Tasks & Deliverable
4.0	<b>QUANTITY TAKE-OFF AND CONTRACT ADMINISTRATION</b>
4.1	Review proposed professional services agreements and amendments (in consultation with the project manager) for the permitted uses of the "f" protection of copyright and intellectual property (incorporating executable 4D sequencing).
4.2	Develop the model map to progressively update and / or Trade Packages (TP) for subcontract mechanical, electrical and plumbing trades, contract type and suitable for administering tendering, secondary check on design documents, schedule of rates for pricing variations.
4.3	Identify any work that is not modelled and from drawings, room data sheets, specific package scope.
4.4	Overlay each model via a collaborative authoring tool to identify inconsistencies and incomplete model extents for the purposes of estimating and contract administration. Create weekly inconsistent, incomplete and unclear contract resolution. (This action is for the purpose of clash detection).
4.5	Revise the BQ and / or TP to match the "f" the revised model information into the 5D compile the BQ and / or TP, produce executable as a tender document. Provide instructions to visualise the quantities and test the accuracy.
4.7	Improve the model information by maintaining codes, trade codes, cost codes and other are contained within the model information tool to the model information and round trip pushing the agreed information into the families or objects of the native model files.
4.8	Attend tender opening, letting coordination advice and report on tender assessment.
5.0	<b>CONTRACT PRICED BQ &amp; BASELINE BQ</b>



# Re-visioning - Modeling Fundamentals

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# Golden Rules

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- **Accurate geometry**
- **Model the way it's built**
  - **bilogBIM - Norwegian Home Builders BIM Manual**
- **Define spaces correctly**
- **Give a 5D QS an early look at your model**



## Nice to Have

- **Correct base point**
- **Define objects with correct level / storey**
- **Use proper object tool ie column tool**
- **Checking for objects within objects**
- **Consistent naming conventions - resist editing**
- **Include a classification code / BIM-MEPaus**



## What LOD is Required for 5D?

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# LOD Specification – BIM Forum 2013



## B20 Exterior Vertical Enclosures

100	<p>Solid mass model representing overall building volume; or, schematic wall elements that are not distinguishable by type or material.</p> <p>Assembly depth/thickness and locations still flexible.</p>	
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## B2010 – Exterior Walls

*Solid wall construction that is composite in nature; in other words, multiple layers of materials to form an overall assembly.*

100	See <a href="#">B20</a>	
200	<p>Generic wall objects separated by type of material (e.g. brick wall vs. terracotta).</p> <p>Approximate overall wall thickness represented by a single assembly.</p> <p>Layouts and locations still flexible.</p>	
300	<p>Composite model assembly with specific overall thickness that accounts for veneer, structure, insulation, air space, and interior skin specified for the wall system. (Refer to LOD350 and LOD400 for individually modeled elements)</p> <p>Penetrations are modeled to nominal dimensions for major wall openings such as windows, doors, and large mechanical elements.</p> <p>Required non-graphic information associated with model elements includes:</p> <ul style="list-style-type: none"><li>• Wall type</li><li>• Materials</li></ul>	
350	<p>A composite wall assembly may be considered for LOD350 only if hosted objects such as windows and doors are provided at a minimum of LOD350.</p> <p>Main structural members such as headers and jambs at openings are modeled within the composite assembly.</p>	







# Min Modeling Requirements (USACE M3)



## ANNEXURE C - 5D Minimum Modeling Matrix

INSERT PROJECT NAME AND CLIENT

Level	Element	QSID	UniFormat ID	CO	SD	DD	CD	CA
Level 4	Slurry Walls	01	A9030.70	-	-	100	100	100
Level 3	<b>Soil Treatment</b>	01	A9040	-	-	100	100	100
Level 1	<b>SHELL</b>	02-08	B					
Level 2	<b>SUPERSTRUCTURE</b>	02-03	B10	-	-	300	350	350
Level 3	<b>Floor Construction</b>	03	B1010	-	-	300	350	350
Level 4	Floor Structural Frame	03	B1010.10	-	-	300	350	350
Level 4	Floor decks, slabs and topping	03	B1010.20	-	-	200	300	300
Level 4	Balcony Floor Construction	03	B1010.30	-	-	300	350	350
Level 4	Mezzanine Floor Construction	03	B1010.40	-	-	200	300	350
Level 4	Ramps	03	B1010.50	-	-	200	300	350
Level 4	Floor Construction Supplementary Components	03	B1010.90	-	-	200	300	350
Level 3	<b>Roof Construction</b>	05	B1020	-	200	200	350	350
Level 4	Roof Structural Frame	05	B1020.10	-	200	200	350	350
Level 4	Roof decks, slabs and sheathing	05	B1020.20	-	200	200	350	350
Level 4	Canopy Construction	05	B1020.30	-	200	200	350	350
Level 4	Roof Construction Supplementary Components	05	B1020.90	-	200	200	350	350
Level 3	<b>Stairs</b>	04	B1080	-	-	-	200	200
Level 4	Stair Construction	04	B1080.10	-	-	-	200	200
Level 4	Stair Soffits	04	B1080.30	-	-	-	200	200
Level 4	Stair Railings	04	B1080.50	-	-	-	200	200
Level 4	Fire Escapes	04	B1080.60	-	-	-	200	200
Level 4	Metal Walkways	04	B1080.70	-	-	-	200	200
Level 4	Ladders	04	B1080.80	-	-	-	200	200
Level 2	<b>EXTERIOR VERTICAL ENCLOSURES</b>	06-08	B20		200	300	350	350
Level 3	<b>Exterior Walls</b>	06	B2010	-	200	300	350	350
Level 4	Exterior Wall Veneer	06	B2010.10	-	200	300	350	300
Level 4	Exterior Wall Construction	06	B2010.20	-	-	300	350	350
Level 4	Exterior Wall Interior Skin	06	B2010.30	-	-	300	350	350
Level 4	Fabricated Exterior Wall Assemblies	06	B2010.40	-	-	300	350	350

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## ANNEXURE C - 5D

INSERT PROJECT NAME AND CLIENT

Level	Element
Level 4	Parapets
Level 4	Equipment Screens
Level 4	Exterior Wall Supplementary Components
Level 4	Exterior Wall Opening Supplementary Components
Level 3	<b>Exterior Windows</b>
Level 4	Exterior Operating Windows
Level 4	Exterior Fixed Windows
Level 4	Exterior Window Wall
Level 4	Exterior Special Function Windows
Level 3	<b>Exterior Doors and Grilles</b>
Level 4	Exterior Entrance Doors
Level 4	Exterior Utility Doors
Level 4	Exterior Oversize Doors
Level 4	Exterior Special Function Doors
Level 4	Exterior Grilles
Level 4	Exterior Gates
Level 4	Exterior Door Supplementary Components
Level 3	<b>Exterior Louvers and Vents</b>
Level 4	Exterior Louvers
Level 4	Exterior Vents





# Min Modeling Requirements (USACE M3)



## ANNEXURE C - 5D Minimum Modeling Matrix

INSERT PROJECT NAME AND CLIENT

Concept Design

Schematic Design

Detailed Design

Contract Documents

Contract Administration

Level	Element	QSIID	UniFormat ID	CO	SD	DD	CD	CA
Level 3	<b>Interior Doors</b>	11	C1030	-	-	200	300	300
Level 4	Interior Swinging Doors	11	C1030.10	-	-	200	300	300
Level 4	Interior Entrance Doors	11	C1030.20	-	-	200	300	300
Level 4	Interior Sliding Doors	11	C1030.25	-	-	200	300	300
Level 4	Interior Folding Doors	11	C1030.30	-	-	200	300	300
Level 4	Interior Colling Doors	11	C1030.40	-	-	200	300	300
Level 4	Interior Panel Doors	11	C1030.50	-	-	200	300	300
Level 4	Interior Special Function Doors	11	C1030.70	-	-	200	300	300
Level 4	Interior Access Doors and Panels	11	C1030.80	-	-	200	300	300
Level 4	Interior Door Supplementary Components	11	C1030.90	-	-	200	300	300
Level 3	<b>Interior Grilles and Gates</b>	11	C1040	-	-	200	300	300
Level 4	Interior Grilles	11	C1040.10	-	-	200	300	300
Level 4	Interior Gates	11	C1040.50	-	-	200	300	300
Level 3	<b>Raised Floor Construction</b>	03	C1060	-	100	200	200	200
Level 4	Access Flooring	03	C1060.10	-	100	200	200	200
Level 4	Platform/Stage Floors	03	C1060.30	-	100	200	200	200
Level 3	<b>Suspended Ceiling Construction</b>	14	C1070	-	-	200	200	200
Level 4	Acoustical Suspended Ceilings	14	C1070.10	-	-	200	200	200
Level 4	Suspended Plaster and Gypsum Board Ceilings	14	C1070.20	-	-	200	200	200
Level 4	Specialty Suspended Ceilings	14	C1070.50	-	-	200	200	200
Level 4	Special Function Suspended Ceilings	14	C1070.70	-	-	200	200	200
Level 4	Ceiling Suspension Components	14	C1070.90	-	-	200	200	200
Level 3	<b>Interior Specialties</b>	16	C1090	-	-	200	300	300
Level 4	Interior Railings and Handrails	10	C1090.10	-	-	100	300	300
Level 4	Interior Louvers	10	C1090.15	-	-	200	300	300
Level 4	Information Specialties	16	C1090.20	-	-	100	100	100
Level 4	Compartments and Cubicles	10	C1090.25	-	-	200	200	200
Level 4	Service Walls	09	C1090.30	-	-	200	300	300
Level 4	Wall and Door Protection	15	C1090.35	-	-	100	200	200

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## ANNEXURE C - 5D Minimum Modeling Matrix

INSERT PROJECT NAME AND CLIENT

Level	Element
Level 4	Toilet, Bath, and Laundry Accessories
Level 4	Interior Gas Lighting
Level 4	Fireplaces and stoves
Level 4	Safety Specialties
Level 4	Storage Specialties
Level 4	Other Interior Specialties
Level 2	<b>INTERIOR FINISHES</b>
Level 3	<b>Wall Finishes</b>
Level 4	Tile Wall Finish
Level 4	Wall Paneling
Level 4	Wall Coverings
Level 4	Wall Carpeting
Level 4	Stone Facing
Level 4	Special Wall Surfacing
Level 4	Wall Painting and Coating
Level 4	Acoustical Wall Treatment
Level 4	Wall Finish Supplementary Components



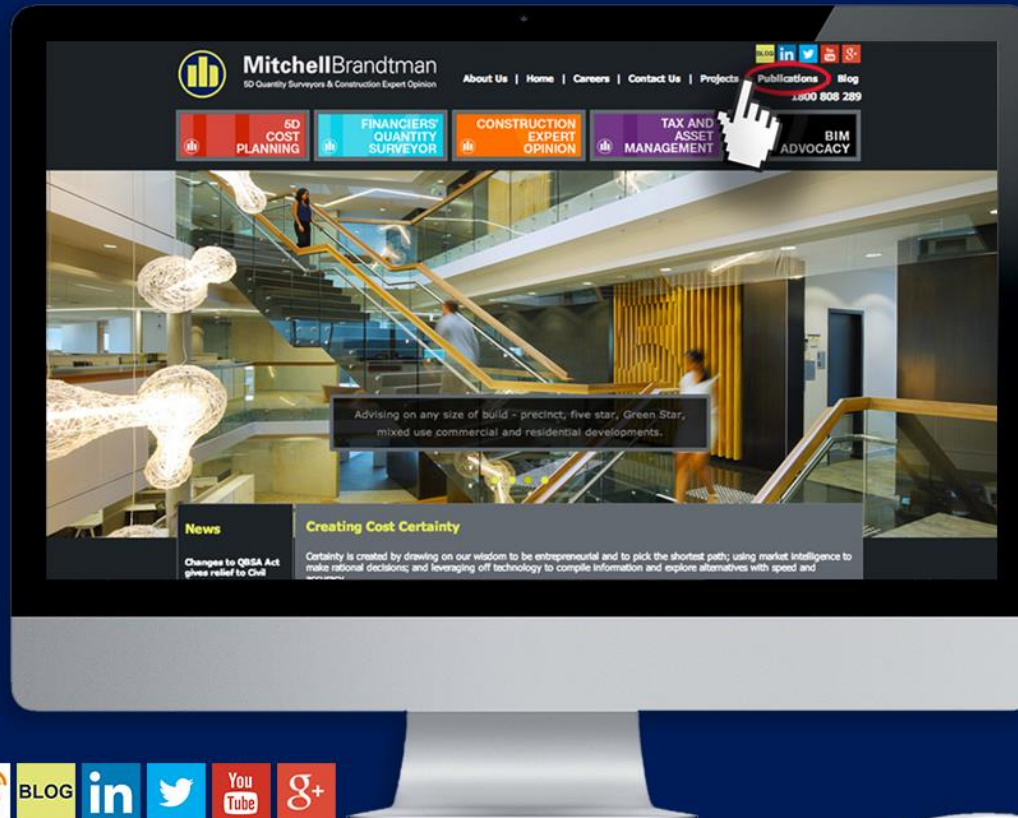
# Final Words

- **Successful 5D includes:**
  - Re-visioning
  - Give models early
  - Model the way its built
  - 5D BEP & Modeling Matrix
  
- **5D QS creates cost certainty by applying:**
  - Wisdom
  - Intelligence
  - Technology



**MitchellBrandtman**  
5D Quantity Surveyors & Construction Expert Opinion

**Thank You**



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