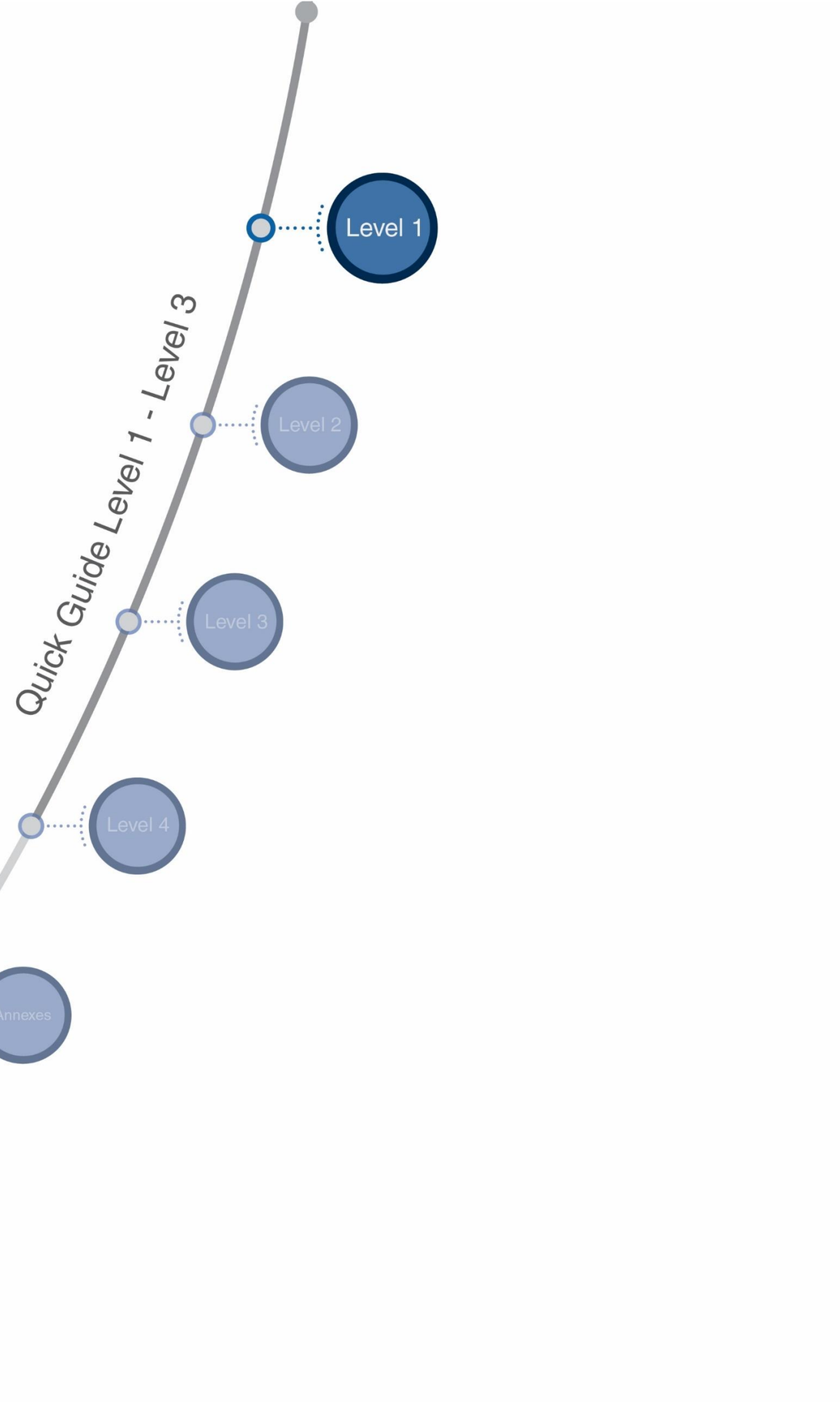
QUICK GUIDE

Level 1 -
BIM Use Overview



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Legend (1) Pre-defined Recommendation — BIM use — (2) tick if adopt

☐ 4 Visual Impact Assessment ☐ ← BIM use example

- View Corridor studies ← tasks example

Notes (1) Pre-defined Recommendation

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DCD's BIM Uses		Project Stage & Milestones					
		Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
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①	**PLANNING**						
PLANNING	**1.1 SITE ANALYSIS**						
	1.1.1 Project Feasibility Studies (PFS)	☑ 1 Project Feasibility Studies (PFS) ☐					
	1.1.2 Architectural Feasibility Studies (AFS)	☑ 2 Architectural Feasibility Studies (AFS) ☐					
	1.1.3 Planning and Engineering Study (PES)	☑ 3 Planning and Engineering Study (PES) ☐					
	1.1.4 Visual Impacts Assessment (VIA) (GIS integration)	☑ 4 Visual Impacts Assessment (VIA) (GIS Integration) ☐ - view corridor and sightline studies - ridgeline analysis	☑ 4 Visual Impacts Assessment (VIA) (GIS Integration) ☐ - view corridor and sightline studies - ridgeline analysis				
	1.1.5 Site Planning	☑ 5 Site Planning ☐ - 3D terrain & building massing					
	1.1.6 Spatial Planning	☑ 6 Spatial Planning (GIS Integration on Site Context) ☐ - connection between proposed buildings, external works, open space & landscape areas - estate wide facility management, nearby community facilities	☑ 6 Schemes Comparison ☐				
	1.2 MASTER LAYOUT STUDY						
	1.2.1 Master Layout Study	☑ 1 Master Layout Study Assisted with 3D Model ☐					

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② **DESIGN**						
2.1 ARCHITECTURAL						
2.1.1 Development Parameters	☑ 1 **Development Parameters** - conceptual mass - P.R. calculation - building height study - flat mix & efficiency - green ratio	☑ 1 **Development Parameters** - P.R. calculation - building height study - flat mix & efficiency - green ratio	☑ 1 **Development Parameters** - P.R. calculation - building height study - flat mix & efficiency - green ratio			
2.1.2 Typical Floors	☑ 2 **Typical Floors Conceptual Design** - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - design of non-standard layout (corridor, lobby, plant room,etc.)	☑ 2 **Typical Floors Scheme Design** - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - plans, sections & elevations & 3D (non-standard items) - colour scheme	☑ 2 **Typical Floors Detail Design** - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - plans, sections & elevations (non-standard items) - colour scheme - architectural schedules	☑ 2 **Typical Floors Tender** - plans, sections & elevations (modular flat items) - plans, sections & elevations (non-standard items) - colour scheme / external tile / cladding layout - architectural schedules	☑ 2 **Typical Floors Shop Drawings** - plans, sections & elevations (modular flat items) - continuous drawings update and information data input - external tile / cladding layout - architectural schedules	☑ 2 **Typical Floors As-built Drawings** - plans, sections & elevations (modular flat items) - plans, sections & elevations (non-standard items) - external tile / cladding layout - architectural schedules & O&M manual
2.1.3 Remaining Areas	☑ 3 **Remaining Areas Conceptual Design** - podium, external areas, roof, footbridges & covered walkway etc. - design of non-standard layout (corridor, lobby, plant room,etc.) - colour scheme	☑ 3 **Remaining Areas Scheme Design** - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations & 3D - colour scheme - street furniture layout & schedules	☑ 3 **Remaining Areas Detail Design** - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations - colour scheme - architectural schedules - street furniture layout & schedules	☑ 3 **Remaining Areas Tender** - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations - colour scheme / external tile / cladding layout - architectural schedules - street furniture layout & schedules	☑ 3 **Remaining Areas Shop Drawings** - podium, external areas, roof, footbridges & covered walkway etc. - continuous drawings update and information data input - external tile / cladding layout - architectural schedules	☑ 3 **Remaining Areas As-built Drawings** - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations (non-standard items) - external tile / cladding layout - architectural schedules & O&M manual - street furniture layout & schedules

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DESIGN	2.1.4	Modular Flat Assembly	☑ 4 **Modular Flat Assembly Conceptual Design**	☑ 4 **Modular Flat Assembly Scheme Design**	☑ 4 **Modular Flat Assembly Detail Design**	☑ 4 **Modular Flat Assembly Tender**	☑ 4 **Modular Flat Assembly Shop Drawings**	☑ 4 **Modular Flat Assembly as-built Drawings**
			- flat size and provision options	- flat size and provision	- flat size and provision	- architectural schedules	- architectural schedules	- architectural schedules
			- plans, sections & elevations	- plans, sections & elevations	- plans, sections & elevations	- plans, sections & elevations	- continuous drawings update and information data input	- plans, sections & elevations
			- toilets and kitchen layout	- toilets and kitchen layout	- toilets and kitchen layout	- toilets and kitchen layout	- toilet & kitchen shop drawings	- toilets and kitchen layout
				- precast façade scheme design	- precast façade detail design	- precast façade tender drawings & schedules	- precast façade shop drawings & mockup drawings	- precast façade
	2.1.5	Interior		☐ 5 **Interior Scheme Design**	☐ 5 **Interior Detail Design**	☐ 5 **Interior Design Tender**	☐ 5 **Interior Design Shop Drawings**	☐ 5 **Interior Design as-built Drawings**
				- plans and internal elevations	- plans and internal elevations	- plans and internal elevations	- Interior tile / cladding setting out	- plans and internal elevations
				- domestic lobbies, lift Interiors, etc. design options	- domestic lobbies, lift Interiors, etc.	- domestic lobbies, lift Interiors, etc.	- domestic lobbies, lift Interiors, etc.	- domestic lobbies, lift Interiors, etc.
						- Interior fitment schedules	- Interior fitment schedules	- Interior fitment schedules
	2.1.6	Hoarding		☐ 6 **Hoarding Scheme Design**	☐ 6 **Hoarding Detail Design**	☐ 6 **Hoarding Tender**	☐ 6 **Hoarding Site Works**	☐ 6 **Hoarding Record Drawings**
	2.1.7	Drainage Within Building	☐ 7 **Drainage Within Building Design Brief**	☐ 7 **Drainage Within Building**	☐ 7 **Drainage Within Building**	☐ 7 **Building Drainage Layout Tender**	☐ 7 **Building Drainage Shop Drawings**	☐ 7 **Building Drainage as-built Drawings**
			- services preliminary provision		- drainage routing in 3D	- drainage routing in 3D	- drainage routing in 3D	- drainage routing in 3D
				- drainage layout schemes	- drainage layout plan	- drainage layout plan	- drainage layout plan	- drainage layout plan
				- vertical diagram	- vertical diagram	- vertical diagram	- vertical diagram	- vertical diagram
					- drainage equipment schedules	- drainage equipment schedules	- drainage equipment schedules	- drainage equipment schedules
				- manhole & pit locations	- manhole & pit locations	- manhole & pit locations	- manhole & pit locations	- manhole & pit locations
					- pit schedules	- pit schedules	- pit schedules	
					- sanitary fitment schedules	- sanitary fitment schedules	- sanitary fitment schedules	- sanitary fitment schedules
				- interface location with drainage at external area	- interface location with drainage at external area	- interface location with drainage at external area		
	2.2	**CIVIL ENGINEERING**						
	2.2.1	Infrastructure		☑ 1 **Infrastructure Scheme Design**	☑ 1 **Infrastructure Scheme Design**	☑ 1 **Infrastructure Scheme Design**	☑ 1 **Infrastructure Design Verification**	☑ 1 **Infrastructure as-built Drawings**
				- roads & bridges layout plan and 3D	- roads & bridges layout plan and 3D	- roads & bridges layout plan and 3D	- continuous drawings update and information data input	- roads & bridges layout plan and 3D

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DESIGN						
2.2.2 Drainage at External Area		☑ 2 Drainage at External Area ☐ - interface location with drainage Within building - drainage layout plan and routing - developed level diagram	☑ 2 Drainage at External Area ☐ - interface location with drainage Within building - drainage layout plan and routing - developed level diagram - manhole and other pit schedules	☑ 2 Drainage at External Area ☐ - interface location with drainage Within building - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules	☑ 2 Underground Drainage Verification ☐ - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules	☑ 2 Underground Drainage as-built Drawings ☐ - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules
2.3 GEOTECHNICAL ENGINEERING						
2.3.1 Site Formation	☐ 1 Site Formation Concept ☐ - estimation of volume of soil cut/fill, rock excavation - cut & fill balancing, natural terrain hazards - GI (refer item 8.1.2)	☑ 1 Site Formation Scheme Design ☐ - estimation of volume of soil cut/fill, rock excavation - cut & fill balancing, natural terrain hazards - site formation plan and section - GI - slope and retaining wall scheme	☑ 1 Site Formation Detail Design ☐ - calculations of volume of soil cut/fill, rock excavation - site formation plan and section - GI - slope and retaining wall detail design	☑ 1 Site Formation Tender ☐ - site formation plan and section - GI - slope and retaining wall tender design	☑ 1 Site Formation Design Verification ☐ - continuous drawings update and information data input	☑ 1 Site Formation As-built Drawings and Records ☐ - site formation As-build drawings - slope and retaining wall as-built record
2.4 STRUCTURAL ENGINEERING						
2.4.1 Foundation	☑ 1 Foundation Conceptual Design ☐ - foundation model (base on GE's information on complex ground condition & geological profile)	☑ 1 Foundation Scheme Design ☐ - loading estimation for foundation design - preliminary foundation plan & sections, Rock Profile	☑ 1 Foundation Detail Design ☐ - Semi-Automated foundation Design (SAFD) - detail foundation plan, sections & schedules, rock profile	☑ 1 Foundation Tender ☐ - Semi-Automated foundation Design (SAFD) - foundation plan, sections & schedules, rock profile	☑ 1 Foundation Design Verification ☐ - Semi-Automated foundation Design (SAFD) (verified by in-house staff) - continuous drawings update and information data input - foundation working sequence	☑ 1 Foundation As-built Drawings and Records ☐ - foundation plan, sections, rock profile as-built drawings and schedules
2.4.2 ELS		☐ 2 ELS Scheme Design ☐ - ELS schematic plans and sections - phasing - left-in lateral support options	☐ 2 ELS Detail Design ☐ - ELS detail plans, sections & schedules - phasing - left-in lateral support detail design	☐ 2 ELS Tender ☐ - ELS plans, sections & schedules Tender - phasing - left-in Lateral support and shoring tender design	☐ 2 ELS Design Verification ☐ - continuous drawings update and information data input - ELS phasing and working sequence	☐ 2 ELS As-built Drawings and Records ☐ - left-in lateral support as-built drawings

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DESIGN	2.4.3	Superstructure	☐ 3 **Superstructure Conceptual Design** - superstructure model to illustrate the conceptual structural system	☑ 3 **Superstructure Scheme Design** - superstructure schematic framing plans and sections	☑ 3 **Superstructure Detail Design** - super-structure framing plan, sections & schedules - bi-directional linkage to structural analysis	☑ 3 **Superstructure Tender Design** - super-structure framing plan, section & schedules - bi-directional linkage to structural analysis	☑ 3 **Superstructure Design Verification** - continuous drawings update and information data input	☑ 3 **Superstructure As-built Drawings and Records** - super-structure framing plan & section
	2.4.4	Demolition		☐ 4 **Demolition Scheme Design** - phasing - working sequence - hoarding design - safety planning	☐ 4 **Demolition Detail Design** - phasing - working sequence - hoarding design - safety planning	☐ 4 **Demolition Tender** - phasing - working sequence - hoarding design - safety planning	☐ 4 **Demolition Site Works** - phasing - working sequence - hoarding design - safety planning	☐ 4 **Demolition Record Drawings** - completion handover record
	2.5	**BUILDING SERVICES ENGINEERING**						
	2.5.1	Aboveground & Building Services Design Brief	☐ 1 **Aboveground & Building Services Design Brief** - services preliminary provision - plant rooms spatial requirement					
	2.5.2	MVAC	☐ 2 **MVAC Design Brief** - services preliminary provision	☐ 2 **MVAC Scheme Design** - major routing scheme design - schematic diagram	☐ 2 **MVAC Detail Design** - routing detail design - schematic diagram - equipment & accessory schedules	☐ 2 **MVAC Tender** - routing layout in 3D - schematic diagram - equipment & accessory schedules	☐ 2 **MVAC Shop Drawing** - CSD & CBWD coordination - schematic diagram verification and update - equipment & accessory schedules	☐ 2 **MVAC As-built Drawings** - CSD & CBWD record - schematic diagram record - O&M manual
	2.5.3	MVAC Plant Room	☐ 3 **MVAC Plant Room Design Brief** - plant rooms spatial requirement	☐ 3 **MVAC Plant Room Scheme Design** - plant room size & location - layout schematics	☐ 3 **MVAC Plant Room Layout Detail Design** - plant room design (space planning) - elevation layout for wall mounted installations - equipment schedules - schematic diagram	☐ 3 **MVAC Plant Room Layout Tender** - plant room layout - elevation layout for wall mounted installations - equipment schedules - schematic diagram	☐ 3 **MVAC Plant Room Layout Shop Drawings** - plant room shop drawings - elevation layout for wall mounted installations - equipment schedules - schematic diagram verification and update	☐ 3 **MVAC Plant Room Layout as-built Record** - plant room as-built layout - plant room as-built elevations - O&M manual - schematic diagram record
	2.5.4	Electrical	☐ 4 **Electrical Design Brief** - services preliminary provision	☐ 4 **Electrical Scheme Design** - interfacing with electric company - major routing scheme design - schematic diagram	☐ 4 **Electrical Detail Design** - interfacing with electric company - routing detail design - schematic diagram - equipment & accessory schedules	☐ 4 **Electrical Tender** - interfacing with electric company - routing layout in 3D - schematic diagram - equipment & accessory schedules	☐ 4 **Electrical Shop Drawing** - interfacing with electric company - CSD & CBWD coordination - schematic diagram verification and update - equipment & accessory schedules	☐ 4 **Electrical** - interfacing with electric company - CSD & CBWD record - schematic diagram record - O&M manual

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DESIGN	2.5.5 Electrical Plant Room	☐ 5 Electrical Plant Room Design Brief	5 Electrical Plant Room Scheme Design	☐ 5 Electrical Plant Room Layout Detail Design	☐ 5 Electrical Plant Room Layout Tender	☐ 5 Electrical Plant Room Layout Shop Drawings	☐ 5 Electrical Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location	- plant room design (space planning)	- plant room layout	- plant room shop drawings	- plant room as-built layout
			- layout schematics	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- plant room as-built elevations
				- equipment schedules	- equipment schedules	- equipment schedules	- O&M manual
				- schematic diagram	- schematic diagram	- schematic diagram verification and update	- schematic diagram record
	2.5.6 Plumbing	☐ 6 Plumbing Design Brief	☐ 6 Plumbing Scheme Design	☐ 6 Plumbing Detail Design	☐ 6 Plumbing Tender	☐ 6 Plumbing	☐ 6 Plumbing
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- major routing scheme design	- routing detail design	- routing layout in 3D	- CSD & CBWD coordination	- CSD & CBWD record
			- schematic diagram	- schematic diagram	- schematic diagram	- schematic diagram verification and update	- schematic diagram record
				- equipment & accessory schedules	- equipment & accessory schedules	- equipment & accessory schedules	- O&M manual
	2.5.7 Plumbing Plant Room	☐ 7 Plumbing Plant Room Design Brief	☐ 7 Plumbing Plant Room Scheme Design	☐ 7 Plumbing Plant Room Layout Detail Design	☐ 7 Plumbing Plant Room Layout Tender	☐ 7 Plumbing Plant Room Layout Shop Drawings	☐ 7 Plumbing Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location	- plant room design (space planning)	- plant room layout	- plant room shop drawings	- plant room as-built layout
			- layout schematics	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- plant room as-built elevations
				- equipment schedules	- equipment schedules	- equipment schedules	- O&M manual
				- schematic diagram	- schematic diagram	- schematic diagram verification and update	- schematic diagram record
	2.5.8 Fire Services	☐ 8 Fire Services Design Brief	☐ 8 Fire Services Scheme Design	☐ 8 Fire Services Detail Design	☐ 8 Fire Services Tender	☐ 8 Fire Services	☐ 8 Fire Services
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- major routing scheme design	- routing detail design	- routing layout in 3D	- CSD & CBWD coordination	- CSD & CBWD record
			- schematic diagram	- schematic diagram	- schematic diagram	- schematic diagram verification	- schematic diagram record
				- equipment & accessory	- equipment & accessory	- equipment & accessory	- O&M manual
	2.5.9 Fire Services Plant Room	☐ 9 Fire Services Plant Room Design Brief	☐ 9 Fire Services Plant Room Scheme Design	☐ 9 Fire Services Plant Room Layout Detail Design	☐ 9 Fire Services Plant Room Layout Tender	☐ 9 Fire Services Plant Room Layout Shop Drawings	☐ 9 Fire Services Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location	- plant room design (Space Planning)	- plant room layout	- plant room shop drawings	- plant room as-built layout
			- layout schematics	- elevation layout for wall mounted	- elevation layout for wall mounted	- elevation layout for wall mounted	- plant room as-built elevations
				- equipment schedules	- equipment schedules	- equipment schedules	- O&M manual
				- schematic diagram	- schematic diagram	- schematic diagram verification	- schematic diagram record

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DESIGN	2.5.10 Town Gas	☐ **10 Town Gas Design Brief**	☐ **10 Town Gas**	☐ **10 Town Gas**	☐ **10 Town Gas**	☐ **10 Town Gas**	☐ **10 Town Gas**
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- schematic layout	- schematic diagram and detail layout	- schematic diagram and detail layout	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work
			- vertical diagram	- riser size	- riser arrangement	- riser arrangement	- riser arrangement
				- equipment schedule	- equipment schedule	- equipment schedule	- schematic diagram record
	2.5.11 Miscellaneous	☐ **11 Miscellaneous Design Brief**	☐ **11 Miscellaneous**	☐ **11 Miscellaneous (CCTV, Parking Provision, etc.)**	☐ **11 Miscellaneous (CCTV, Parking Provision, etc.)**	☐ **11 Miscellaneous (CCTV, Parking Provision, etc.)**	☐ **11 Miscellaneous (CCTV, Parking Provision, etc.)**
		- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV
		- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging
	2.6 LANDSCAPE						
	2.6.1 Master Layout	☐ **1 Preliminary Master Layout**	☐ **1 Preliminary Master Layout**	☐ **1 Detailed Master Layout**			
		- green ratio	- green ratio	- green ratio			
		- magnitude of influence on existing tree according to development schemes	- tree felling / transplant proposals	- tree felling / transplant proposals			
	2.6.2 Hard Landscaping		☐ **2 Hard Landscaping Scheme Design**	☐ **2 Hard Landscaping Detail Design**	☐ **2 Hard Landscaping Tender**	☐ **2 Hard Landscaping Construction**	☐ **2 Hard Landscaping as-built Record**
			- planters	- planters	- planters		- planters
	2.6.3 Soft Landscaping		☐ **3 Soft Landscaping**	☐ **3 Soft Landscape Design**	☐ **3 Soft Landscape Tender**	☐ **3 Soft Landscape Construction**	☐ **3 Soft landscape as-built Record**
			- magnitude of influence on existing tree according to development schemes	- plant layout & schedules	- plant layout & schedules	- continuous drawings update and information data input	- plant layout & schedules
			- existing tree survey				
				- customization of soft landscape library for BIM			
	2.6.4 Tree Management			☐ 4 Tree Management			
	2.7 VALUE ENGINEERING						
	2.7.1 Value Management & Design Optimization		☐ 1 Value Management & Design Optimization				

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③	**ANALYSIS & SIMULATION**						
	3.1 ENVIRONMENTAL: PASSIVE						
	3.1.1 Air Ventilation Assessment (AVA)	☐ 1 Air Ventilation Assessment (AVA) - integrated use with CFD software	☐ 1 Air Ventilation Assessment (AVA)	☐ 1 Air Ventilation Assessment (AVA)			
	3.1.2 Microclimate Studies	☐ 2 Microclimate Studies - airflow simulation & ventilation - wind environment at low level / mid level	☐ 2 Microclimate Studies (MCS) - airflow simulation & ventilation - wind environment at low level / mid level	☐ 2 BEAM PLUS Study - micro-climate study			
	3.1.3 Solar Study	☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study	☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study	☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study			
	3.1.4 Pollutants Dispersion	☐ 4 Pollutants Dispersion from RCP/JCP - under summer / annual prevailing wind					
	3.1.5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment			
	3.1.6 RTTV calculation			☐ 6 RTTV Calculation (refer to Annex 4)			
	3.2 ENERGY: ACTIVE						
	3.2.1 Lighting Analysis			☐ 1 Lighting Analysis - lighting simulation by DIALux - optimization of lighting design for energy saving			
	3.2.2 Energy Simulation	☐ 2 Energy Simulation - simulated pattern of daily cooling required - solar heat gain simulation	☐ 2 Energy Simulation - simulated pattern of daily cooling required - solar heat gain simulation	☐ 2 Energy Estimation			
	3.2.3 PV Panel Study			☐ 3 PV Panel Study (refer to Annex 5) - shading analysis - glare analysis			

ANALYSIS & SIMULATION

Q1. Quick Guide Level 1 - BIM Use Overview

Project Number: **Project Name:**

Legend (1) Pre-defined Recommendation — BIM use — (2) tick if adopt

☐ 4 Visual Impact Assessment ← BIM use example
- View Corridor studies ← tasks example

Notes (1) Pre-defined Recommendation
- ☑ - must do items (should be implemented for all projects except for special circumstances)
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(2) tick if adopt
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DCD's BIM Uses	Project Stage & Milestones					
	Inception & Feasibility	**Scheme Design**	**Detailed Design**	**Tender**	**Construction**	**Post-Completion**
	Public Consultation, DipCON, AAP, EAP, PDRC(1) & SPC	PDRC(2), SOM, BSDRP(1), BC & DDRP(1), Public Consultation	BSDRP(2), DDRP(2), Statutory Submissions	Tender, Housing Department Tender Board, Tender Committee	Contract Commencement	
④ **COST ESTIMATION (QTO)**	**Project Construction Cost Ceiling (PCCC)**	**Project Budget**	**Detailed Cost Estimate**	**Revised Project Budget**	**Cost Control, Budget Forecast & Monitoring**	
4.1.1 BIM-enabled QTO	☐ 1 Cost Budgeting - Construction Floor Area (CFA)	☐ 1 Cost Budgeting	☐ **1 BIM-enabled QTO for Estimate** - e.g. walls, floors, doors, windows, concrete (not exhaustive; project team to decide based on project need)	☐ **1 BIM-enabled QTO for Tender** - e.g. walls, floors, doors, windows, concrete (not exhaustive; project team to decide based on project need)	☐ **1 5D BIM for Construction Cash Flow Simulation**	
4.1.2 BIM QTO for Standard Modular Flats				☐ 2 BIM QTO for Standard Modular Flats		
4.1.3 Model-based QTO in ARAB Using VICO office				☐ 3 Model-based QTO in ARAB Using VICO Office		
4.1.4 5D BIM at ARAB				☐ 4 5D BIM at ARAB		
⑤ **DOCUMENTATION & PRESENTATION**						
5.1 ICU SUBMISSIONS						
5.1.1 ICU Submissions			☑ **1 Statutory (ICU) Submissions** - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions	☑ **1 Statutory (ICU) Submissions** - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions	☑ **1 Statutory (ICU) Amendment & Record Submissions** - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions	
5.2 NON-ICU SUBMISSIONS						
5.2.1 FSD Submission			☐ 1 FSD Submission			
5.2.2 WSD Plumbing Submission			☐ 2 WSD Plumbing Submission			
5.2.3 ACABUS Submission			☐ 3 ACABUS Submission			

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DOCUMENTATION & PRESENTATION						
5.3 RENDERING / ANIMATIONS / 3D PRINTING						
5.3.1 Architectural Presentation	☑ 1 Architectural Presentation - architectural concept - design visualization & presentation	☑ 1 Architectural Presentation - schematic design - public consultations & community engagement - circulation pattern at public transport interchange		☐ 1 Animation (by Tenderers) - construction planning - construction safety		
5.3.2 Geological Presentation			☐ 2 Geological - site geological model			
5.3.3 MEP Coordination			☑ 3 MEP Coordination - 3D printing for BS coordination			
⑥ **CONSTURCTION PLANNING (with Contractor)**						
CONSTURCTION PLANNING						
6.1 SITE LOGISTICS PLANNING						
6.1.1 Site Layout & Logistic Planning				☐ 1 Site Layout & Logistic Planning - 2D / 3D / 4D presentations	☑ 1 Site Layout & Logistic Planning and Coordination - produce various views from desired viewpoints - site area or space reservations - site walkways - 3D site scan	
6.1.2 Minimize Cut & fill for Site Formation Works					☐ 2 Minimize Cut & Fill for Site Formation Works	
6.1.3 Construction Lift, Material Hoist & Tower Crane Planning					☑ 3 Construction Lift, Material Hoist & Tower Crane Planning	

Q1. Quick Guide Level 1 - BIM Use Overview

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CONSTRUCTION PLANNING						
6.2 SAFETY PLANNING						
6.2.1 Site Safety Planning				☐ 1 Site Safety Planning	☑ 1 Site Safety Planning Training - risk zones related to cranes - other safety hazards e.g. cable, pipe lines excavation, asbestos	
6.2.2 Temporary Works Design					☑ 2 Temporary Works Design	
6.3 CONSTRUCTION SEQUENCE						
6.3.1 Sequencing of Works	☐ 1 Sequencing of Works (Engineering Design) - master layout model, 3D printing	☐ 1 Sequencing of Works (Engineering Design) - simulation of hoisting of footbridge		☐ 1 Method Statement (Contractor Design) - ELS sequence - demolition works sequence - Temporary works	☑ 1 Method Statement (Contractor Design) - construction planning and 4D simulation for ELS works - demolition planning and simulation of sequences of demolition - construction system design (formwork and scaffolding) - reporting project progress	
6.3.2 Animation, Design visualization and Presentation	☐ 2 Animation for DC consultation & Public Engagement - existing site contour, location, gradients and drainage patterns, access and circulation patterns, footbridge construction, traffic diversion etc.	☐ 2 Design Visualization and Presentation - animated models, fly-throughs, static 3D renderings, 4D process sequencing	☐ 2 Design Visualization and Presentation - animated models, fly-throughs, static 3D renderings, 4D process sequencing			

Q1. Quick Guide Level 1 - BIM Use Overview

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- View Corridor studies ← tasks example

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CONSTRUCTION PLANNING	**6.4 CONSTRUCTION COORDINATION**					
	6.4.1 Site Coordination: sub-structure				☐ 1 Site Coordination : Sub-structure - sub-structure up to typical floor of domestic blocks with underground services around the	
	6.4.2 Site Coordination: concealed works				☐ 2 Site Coordination: concealed works - underground cable duct / pit for utilities service, water pipe and electric cable entrance, etc. around building - concealed conduit and builder's supporting work inside service / plant rooms at G/F of domestic blocks, such as meter rooms, pump rooms, main TBE room, etc. - concealed conduit and builder's supporting work for BS installations layout of estate management office, NGO premises, etc.	
⑦	**MULTI-DISCIPINARY DESIGN COLLABORATION**					
MULTI-DISCIPINARY DESIGN COLLABORATION	**7.1 DESIGN VALIDATION**					
	7.1.1 CSD		☑ 1 CSD - at congested area & critical headroom area - discover exposed services - prevent water pipes through water sensitive rooms - maintenance space / platforms requirements - validation by partial clash detection		☑ 1 CSD - CSD shop drawings in 3D - discover exposed services - validation by full clash detection before construction	

Q1. Quick Guide Level 1 - BIM Use Overview

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MULTI-DISCIPINARY DESIGN COLLABORATION	7.1.2 CBWD			☑ 2 CBWD - services require structural openings - services through compartment or FRR walls		☑ 2 CBWD - full CBWD plans and elevations - CBWD for structural opening	
	7.1.3 Riser Design			☑ 3 Riser Design - location and size - internal arrangement - maintenance and access panel		☑ 3 Riser Design - location and size - internal arrangement - maintenance and access panel	
	7.1.4 Structural Columns and Walls Locations	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout			
	7.1.5 Headroom checking			☑ 5 Headroom Checking - working area - corridor width - staircase height		☑ 5 Headroom Checking - working area - corridor width - staircase height	
	7.1.6 Ceiling Design			☑ 6 Ceiling Design - false ceiling mounted light fittings, FS equipment coordination		☑ 6 Ceiling Design Shop Drawings - false ceiling mounted light fittings, FS equipment coordination	
⑧	**EXISTING CONDITION SURVEY & 3D SCANNING**						
EXISTING CONDITION SURVEY & 3D SCANNING	8.1 EXISTING SURVEY AND AS-BUILT 3D SCANNING VERIFICATION						
	8.1.1 Civil	☑ 1 Civil - existing road and infrastructure - existing underground drain					☑ 1 Civil - as-built road and infrastructure record - as-built underground drain record

Q1. Quick Guide Level 1 - BIM Use Overview

Project Number:

Project Name:

Legend (1) Pre-defined Recommendation | BIM use | (2) tick if adopt

☐ 4 **Visual Impact Assessment** ☐ ← BIM use example

- View Corridor studies ← tasks example

Notes (1) Pre-defined Recommendation

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DCD's BIM Uses			Project Stage & Milestones					
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EXISTING CONDITION SURVEY & 3D SCANNING	8.1.2	Ground Investigation	☑ 2 **Ground Investigation** - existing underground condition - existing borelog information					
	8.1.3	Building Structures	☑ 3 **Building Structures** - existing building structures by manual modelling				☑ 3 **Building Structures** - complex structural geometry alignment verification by laser scanning	☑ 3 **Building Structures** - complex structural geometry alignment verification by laser scanning
	8.1.4	Underground Structures	☑ 4 **Underground Structures** - existing underground structures by manual modelling					
	8.1.5	Architectural	☑ 5 **Architectural** - existing building layout by laser scanning / manual modelling					☑ 5 **Architectural** - complex architectural geometry alignment verification by laser scanning
	8.1.6	Drainage	☑ 6 **Drainage** - existing building drainage - existing external aboveground drainage				☑ 6 **Drainage** - as-built concealed drainage laser scanning	☑ 6 **Drainage** - as-built laser scanning
	8.1.7	Building Services	☑ 7 **Building Services** - existing internal building services - existing external services				☑ 7 **Building Services** - concealed services alignment laser scanning	☑ 7 **Building Services** - as-built laser scanning
	8.1.8	Tree Survey	☐ 8 **Tree Survey** - Old & Valuable Trees (OVTs)					

Q1. Quick Guide Level 1 - BIM Use Overview

Project Number: **Project Name:**

Legend (1) Pre-defined Recommendation BIM use (2) tick if adopt

☐ 4 Visual Impact Assessment ☐ ← BIM use example

- View Corridor studies ← tasks example

Notes (1) Pre-defined Recommendation

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DCD's BIM Uses		Project Stage & Milestones					
		Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
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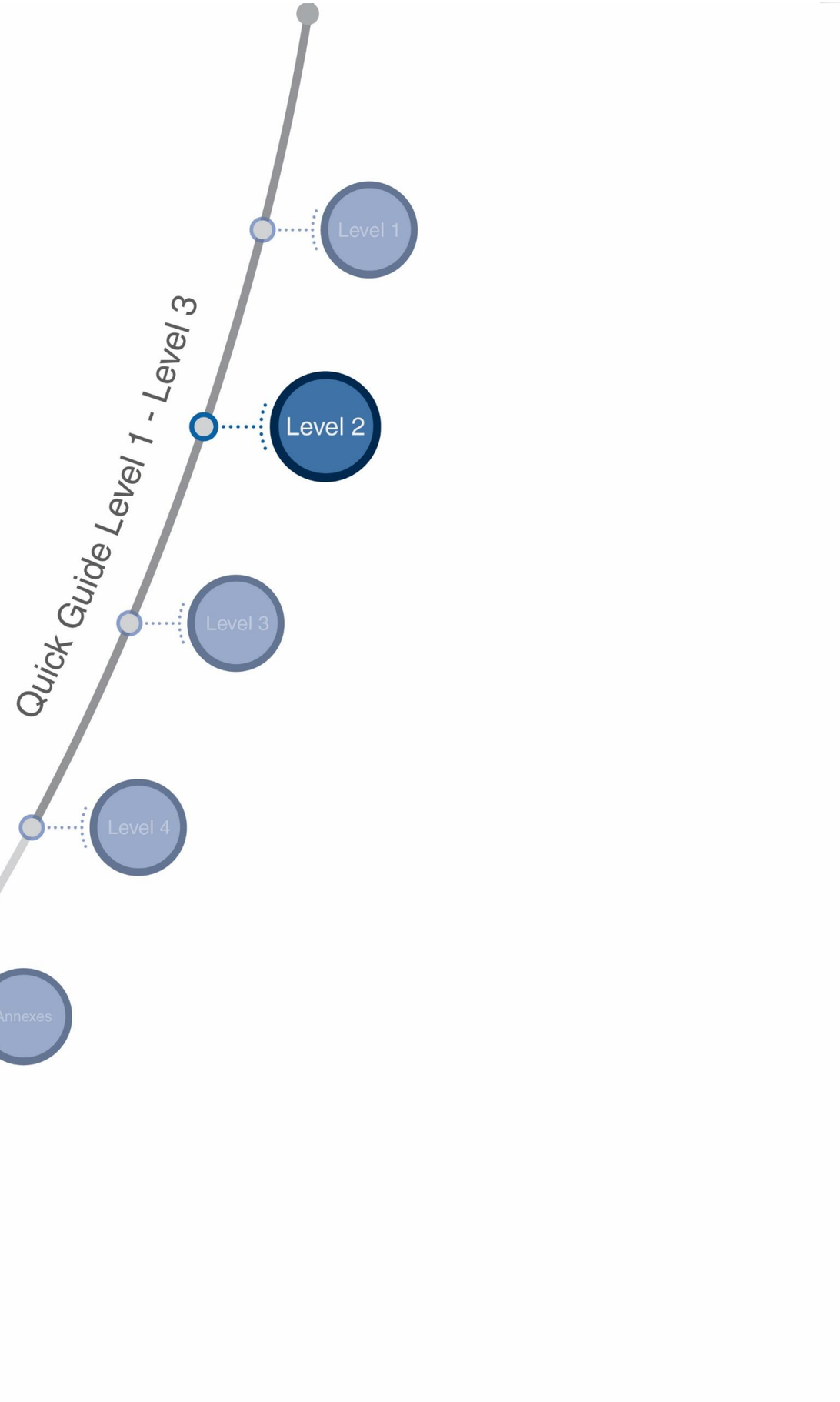
EXISTING CONDITION SURVEY & 3D SCANNING	8.1.9 Topographic	☑ 9 Topographic - topographic survey - GIS - 3D terrain by 3D site scanning (LiDAR / photogrammetry)					☑ 9 Site Formation - as-built record by 3D scanning - as-built GIS information record
	8.1.10 Surrounding context	☑ 10 Surrounding Context - 3D model from Lands - 3D site scanning (LiDAR / photogrammetry)					
	8.1.11 Underground Utilities	☑ 11 Underground Utilities - records from utility companies				☑ 11 Underground Utilities - as-built concealed services laser scanning	
	8.2 TENANCY MANAGEMENT						
	8.2.1 Space management						☐ 1 Space Management of Commercial Center and Visualization Before Bidding
	8.2.2 Space visualization						☐ 2 Visualization of Space Before Prospective Tenants Bidding
	8.2.3 Point cloud as-built survey						☐ 3 Point Cloud As-built Survey
	8.3 O&M MANUALS						
	8.3.1 Linking information & As-fitted Drawings to BIM Model						☐ 1 Linking Information & As-fitted Drawings to BIM Model - e.g. detailed shop drawings linked to balustrades - e.g. easy retrieval of glass wall information from BIM - e.g. easy retrieval of building services installations from BIM

QUICK GUIDE

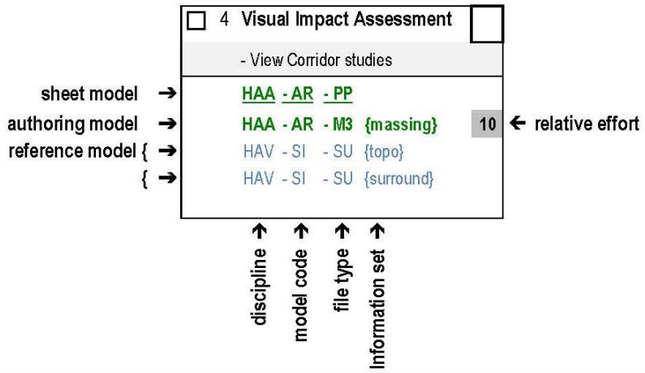
Level 2 -
BIM Application Detail



Q2 Quick Guide Level 2 – BIM Application Detail

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



Notes

sheet model	- use this file to generate the deliverables
authoring model	- concerned information should be input in this model
reference model	- other read-only BIM models required as background
discipline	- Owner, modeller and responsible for updating the BIM model - if project rely on BIM consultant, owner should be taken up by BIM consultant
model code	- name of the BIM model. Refer to file naming convention
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relative effort	- relative effort, presented in a scale from 1 (least effort) to 10 (most effort), indicated in terms of man-days necessary for this BIM application

DCD's BIM Uses		Project Stage & Milestones					
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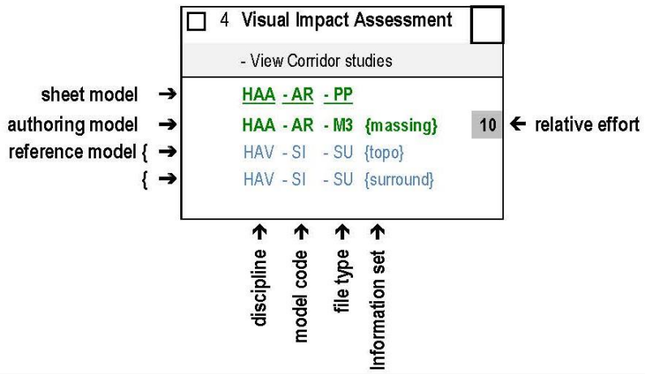
①	**PLANNING**						
PLANNING	**1.1 SITE ANALYSIS**						
	1.1.1 Project Feasibility Studies (PFS)	☑ 1 **Project Feasibility Studies (PFS)** HAA - AR - PP HAA - AR - M3 {massing} 1 HAA - SI - SU {GIS}					
	1.1.2 Architectural Feasibility Studies (AFS)	☑ 2 **Architectural Feasibility Studies (AFS)** HAA - AR - PP HAA - AR - M3 {massing} 1 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS}					
	1.1.3 Planning and Engineering Study (PES)	☑ 3 **Planning and Engineering Study (PES)** HAA - AR - PP HAA - AR - M3 {massing} 1 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS} HAB - SI - SU {UU}					

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



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PLANNING	1.1.4 Visual Impacts Assessment (VIA) (GIS integration)	☑ 4 Visual Impacts Assessment (VIA) (GIS Integration) - view corridor and sightline studies - ridgeline analysis HAA - AR - PP HAA - AR - M3 {massing} 1 HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 4 Visual Impacts Assessment (VIA) (GIS Integration) - view corridor and sightline studies - ridgeline analysis HAA - AR - PP HAA - AR - M3 {massing} 1 HAV - SI - SU {topo} HAV - SI - SU {surround}				
	1.1.5 Site Planning	☑ 5 Site Planning - 3D terrain & building massing HAA - AR - PP HAA - AR - M3 {massing} 1 HAV - SI - SU {topo} HAV - SI - SU {surround}					
	1.1.6 Spatial Planning	☑ 6 Spatial Planning (GIS Integration on Site Context) - connection between proposed buildings, external works, open space & landscape areas - estate wide facility management, nearby community facilities HAA - AR - PP HAA - AR - M3 {massing} 2 HAA - LA - M3 {hard} 2 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS} HAB - SI - SU {UU}	☑ 6 Schemes Comparison HAA - AR - PP HAA - AR - M3 {massing} 2 HAA - LA - M3 {hard} 2 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS} HAB - SI - SU {UU}				

Q2. QUICK GUIDE Level 2 - BIM Application Detail

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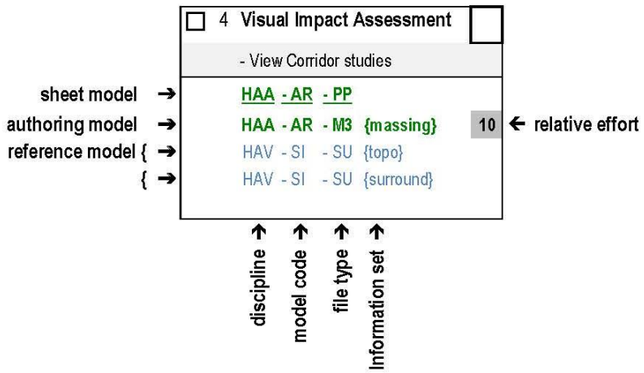

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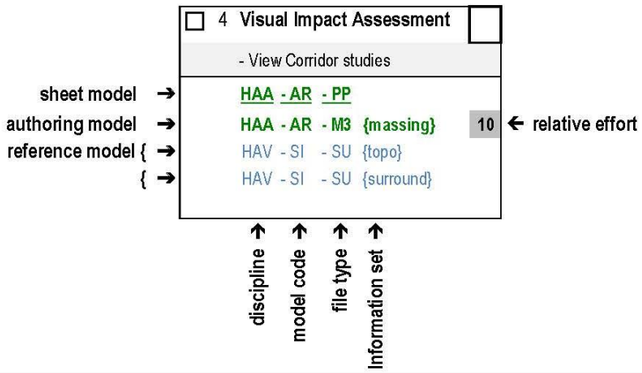
PLANNING	**1.2 MASTER LAYOUT STUDY**					
	1.2.1 Master Layout Study	☑ 1 Master Layout Study Assisted with 3D Model HAA - AR - M3 {massing} 2 HAA - LA - M3 {hard} 2 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS} HAB - SI - SU {UU}				
②	**DESIGN**					
DESIGN	**2.1 ARCHITECTURAL**					
	2.1.1 Development Parameters	☑ 1 Development Parameters - conceptual mass - P.R. calculation - building height study - flat mix & efficiency - green ratio HAA - AR - PP HAA - AR - M3 {massing} 2 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 1 Development Parameters - P.R. calculation - building height study - flat mix & efficiency - green ratio HAA - AR - PP HAA - AR - M3 {layout} 3 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 1 Development Parameters - P.R. calculation - building height study - flat mix & efficiency - green ratio HAA - AR - IC HAA - AR - M3 {layout} 3 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}		

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



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		Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
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DESIGN	2.1.2 Typical Floors	☑ 2 Typical Floors Conceptual Design - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - design of non-standard layout (corridor, lobby, plant room,etc.) HAA - AR - PP HAA - AR - M3 {massing} 3 HAA - MF - M3 {layout}	☑ 2 Typical Floors Scheme Design - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - plans, sections & elevations & 3D (non-standard items) - colour scheme HAA - AR - PP HAA - AR - M3 {layout} 4 HAA - MF - M3 {layout}	☑ 2 Typical Floors Detail Design - make use of standard modular flat from D&S to assemble block layout - project team to make adjustment to MFD if required - plans, sections & elevations (non-standard items) - colour scheme - architectural schedules HAA - AR - DR HAA - AR - M3 {layout} 5 HAA - MF - M3 {layout}	☑ 2 Typical Floors Tender - plans, sections & elevations (modular flat items) - plans, sections & elevations (non-standard items) - colour scheme / external tile / cladding layout - architectural schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout}	☑ 2 Typical Floors Shop Drawings - plans, sections & elevations (modular flat items) - continuous drawings update and information data input - external tile / cladding layout - architectural schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout}	☑ 2 Typical Floors As-built Drawings - plans, sections & elevations (modular flat items) - plans, sections & elevations (non-standard items) - external tile / cladding layout - architectural schedules & O&M manual HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout}
	2.1.3 Remaining Areas	☑ 3 Remaining Areas Conceptual Design - podium, external areas, roof, footbridges & covered walkway etc. - design of non-standard layout (corridor, lobby, plant room,etc.) - colour scheme HAA - AR - PP HAA - AR - M3 {massing} 3 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 3 Remaining Areas Scheme Design - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations & 3D - colour scheme - street furniture layout & schedules HAA - AR - PP HAA - AR - M3 {layout} 4 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 3 Remaining Areas Detail Design - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations - colour scheme - architectural schedules - street furniture layout & schedules HAA - AR - DR HAA - AR - M3 {layout} 5 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 3 Remaining Areas Tender - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations - colour scheme / external tile / cladding layout - architectural schedules - street furniture layout & schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 3 Remaining Areas Shop Drawings - podium, external areas, roof, footbridges & covered walkway etc. - continuous drawings update and information data input - external tile / cladding layout - architectural schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAL - LA - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☑ 3 Remaining Areas As-built Drawings - podium, external areas, roof, footbridges & covered walkway etc. - plans, sections & elevations (non-standard items) - external tile / cladding layout - architectural schedules & O&M manual - street furniture layout & schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAL - LA - M3 {layout} EX - SI - M3 {topo} EX - SI - M3 {surround}

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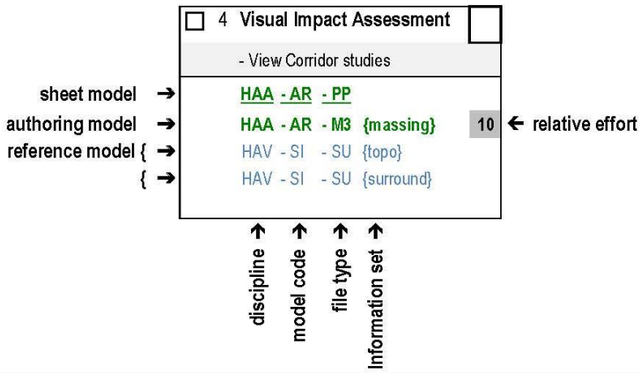

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DESIGN	2.1.4 Modular Flat Assembly	☑ 4 Modular Flat Assembly Conceptual Design - flat size and provision options - plans, sections & elevations - toilets and kitchen layout HAA - AR - PP HAA - AR - M3 {massing} 3 HAA - MF - M3 {layout} 3	☑ 4 Modular Flat Assembly Scheme Design - flat size and provision - plans, sections & elevations - toilets and kitchen layout - precast façade scheme design HAA - AR - PP HAA - AR - M3 {layout} 4 HAA - MF - M3 {layout} 4	☑ 4 Modular Flat Assembly Detail Design - flat size and provision - plans, sections & elevations - toilets and kitchen layout - precast façade detail design HAA - AR - DR HAA - AR - M3 {layout} 5 HAA - MF - M3 {layout} 5	☑ 4 Modular Flat Assembly Tender - architectural schedules - plans, sections & elevations - toilets and kitchen layout - precast façade tender drawings & schedules HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout} 6	☑ 4 Modular Flat Assembly Shop Drawings - architectural schedules - continuous drawings update and information data input - toilet & kitchen shop drawings - precast façade shop drawings & mockup drawings HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout} 6	☑ 4 Modular Flat Assembly as-built Drawings - architectural schedules - plans, sections & elevations - toilets and kitchen layout - precast façade HAA - AR - DR HAA - AR - M3 {layout} 6 HAA - MF - M3 {layout} 6
	2.1.5 Interior	☐ 5 Interior Scheme Design - plans and internal elevations - domestic lobbies, lift Interiors, etc. design options HAA - IN - PP HAA - IN - M3 {layout} 4 HAA - AR - M3 {layout}	☐ 5 Interior Detail Design - plans and internal elevations - domestic lobbies, lift Interiors, etc. HAA - IN - DR HAA - IN - M3 {layout} 5 HAA - AR - M3 {layout}	☐ 5 Interior Design Tender - plans and internal elevations - domestic lobbies, lift Interiors, etc. - Interior fitment schedules HAA - IN - DR HAA - IN - M3 {layout} 6 HAA - AR - M3 {layout}	☐ 5 Interior Design Shop Drawings - Interior tile / cladding setting out - domestic lobbies, lift Interiors, etc. - Interior fitment schedules HAA - IN - DR HAA - IN - M3 {layout} 6 HAA - AR - M3 {layout}	☐ 5 Interior Design as-built Drawings - plans and internal elevations - domestic lobbies, lift Interiors, etc. - Interior fitment schedules HAA - IN - DR HAA - IN - M3 {layout} 6 HAA - AR - M3 {layout}
	2.1.6 Hoarding	☐ 6 Hoarding Scheme Design HAA - SI - DR HAA - SI - M3 {hoarding} 2 HAS - SS - SU {layout} HAV - SI - SU {topo}	☐ 6 Hoarding Detail Design HAA - SI - DR HAS - SI - M3 {hoarding} 3 HAS - SS - SU {layout} HAV - SI - SU {topo}	☐ 6 Hoarding Tender HAA - SI - DR HAS - SS - SU {hoarding} 3 HAS - SS - SU {layout} HAV - SI - SU {topo}	☐ 6 Hoarding Site Works HAA - SI - DR HAS - SS - SU {hoarding} 3 HAS - SS - SU {layout} HAV - SI - SU {topo}	☐ 6 Hoarding Record Drawings HAA - SI - DR HAS - SS - SU {hoarding} 1 HAS - SS - SU {layout} HAV - SI - SU {topo}	

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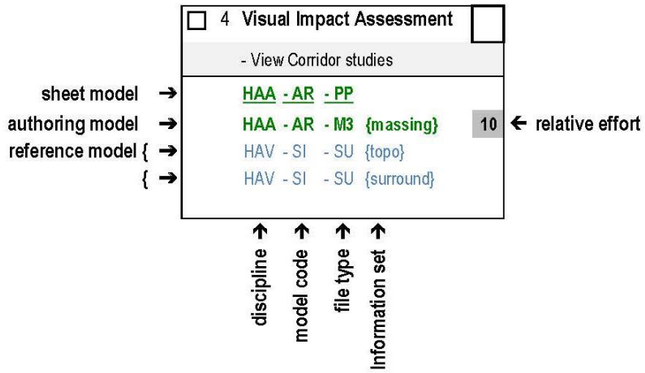

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DESIGN	2.1.7 Drainage Within Building	☐ 7 Drainage Within Building Design Brief - services preliminary provision	☐ 7 Drainage Within Building - drainage layout schemes - vertical diagram - manhole & pit locations - interface location with drainage at external area HAA - DD - PP HAA - DD - M3 {layout} 4 HAA - DD - M3 {VD} 4 HAA - AR - M3 {layout} HAA - MF - M3 {drainage} HAL - LA - M3 {blg_green} HAC - SI - M3 {drainage}	☐ 7 Drainage Within Building - drainage routing in 3D - drainage layout plan - vertical diagram - drainage equipment schedules - manhole & pit locations - pit schedules - sanitary fitment schedules - interface location with drainage at external area HAA - DD - PP HAA - DD - M3 {layout} 7 HAA - DD - M3 {VD} 7 HAA - AR - M3 {layout} HAA - MF - M3 {drainage} HAL - LA - M3 {blg_green} HAC - SI - M3 {drainage}	☐ 7 Building Drainage Layout Tender - drainage routing in 3D - drainage layout plan - vertical diagram - drainage equipment schedules - manhole & pit locations - pit schedules - sanitary fitment schedules - interface location with drainage at external area HAA - DD - PP HAA - DD - M3 {layout} 8 HAA - DD - M3 {VD} 8 HAA - AR - M3 {layout} HAA - MF - M3 {drainage} HAL - LA - M3 {blg_green} HAC - SI - M3 {drainage}	☐ 7 Building Drainage Shop Drawings - drainage routing in 3D - drainage layout plan - vertical diagram - drainage equipment schedules - manhole & pit locations - pit schedules - sanitary fitment schedules HAA - DD - PP HAA - DD - M3 {layout} 10 HAA - DD - M3 {VD} 10 HAA - AR - M3 {layout} HAA - MF - M3 {drainage} HAL - LA - M3 {blg_green} HAC - SI - M3 {drainage}	☐ 7 Building Drainage as-built Drawings - drainage routing in 3D - drainage layout plan - vertical diagram - drainage equipment schedules - manhole & pit locations - sanitary fitment schedules HAA - DD - PP HAA - DD - M3 {layout} 9 HAA - DD - M3 {VD} 9 HAA - AR - M3 {layout} HAA - MF - M3 {drainage} HAL - LA - M3 {blg_green} HAC - SI - M3 {drainage}
	2.2 CIVIL ENGINEERING						
	2.2.1 Infrastructure		☑ 1 Infrastructure Scheme Design - roads & bridges layout plan and 3D HAC - SI - DR HAC - SI - M3 {layout} 3 HAA - SI - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {GIS}	☑ 1 Infrastructure Scheme Design - roads & bridges layout plan and 3D HAC - SI - DR HAC - SI - M3 {layout} 4 HAA - SI - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {GIS}	☑ 1 Infrastructure Scheme Design - roads & bridges layout plan and 3D HAC - SI - DR HAC - SI - M3 {layout} 5 HAA - SI - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {GIS}	☑ 1 Infrastructure Design Verification - continuous drawings update and information data input HAC - SI - DR HAC - SI - M3 {layout} 4 HAA - SI - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {GIS}	☑ 1 Infrastructure as-built Drawings - roads & bridges layout plan and 3D HAC - SI - DR HAC - SI - M3 {layout} 4 HAA - SI - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {GIS}

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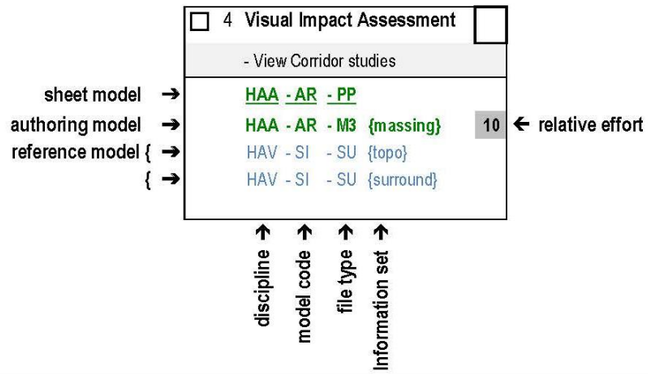

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DESIGN	2.2.2 Drainage at External Area		☑ 2 Drainage at External Area - interface location with drainage Within building - drainage layout plan and routing - developed level diagram HAC - SI - DR HAC - SI - M3 {drainage} 4 HAC - SI - M3 {VD} 4 HAA - DD - M3 {layout} HAA - DD - M3 {VD} HAL - SI - M3 {layout} HAC - SI - SU {drainage} HAV - SI - SU {topo}	☑ 2 Drainage at External Area - interface location with drainage Within building - drainage layout plan and routing - developed level diagram - manhole and other pit schedules HAC - SI - DR HAC - SI - M3 {drainage} 7 HAC - SI - M3 {VD} 7 HAA - DD - M3 {layout} HAA - DD - M3 {VD} HAL - SI - M3 {layout} HAC - SI - SU {drainage} HAV - SI - SU {topo}	☑ 2 Drainage at External Area - interface location with drainage Within building - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules HAC - SI - DR HAC - SI - M3 {drainage} 8 HAC - SI - M3 {VD} 8 HAA - DD - M3 {layout} HAA - DD - M3 {VD} HAL - SI - M3 {layout} HAC - SI - SU {drainage} HAV - SI - SU {topo}	☑ 2 Underground Drainage Verification - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules HAC - SI - DR HAC - SI - M3 {drainage} 10 HAC - SI - M3 {VD} 10 HAA - DD - M3 {layout} HAA - DD - M3 {VD} HAL - SI - M3 {layout} HAC - SI - SU {drainage} HAV - SI - SU {topo}	☑ 2 Underground Drainage as-built Drawings - drainage layout plan and routing in 3D - developed level diagram - manhole and other pit schedules HAC - SI - DR HAC - SI - M3 {drainage} 9 HAC - SI - M3 {VD} 9 HAA - DD - M3 {layout} HAA - DD - M3 {VD} HAL - SI - M3 {layout} HAC - SI - SU {drainage} HAV - SI - SU {topo}
	2.3 GEOTECHNICAL ENGINEERING						
	2.3.1 Site Formation	☐ 1 Site Formation Concept - estimation of volume of soil cut/fill, rock excavation - cut & fill balancing, natural terrain hazards - GI (refer item 8.1.2) HAG - SI - DR HAG - SI - M3 {SF} 2 HAA - SI - M3 {layout} HAV - SI - SU {topo}	☑ 1 Site Formation Scheme Design - estimation of volume of soil cut/fill, rock excavation - cut & fill balancing, natural terrain hazards - site formation plan and section - GI - slope and retaining wall scheme HAG - SI - DR HAG - SI - M3 {SF} 3 HAA - SI - M3 {layout} HAV - SI - SU {topo}	☑ 1 Site Formation Detail Design - calculations of volume of soil cut/fill, rock excavation - site formation plan and section - GI - slope and retaining wall detail design HAG - SI - DR HAG - SI - M3 {SF} 4 HAA - SI - M3 {layout} HAV - SI - SU {topo}	☑ 1 Site Formation Tender - site formation plan and section - GI - slope and retaining wall tender design HAG - SI - DR HAG - SI - M3 {SF} 5 HAA - SI - M3 {layout} HAV - SI - SU {topo}	☑ 1 Site Formation Design Verification - continuous drawings update and information data input HAG - SI - DR HAG - SI - M3 {SF} 4 HAA - SI - M3 {layout} HAV - SI - SU {topo}	☑ 1 Site Formation As-built Drawings and Records - site formation As-build drawings - slope and retaining wall as-built record HAG - SI - DR HAG - SI - M3 {SF} 4 HAV - SI - SU {topo}

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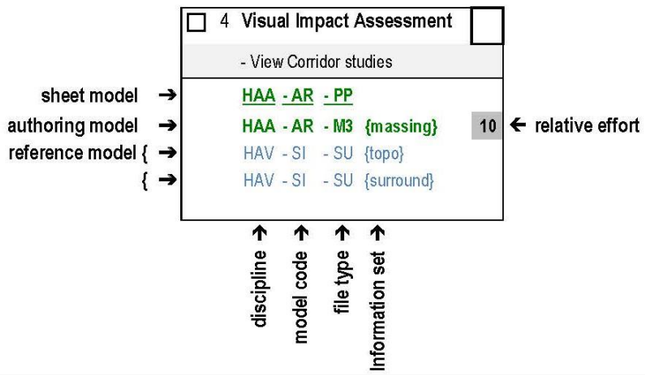

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DESIGN	**2.4 STRUCTURAL ENGINEERING**					
2.4.1 Foundation	☑ 1 **Foundation Conceptual Design** - foundation model (base on GE's information on complex ground condition & geological profile) **HAS - FD - DR** **HAS - FD - M3 {layout}** 2 HAA - AR - M3 {massing} HAG - SI - SU {GI} HAG - SI - M3 {SF} HAV - SI - SU {topo}	☑ 1 **Foundation Scheme Design** - loading estimation for foundation design - preliminary foundation plan & sections, Rock Profile **HAS - FD - DR** **HAS - FD - M3 {layout}** 3 HAA - AR - M3 {layout} HAG - SI - SU {GI} HAG - SI - M3 {SF}	☑ 1 **Foundation Detail Design** - Semi-Automated foundation Design (SAFD) - detail foundation plan, sections & schedules, rock profile **HAS - FD - DR** **HAS - FD - M3 {layout}** 4 HAA - AR - M3 {layout} HAG - SI - SU {GI} HAG - SI - M3 {SF}	☑ 1 **Foundation Tender** - Semi-Automated foundation Design (SAFD) - foundation plan, sections & schedules, rock profile **HAS - FD - DR** **HAS - FD - M3 {layout}** 5 HAA - AR - M3 {layout} HAG - SI - SU {GI} HAG - SI - M3 {SF}	☑ 1 **Foundation Design Verification** - Semi-Automated foundation Design (SAFD) (verified by in-house staff) - continuous drawings update and information data input - foundation working sequence **HAS - FD - DR** **HAS - FD - M3 {layout}** 4 HAA - AR - M3 {layout} HAG - SI - SU {GI} HAG - SI - M3 {SF}	☑ 1 **Foundation As-built Drawings and Records** - foundation plan, sections, rock profile as-built drawings and schedules **HAS - FD - DR** **HAS - FD - M3 {layout}** 4 HAA - AR - M3 {layout} HAG - SI - SU {GI} HAG - SI - M3 {SF}
2.4.2 ELS	☐ 2 **ELS Scheme Design** - ELS schematic plans and sections - phasing - left-in lateral support options **HAS - LS - DR** **HAS - LS - M3 {layout}** 3 HAS - FD - M3 {layout} HAA - AR - M3 {layout} HAG - SI - M3 {SF}	☐ 2 **ELS Detail Design** - ELS detail plans, sections & schedules - phasing - left-in lateral support detail design **HAS - LS - DR** **HAS - LS - M3 {layout}** 4 HAS - FD - M3 {layout} HAA - AR - M3 {layout} HAG - SI - M3 {SF}	☐ 2 **ELS Tender** - ELS plans, sections & schedules Tender - phasing - left-in Lateral support and shoring tender design **HAS - LS - DR** **HAS - LS - M3 {layout}** 5 HAS - FD - M3 {layout} HAA - AR - M3 {layout} HAG - SI - M3 {SF}	☐ 2 **ELS Design Verification** - continuous drawings update and information data input - ELS phasing and working sequence **HAS - LS - DR** **HAS - LS - M3 {layout}** 4 HAS - FD - M3 {layout} HAA - AR - M3 {layout} HAG - SI - M3 {SF}	☐ 2 **ELS As-built Drawings and Records** - left-in lateral support as-built drawings **HAS - LS - DR** **HAS - LS - M3 {layout}** 4 HAS - FD - M3 {layout} HAA - AR - M3 {layout}

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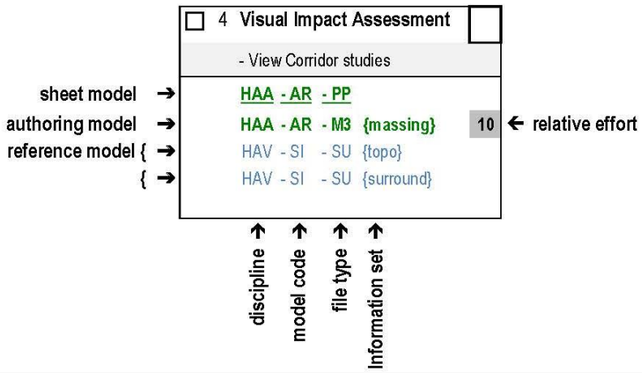

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DESIGN	2.4.3 Superstructure	☐ 3 Superstructure Conceptual Design - superstructure model to illustrate the conceptual structural system HAS - SS - DR HAS - SS - M3 {layout} 2 HAA - AR - M3 {layout}	☑ 3 Superstructure Scheme Design - superstructure schematic framing plans and sections HAS - SS - DR HAS - SS - M3 {layout} 3 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAB - BS - M3 {{layout}}	☑ 3 Superstructure Detail Design - super-structure framing plan, sections & schedules - bi-directional linkage to structural analysis HAS - SS - DR HAS - SS - M3 {layout} 4 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAB - BS - M3 {{layout}}	☑ 3 Superstructure Tender Design - super-structure framing plan, section & schedules - bi-directional linkage to structural analysis HAS - SS - DR HAS - SS - M3 {layout} 5 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAB - BS - M3 {{layout}}	☑ 3 Superstructure Design Verification - continuous drawings update and information data input HAS - SS - DR HAS - SS - M3 {layout} 5 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAB - BS - M3 {{layout}}	☑ 3 Superstructure As-built Drawings and Records - super-structure framing plan & section HAS - SS - DR HAS - SS - M3 {layout} 5 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAB - BS - M3 {{layout}}
	2.4.4 Demolition		☐ 4 Demolition Scheme Design - phasing - working sequence - hoarding design - safety planning HAS - SI - DR HAS - SS - SU {layout} 2 HAA - SI - M3 {hoarding} HAV - SI - SU {topo}	☐ 4 Demolition Detail Design - phasing - working sequence - hoarding design - safety planning HAS - SI - DR HAS - SS - SU {layout} 3 HAA - SI - M3 {hoarding} HAV - SI - SU {topo}	☐ 4 Demolition Tender - phasing - working sequence - hoarding design - safety planning HAS - SI - DR HAS - SS - SU {layout} 3 HAA - SI - M3 {hoarding} HAV - SI - SU {topo}	☐ 4 Demolition Site Works - phasing - working sequence - hoarding design - safety planning HAS - SI - DR HAS - SS - SU {layout} 3 HAA - SI - M3 {hoarding} HAV - SI - SU {topo}	☐ 4 Demolition Record Drawings - completion handover record HAS - SI - DR HAS - SS - SU {layout} 1 HAA - SI - M3 {hoarding} HAV - SI - SU {topo}
	2.5 BUILDING SERVICES ENGINEERING						
	2.5.1 Aboveground & Building Services Design Brief	☐ 1 Aboveground & Building Services Design Brief - services preliminary provision - plant rooms spatial requirement					

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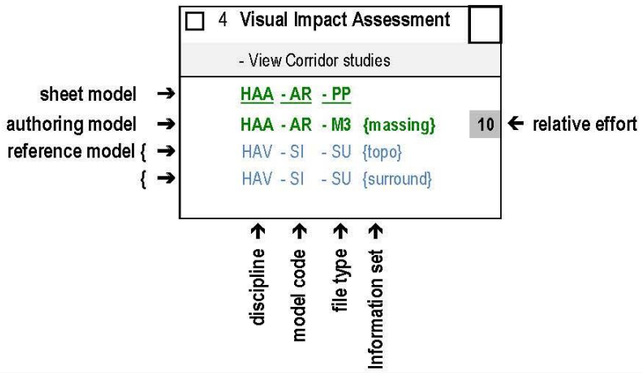

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DCD's BIM Uses		Project Stage & Milestones					
		Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
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DESIGN	2.5.2 MVAC	☐ 2 MVAC Design Brief	☐ 2 MVAC Scheme Design	☐ 2 MVAC Detail Design	☐ 2 MVAC Tender	☐ 2 MVAC Shop Drawing	☐ 2 MVAC As-built Drawings
		- services preliminary provision	- major routing scheme design - schematic diagram	- routing detail design - schematic diagram - equipment & accessory schedules	- routing layout in 3D - schematic diagram - equipment & accessory schedules	- CSD & CBWD coordination - schematic diagram verification and update - equipment & accessory schedules	- CSD & CBWD record - schematic diagram record - O&M manual
			HAB - MV - DR HAB - MV - M3 {layout} 4 HAB - MV - M3 {VD} 4 HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 7 HAB - MV - M3 {VD} 7 HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 8 HAB - MV - M3 {VD} 8 HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 10 HAB - MV - M3 {VD} 10 HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 9 HAB - MV - M3 {VD} 9 HAA - AR - M3 {layout}
	2.5.3 MVAC Plant Room	☐ 3 MVAC Plant Room Design Brief	☐ 3 MVAC Plant Room Scheme Design	☐ 3 MVAC Plant Room Layout Detail Design	☐ 3 MVAC Plant Room Layout Tender	☐ 3 MVAC Plant Room Layout Shop Drawings	☐ 3 MVAC Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location - layout schematics	- plant room design (space planning) - elevation layout for wall mounted installations - equipment schedules - schematic diagram	- plant room layout - elevation layout for wall mounted installations - equipment schedules - schematic diagram	- plant room shop drawings - elevation layout for wall mounted installations - equipment schedules - schematic diagram verification and update	- plant room as-built layout - plant room as-built elevations - O&M manual - schematic diagram record
			HAB - MV - DR HAB - MV - M3 {layout} 3 HAB - MV - M3 {VD} HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 7 HAB - MV - M3 {VD} HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 8 HAB - MV - M3 {VD} HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 10 HAB - MV - M3 {VD} HAA - AR - M3 {layout}	HAB - MV - DR HAB - MV - M3 {layout} 9 HAB - MV - M3 {VD} HAA - AR - M3 {layout}

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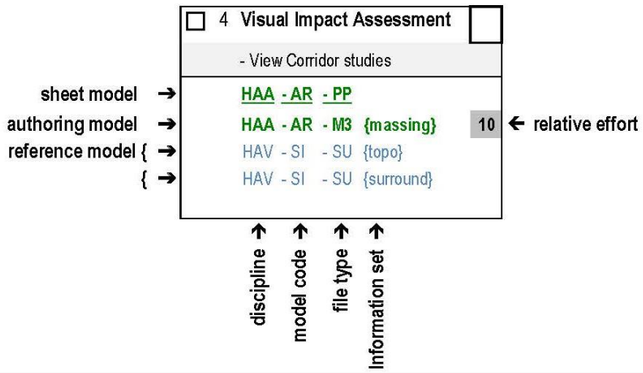

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DESIGN	2.5.4 Electrical	☐ 4 Electrical Design Brief - services preliminary provision	☐ 4 Electrical Scheme Design - interfacing with electric company - major routing scheme design - schematic diagram HAB - EE - DR HAB - EE - M3 {layout} 4 HAB - EE - M3 {VD} 4 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	☐ 4 Electrical Detail Design - interfacing with electric company - routing detail design - schematic diagram - equipment & accessory schedules HAB - EE - DR HAB - EE - M3 {layout} 7 HAB - EE - M3 {VD} 7 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	☐ 4 Electrical Tender - interfacing with electric company - routing layout in 3D - schematic diagram - equipment & accessory schedules HAB - EE - DR HAB - EE - M3 {layout} 8 HAB - EE - M3 {VD} 8 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	☐ 4 Electrical Shop Drawing - interfacing with electric company - CSD & CBWD coordination - schematic diagram verification and update - equipment & accessory schedules HAB - EE - DR HAB - EE - M3 {layout} 10 HAB - EE - M3 {VD} 10 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	☐ 4 Electrical - interfacing with electric company - CSD & CBWD record - schematic diagram record - O&M manual HAB - EE - DR HAB - EE - M3 {layout} 9 HAB - EE - M3 {VD} 9 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}
	2.5.5 Electrical Plant Room	☐ 5 Electrical Plant Room Design Brief - plant rooms spatial requirement	5 Electrical Plant Room Scheme Design - plant room size & location - layout schematics HAB - EE - DR HAB - EE - M3 {layout} 3 HAB - EE - M3 {VD} HAA - AR - M3 {layout}	☐ 5 Electrical Plant Room Layout Detail Design - plant room design (space planning) - elevation layout for wall mounted installations - equipment schedules - schematic diagram HAB - EE - DR HAB - EE - M3 {layout} 7 HAB - EE - M3 {VD} HAA - AR - M3 {layout}	☐ 5 Electrical Plant Room Layout Tender - plant room layout - elevation layout for wall mounted installations - equipment schedules - schematic diagram HAB - EE - DR HAB - EE - M3 {layout} 8 HAB - EE - M3 {VD} HAA - AR - M3 {layout}	☐ 5 Electrical Plant Room Layout Shop Drawings - plant room shop drawings - elevation layout for wall mounted installations - equipment schedules - schematic diagram verification and update HAB - EE - DR HAB - EE - M3 {layout} 10 HAB - EE - M3 {VD} HAA - AR - M3 {layout}	☐ 5 Electrical Plant Room Layout as-built Record - plant room as-built layout - plant room as-built elevations - O&M manual - schematic diagram record HAB - EE - DR HAB - EE - M3 {layout} 9 HAB - EE - M3 {VD} HAA - AR - M3 {layout}

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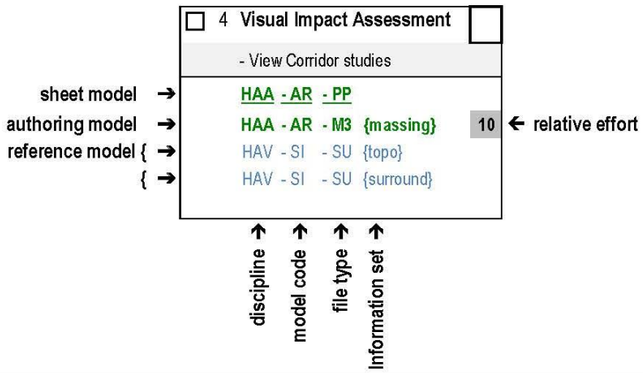

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DESIGN	2.5.6 Plumbing	☐ 6 Plumbing Design Brief	☐ 6 Plumbing Scheme Design	☐ 6 Plumbing Detail Design	☐ 6 Plumbing Tender	☐ 6 Plumbing	☐ 6 Plumbing
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- major routing scheme design	- routing detail design	- routing layout in 3D	- CSD & CBWD coordination	- CSD & CBWD record
			- schematic diagram	- schematic diagram	- schematic diagram	- schematic diagram verification and update	- schematic diagram record
				- equipment & accessory schedules	- equipment & accessory schedules	- equipment & accessory schedules	- O&M manual
		HAB - PB - DR HAB - PB - M3 {layout} 4 HAB - PB - M3 {VD} 4 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 7 HAB - PB - M3 {VD} 7 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 8 HAB - PB - M3 {VD} 8 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 10 HAB - PB - M3 {VD} 10 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 9 HAB - PB - M3 {VD} 9 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAL - LA - M3 {blg_green} HAL - SI - M3 {layout}
	2.5.7 Plumbing Plant Room	☐ 7 Plumbing Plant Room Design Brief	☐ 7 Plumbing Plant Room Scheme Design	☐ 7 Plumbing Plant Room Layout Detail Design	☐ 7 Plumbing Plant Room Layout Tender	☐ 7 Plumbing Plant Room Layout Shop Drawings	☐ 7 Plumbing Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location	- plant room design (space planning)	- plant room layout	- plant room shop drawings	- plant room as-built layout
			- layout schematics	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- elevation layout for wall mounted installations	- plant room as-built elevations
				- equipment schedules	- equipment schedules	- equipment schedules	- O&M manual
				- schematic diagram	- schematic diagram	- schematic diagram verification and update	- schematic diagram record
		HAB - PB - DR HAB - PB - M3 {layout} 3 HAB - PB - M3 {VD} HAA - AR - M3 {layout}		HAB - PB - DR HAB - PB - M3 {layout} 7 HAB - PB - M3 {VD} HAA - AR - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 8 HAB - PB - M3 {VD} HAA - AR - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 10 HAB - PB - M3 {VD} HAA - AR - M3 {layout}	HAB - PB - DR HAB - PB - M3 {layout} 9 HAB - PB - M3 {VD} HAA - AR - M3 {layout}

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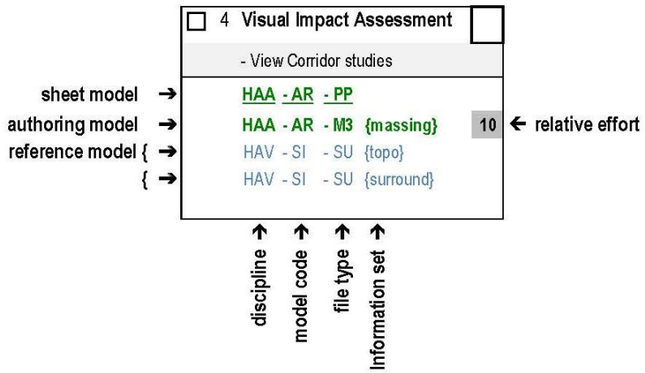

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DESIGN	2.5.8 Fire Services	☐ 8 Fire Services Design Brief	☐ 8 Fire Services Scheme Design	☐ 8 Fire Services Detail Design	☐ 8 Fire Services Tender	☐ 8 Fire Services	☐ 8 Fire Services
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- major routing scheme design	- routing detail design	- routing layout in 3D	- CSD & CBWD coordination	- CSD & CBWD record
			- schematic diagram	- schematic diagram	- schematic diagram	- schematic diagram verification	- schematic diagram record
				- equipment & accessory	- equipment & accessory	- equipment & accessory	- O&M manual
			HAB - FS - DR	HAB - FS - DR	HAB - FS - DR	HAB - FS - DR	HAB - FS - DR
			HAB - FS - M3 {layout} 4	HAB - FS - M3 {layout} 7	HAB - FS - M3 {layout} 8	HAB - FS - M3 {layout} 10	HAB - FS - M3 {layout} 9
			HAB - FS - M3 {VD} 4	HAB - FS - M3 {VD} 7	HAB - FS - M3 {VD} 8	HAB - FS - M3 {VD} 10	HAB - FS - M3 {VD} 9
			HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}
			HAA - MF - M3 {layout}	HAA - MF - M3 {layout}	HAA - MF - M3 {layout}	HAA - MF - M3 {layout}	HAA - MF - M3 {layout}
			HAA - SI - M3 {layout}	HAA - SI - M3 {layout}	HAA - SI - M3 {layout}	HAA - SI - M3 {layout}	HAA - SI - M3 {layout}
			HAL - LA - M3 {blg_green}	HAL - LA - M3 {blg_green}	HAL - LA - M3 {blg_green}	HAL - LA - M3 {blg_green}	HAL - LA - M3 {blg_green}
			HAL - SI - M3 {layout}	HAL - SI - M3 {layout}	HAL - SI - M3 {layout}	HAL - SI - M3 {layout}	HAL - SI - M3 {layout}
	2.5.9 Fire Services Plant Room	☐ 9 Fire Services Plant Room Design Brief	☐ 9 Fire Services Plant Room Scheme Design	☐ 9 Fire Services Plant Room Layout Detail Design	☐ 9 Fire Services Plant Room Layout Tender	☐ 9 Fire Services Plant Room Layout Shop Drawings	☐ 9 Fire Services Plant Room Layout as-built Record
		- plant rooms spatial requirement	- plant room size & location	- plant room design (Space Planning)	- plant room layout	- plant room shop drawings	- plant room as-built layout
			- layout schematics	- elevation layout for wall mounted	- elevation layout for wall mounted	- elevation layout for wall mounted	- plant room as-built elevations
				- equipment schedules	- equipment schedules	- equipment schedules	- O&M manual
				- schematic diagram	- schematic diagram	- schematic diagram verification	- schematic diagram record
			HAB - FS - DR	HAB - FS - DR	HAB - FS - DR	HAB - FS - DR	HAB - FS - DR
			HAB - FS - M3 {layout} 3	HAB - FS - M3 {layout} 7	HAB - FS - M3 {layout} 8	HAB - FS - M3 {layout} 10	HAB - FS - M3 {layout} 9
			HAB - FS - M3 {VD}	HAB - FS - M3 {VD}	HAB - FS - M3 {VD}	HAB - FS - M3 {VD}	HAB - FS - M3 {VD}
			HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}	HAA - AR - M3 {layout}

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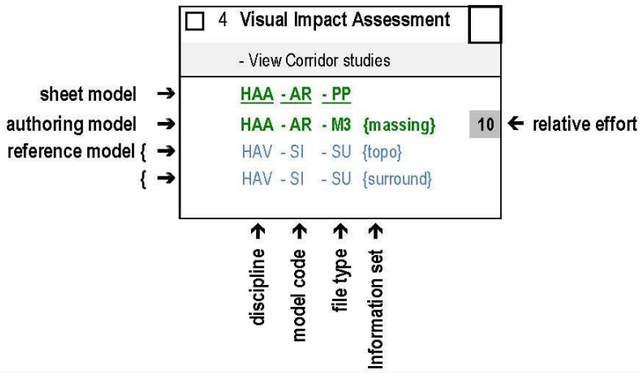

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DESIGN	2.5.10 Town Gas	☐ 10 Town Gas Design Brief	☐ 10 Town Gas	☐ 10 Town Gas	☐ 10 Town Gas	☐ 10 Town Gas	☐ 10 Town Gas
		- services preliminary provision	- interfacing with public mains	- interfacing with public mains	- interfacing with public mains	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work and related underground conditions
			- schematic layout	- schematic diagram and detail layout	- schematic diagram and detail layout	- on-site coordination and design verification, and continuous drawings update	- as-built record for new services, builder's work
			- vertical diagram	- riser size	- riser arrangement	- riser arrangement	- riser arrangement
				- equipment schedule	- equipment schedule	- equipment schedule	- schematic diagram record
		HAB - TG - DR HAB - TG - M3 {layout} 3 HAB - TG - M3 {VD} 3 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout}	HAB - TG - DR HAB - TG - M3 {layout} 7 HAB - TG - M3 {VD} 7 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout}	HAB - TG - DR HAB - TG - M3 {layout} 7 HAB - TG - M3 {VD} 7 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout}	HAB - TG - DR HAB - TG - M3 {layout} 8 HAB - TG - M3 {VD} 8 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout}	HAB - TG - DR HAB - TG - M3 {layout} 4 HAB - TG - M3 {VD} 9 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout}
	2.5.11 Miscellaneous	☐ 11 Miscellaneous Design Brief	☐ 11 Miscellaneous	☐ 11 Miscellaneous (CCTV, Parking Provision, etc.)	☐ 11 Miscellaneous (CCTV, Parking Provision, etc.)	☐ 11 Miscellaneous (CCTV, Parking Provision, etc.)	☐ 11 Miscellaneous (CCTV, Parking Provision, etc.)
		- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV	- security, CCTV
		- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging	- parking provision, e.g. drop bars, EV charging
		HAB - MI - DR HAB - MI - M3 {layout} 3 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	HAB - MI - DR HAB - MI - M3 {layout} 6 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	HAB - MI - DR HAB - MI - M3 {layout} 7 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	HAB - MI - DR HAB - MI - M3 {layout} 7 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	HAB - MI - DR HAB - MI - M3 {layout} 6 HAA - AR - M3 {layout} HAA - SI - M3 {layout}

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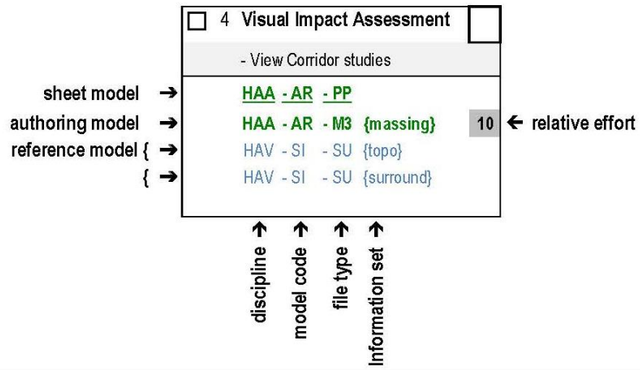

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DESIGN	**2.6 LANDSCAPE**					
2.6.1 Master Layout	☐ 1 Preliminary Master Layout - green ratio - magnitude of influence on existing tree according to development schemes HAL - LA - PP HAL - LA - M3 {layout} 1 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 1 Preliminary Master Layout - green ratio - tree felling / transplant proposals HAL - LA - DR HAL - LA - M3 {layout} 2 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 1 Detailed Master Layout - green ratio - tree felling / transplant proposals HAL - LA - DR HAL - LA - M3 {layout} 4 HAA - AR - M3 {layout} HAA - SI - M3 {layout}			
2.6.2 Hard Landscaping		☐ 2 Hard Landscaping Scheme Design - planters HAA - LA - DR HAA - LA - M3 {hard} 2 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 2 Hard Landscaping Detail Design - planters HAA - LA - DR HAA - LA - M3 {hard} 4 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 2 Hard Landscaping Tender - planters HAA - LA - DR HAA - LA - M3 {hard} 5 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 2 Hard Landscaping Construction HAA - LA - DR HAA - LA - M3 {hard} 5 HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 2 Hard Landscaping as-built Record - planters HAA - LA - DR HAA - LA - M3 {hard} 4 HAA - AR - M3 {layout} HAA - SI - M3 {layout}
2.6.3 Soft Landscaping		☐ 3 Soft Landscaping - magnitude of influence on existing tree according to development schemes - existing tree survey HAL - LA - DR HAL - LA - M3 {soft} 2 HAL - SI - M3 {layout} HAA - LA - M3 {hard} HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 3 Soft Landscape Design - plant layout & schedules - customization of soft landscape library for BIM HAL - LA - DR HAL - LA - M3 {soft} 3 HAL - SI - M3 {layout} HAA - LA - M3 {hard} HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 3 Soft Landscape Tender - plant layout & schedules HAL - LA - DR HAL - LA - M3 {soft} 5 HAL - SI - M3 {layout} HAA - LA - M3 {hard} HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 3 Soft Landscape Construction - continuous drawings update and information data input HAL - LA - DR HAL - LA - M3 {soft} 5 HAL - SI - M3 {layout} HAA - LA - M3 {hard} HAA - AR - M3 {layout} HAA - SI - M3 {layout}	☐ 3 Soft landscape as-built Record - plant layout & schedules HAL - LA - DR HAL - LA - M3 {soft} 4 HAL - SI - M3 {layout} HAA - LA - M3 {hard} HAA - AR - M3 {layout} HAA - SI - M3 {layout}
2.6.4 Tree Management			☐ 4 Tree Management			

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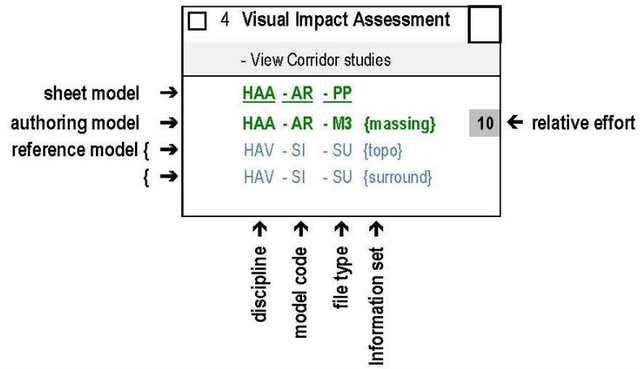

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DCD's BIM Uses	Project Stage & Milestones					
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DESIGN	**2.7 VALUE ENGINEERING**					
2.7.1 Value Management & Design Optimization		☐ 1 Value Management & Design Optimization				
③	**ANALYSIS & SIMULATION**					
ANALYSIS & SIMULATION	**3.1 ENVIRONMENTAL: PASSIVE**					
3.1.1 Air Ventilation Assessment (AVA)		☐ 1 Air Ventilation Assessment (AVA) - integrated use with CFD software **HAA - AR - CF {AVA}** 2 HAA - AR - M3 {massing} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 1 Air Ventilation Assessment (AVA) **HAA - AR - CF {AVA}** 3 HAA - AR - M3 {massing} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 1 Air Ventilation Assessment (AVA) **HAA - AR - CF {AVA}** 4 HAA - AR - M3 {massing} HAV - SI - SU {topo} HAV - SI - SU {surround}		
3.1.2 Microclimate Studies		☐ 2 Microclimate Studies - airflow simulation & ventilation - wind environment at low level / mid level **HAA - AR - CF {AVA}** 2 HAA - AR - M3 {massing} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 2 Microclimate Studies (MCS) - airflow simulation & ventilation - wind environment at low level / mid level **HAA - AR - CF {AVA}** 4 HAA - AR - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 2 BEAM PLUS Study - micro-climate study		
3.1.3 Solar Study		☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study **HAA - AR - DL {solar_study}** 2 HAA - AR - M3 {massing} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study **HAA - AR - DL {solar_study}** 3 HAA - AR - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}	☐ 3 Solar Study - shadow & daylight analysis - daylight provision, open space solar access hour study **HAA - AR - DL {solar_study}** 3 HAA - AR - M3 {layout} HAV - SI - SU {topo} HAV - SI - SU {surround}		

Q2. QUICK GUIDE Level 2 - BIM Application Detail

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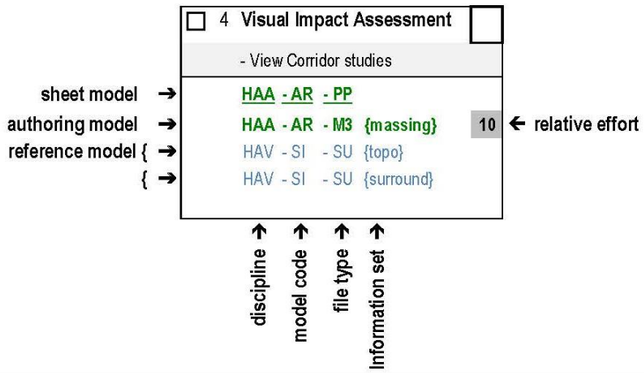

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ANALYSIS & SIMULATION	3.1.4 Pollutants Dispersion	☐ 4 Pollutants Dispersion from RCP/JCP - under summer / annual prevailing wind					
	3.1.5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment	☐ 5 Traffic Impact Assessment			
	3.1.6 RTTV calculation			☐ 6 RTTV Calculation (refer to Annex 4)			
	3.2 ENERGY: ACTIVE						
	3.2.1 Lighting Analysis			☐ 1 Lighting Analysis - lighting simulation by DIALux - optimization of lighting design for energy saving HAB - EE - M3 {dialux} 4 HAA - AR - M3 {layout} HAA - MF - M3 {layout}			
	3.2.2 Energy Simulation	☐ 2 Energy Simulation - simulated pattern of daily cooling required - solar heat gain simulation	☐ 2 Energy Simulation - simulated pattern of daily cooling required - solar heat gain simulation	☐ 2 Energy Estimation			
	3.2.3 PV Panel Study			☐ 3 PV Panel Study (refer to Annex 5) - shading analysis - glare analysis			

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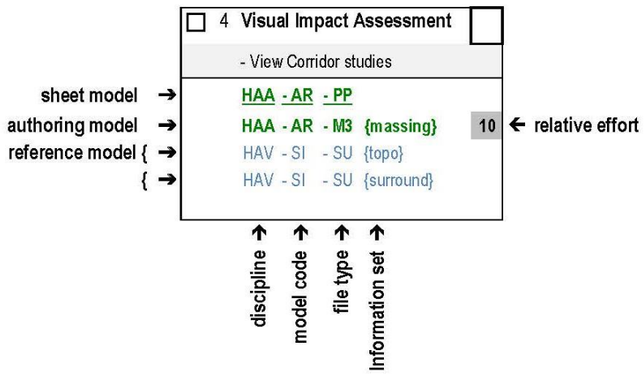

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④	COST ESTIMATION (QTO)	Project Construction Cost Ceiling (PCCC)	Project Budget	Detailed Cost Estimate	Revised Project Budget	Cost Control, Budget Forecast & Monitoring	
COST ESTIMATION (QTO)	4.1.1 BIM-enabled QTO	☐ 1 Cost Budgeting - Construction Floor Area (CFA)	☐ 1 Cost Budgeting	☐ 1 BIM-enabled QTO for Estimate - e.g. walls, floors, doors, windows, concrete (not exhaustive; project team to decide based on project need) HAQ - SS - BQ 5 HAQ - AR - BQ 5 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAS - SS - M3 {layout} HAS - FD - M3 {layout}	☐ 1 BIM-enabled QTO for Tender - e.g. walls, floors, doors, windows, concrete (not exhaustive; project team to decide based on project need) HAQ - SS - BQ 5 HAQ - AR - BQ 5 HAA - AR - M3 {layout} HAA - MF - M3 {layout} HAA - SI - M3 {layout} HAS - SS - M3 {layout} HAS - FD - M3 {layout}	☐ 1 5D BIM for Construction Cash Flow Simulation	
	4.1.2 BIM QTO for Standard Modular Flats				☐ 2 BIM QTO for Standard Modular Flats		
	4.1.3 Model-based QTO in ARAB Using VICO office				☐ 3 Model-based QTO in ARAB Using VICO Office		
	4.1.4 5D BIM at ARAB				☐ 4 5D BIM at ARAB		

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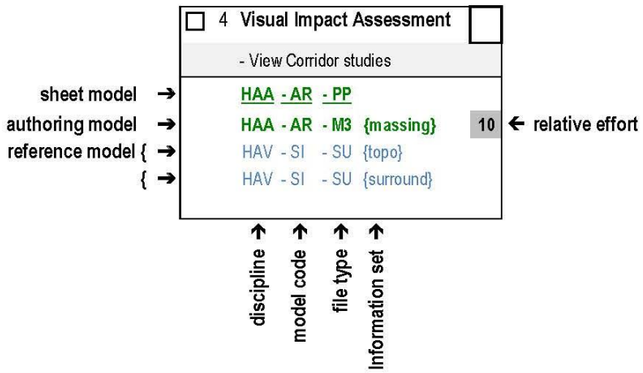

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⑤	**DOCUMENTATION & PRESENTATION**					
DOCUMENTATION & PRESENTATION	**5.1 ICU SUBMISSIONS**					
	5.1.1 ICU Submissions		☑ 1 Statutory (ICU) Submissions - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions HAA - AR - IC 6 HAA - DD - IC 6 HAS - FD - IC 6 HAS - LS - IC 6 HAS - SS - IC 6 related M3 models	☑ 1 Statutory (ICU) Submissions - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions HAA - AR - IC 6 HAA - DD - IC 6 HAS - FD - IC 6 HAS - LS - IC 6 HAS - SS - IC 6 related M3 models	☑ 1 Statutory (ICU) Amendment & Record Submissions - GBP, drainage plan, etc. - ELS, site formation, foundation, super-structural submissions HAA - AR - IC 6 HAA - DD - IC 6 HAS - FD - IC 6 HAS - LS - IC 6 HAS - SS - IC 6 related M3 models	
	5.2 NON-ICU SUBMISSIONS					
	5.2.1 FSD Submission		☐ 1 FSD Submission			
	5.2.2 WSD Plumbing Submission		☐ 2 WSD Plumbing Submission			
	5.2.3 ACABUS Submission		☐ 3 ACABUS Submission			

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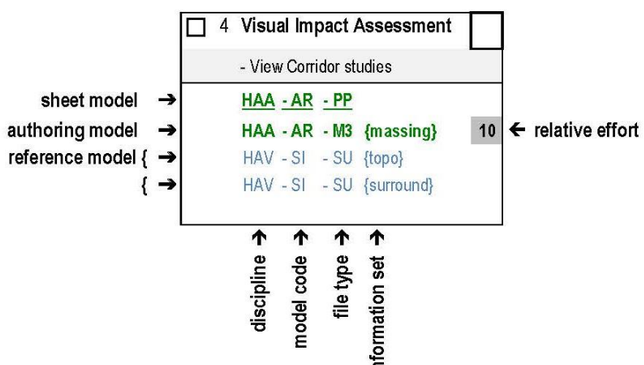

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DOCUMENTATION & PRESENTATION						
5.3 RENDERING / ANIMATIONS / 3D PRINTING						
5.3.1 Architectural Presentation	☑ 1 Architectural Presentation - architectural concept - design visualization & presentation HAA - AR - PP **HAA - AR - M3 {massing}** 4 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS}	☑ 1 Architectural Presentation - schematic design - public consultations & community engagement - circulation pattern at public transport interchange HAA - AR - PP **HAA - AR - M3 {massing}** 4 HAV - SI - SU {topo} HAV - SI - SU {surround} HAV - SI - SU {GIS}		☐ 1 Animation (by Tenderers) - construction planning - construction safety CTR - AR - PP **HAA - AR - M3 {layout}** 4 HAS - SS - M3 {layout} HAG - SI - M3 {SF} HAV - SI - SU {surround}		
5.3.2 Geological Presentation			☐ 2 Geological - site geological model			
5.3.3 MEP Coordination			☑ 3 MEP Coordination - 3D printing for BS coordination **HAB - BS - CM** 4 HAA - AR - M3 {layout} HAB - BS - M3 {layout} HAS - SS - M3 {layout}			

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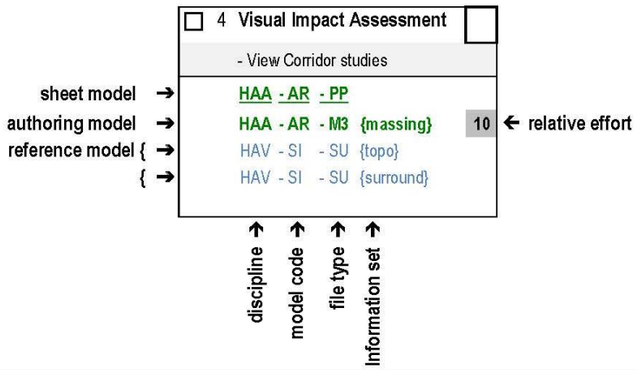

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⑥	**CONSTURCTION PLANNING (with Contractor)**					
CONSTRUCTION PLANNING	**6.1 SITE LOGISTICS PLANNING**					
	6.1.1 Site Layout & Logistic Planning			☐ 1 Site Layout & Logistic Planning - 2D / 3D / 4D presentations CTR - SI - MS {site_layout} 5 related M3 models	☑ 1 Site Layout & Logistic Planning and Coordination - produce various views from desired viewpoints - site area or space reservations - site walkways - 3D site scan CTR - SI - MS {site_layout} 5 related M3 models	
	6.1.2 Minimize Cut & fill for Site Formation Works				☐ 2 Minimize Cut & Fill for Site Formation Works CTR - SI - MS {SF} 5 related M3 models	
	6.1.3 Construction Lift, Material Hoist & Tower Crane Planning				☑ 3 Construction Lift, Material Hoist & Tower Crane Planning CTR - SI - MS {logistic} 5 related M3 models	
	6.2 SAFETY PLANNING					
	6.2.1 Site Safety Planning			☐ 1 Site Safety Planning CTR - SI - MS {site_layout} 5 related M3 models	☑ 1 Site Safety Planning Training - risk zones related to cranes - other safety hazards e.g. cable, pipe lines excavation, asbestos CTR - SI - MS {site_layout} 5 related M3 models	

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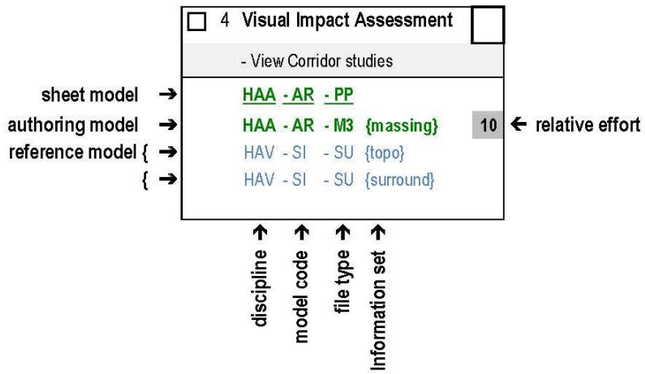

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CONSTURCTION PLANNING						
6.2.2 Temporary Works Design					☑ 2 Temporary Works Design CTR - SS - MS {temp_work} 5 related M3 models	
6.3 CONSTRUCTION SEQUENCE						
6.3.1 Sequencing of Works	☐ 1 Sequencing of Works (Engineering Design) - master layout model, 3D printing HAS - SS - MS {sequence} 4 HAS - FD - MS {sequence} 4 HAS - LS - MS {sequence} 4 related M3 models	☐ 1 Sequencing of Works (Engineering Design) - simulation of hoisting of footbridge HAS - SS - MS {sequence} 4 HAS - FD - MS {sequence} 4 HAS - LS - MS {sequence} 4 related M3 models		☐ 1 Method Statement (Contractor Design) - ELS sequence - demolition works sequence - Temporary works CTR - SS - MS {sequence} 4 CTR - FD - MS {sequence} 4 CTR - LS - MS {sequence} 4 CTR - SS - MS {temp_work} 4 related M3 models	☑ 1 Method Statement (Contractor Design) - construction planning and 4D simulation for ELS works - demolition planning and simulation of sequences of demolition - construction system design (formwork and scaffolding) - reporting project progress CTR - SS - MS {sequence} 4 CTR - FD - MS {sequence} 4 CTR - LS - MS {sequence} 4 CTR - SS - MS {temp_work} 4 related M3 models	
6.3.2 Animation, Design visualization and Presentation	☐ 2 Animation for DC consultation & Public Engagement - existing site contour, location, gradients and drainage patterns, access and circulation patterns, footbridge construction, traffic diversion etc. HAA - SI - PP {site_analys} 3 HAA - SI - MS {traffic} 3 HAS - SS - MS {sequence} 3 related M3 models	☐ 2 Design Visualization and Presentation - animated models, fly-throughs, static 3D renderings, 4D process sequencing HAA - AR - VS {animation} 4 HAA - AR - VS {rendering} 4 HAS - SS - MS {animation} 4 related M3 models	☐ 2 Design Visualization and Presentation - animated models, fly-throughs, static 3D renderings, 4D process sequencing HAA - AR - VS {animation} 4 HAA - AR - VS {rendering} 4 HAS - SS - MS {animation} 4 related M3 models			

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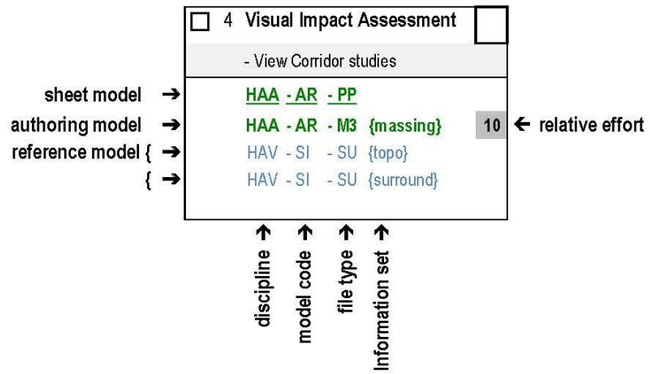

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CONSTRUCTION PLANNING	**6.4 CONSTRUCTION COORDINATION**					
	6.4.1 Site Coordination: sub-structure				☐ 1 Site Coordination : Sub-structure - sub-structure up to typical floor of domestic blocks with underground services around the building	
	6.4.2 Site Coordination: concealed works				☐ 2 Site Coordination: concealed works - underground cable duct / pit for utilities service, water pipe and electric cable entrance, etc. around building - concealed conduit and builder's supporting work inside service / plant rooms at G/F of domestic blocks, such as meter rooms, pump rooms, main TBE room, etc. - concealed conduit and builder's supporting work for BS installations layout of estate management office, NGO premises, etc.	

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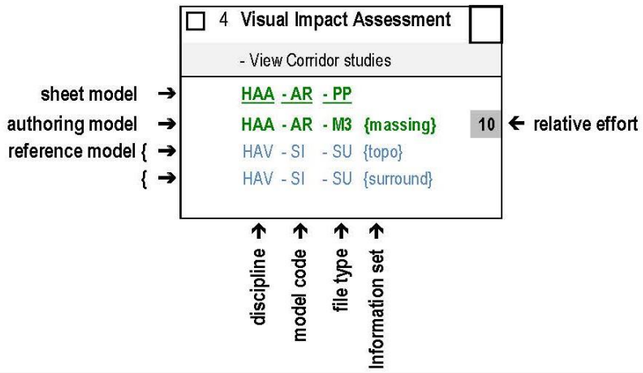

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⑦	**MULTI-DISCIPINARY DESIGN COLLABORATION**					
MULTI-DISCIPINARY DESIGN COLLABORATION	**7.1 DESIGN VALIDATION**					
7.1.1 CSD			☑ 1 CSD - at congested area & critical headroom area - discover exposed services - prevent water pipes through water sensitive rooms - maintenance space / platforms requirements - validation by partial clash detection HAB - BS - CR 9 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}		☑ 1 CSD - CSD shop drawings in 3D - discover exposed services - validation by full clash detection before construction CTR - BS - CR 10 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}	
7.1.2 CBWD			☑ 2 CBWD - services require structural openings - services through compartment or FRR walls HAB - BS - CR 9 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}		☑ 2 CBWD - full CBWD plans and elevations - CBWD for structural opening HAB - BS - CR 10 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}	

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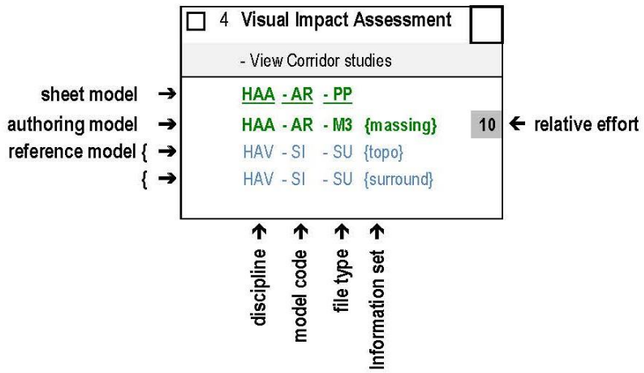

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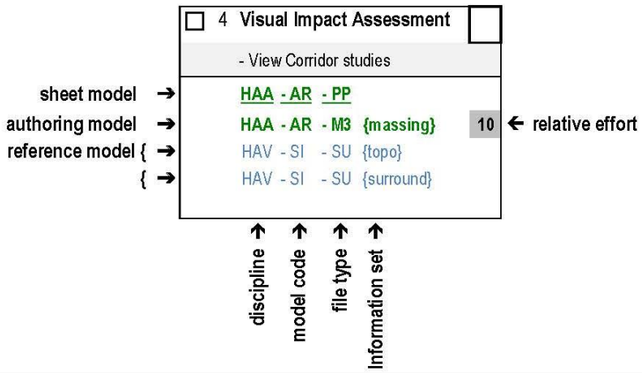
MULTI-DISCIPINARY DESIGN COLLABORATION	7.1.3 Riser Design			☑ 3 Riser Design - location and size - internal arrangement - maintenance and access panel **HAB - BS - CR** 9 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}		☑ 3 Riser Design - location and size - internal arrangement - maintenance and access panel **HAB - BS - CR** 10 HAA - DD - M3 {layout} HAB - BS - M3 {layout} HAA - AR - M3 {layout} HAS - SS - M3 {layout} HAL - LA - M3 {layout}	
	7.1.4 Structural Columns and Walls Locations	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout **HAA - AR - M3 {layout}** 1 HAS - SS - M3 {layout}	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout **HAA - AR - M3 {layout}** 4 HAS - SS - M3 {layout}	☑ 4 Structural Columns and Walls Locations - coordination between architectural and structural layout **HAA - AR - M3 {layout}** 5 HAS - SS - M3 {layout}			
	7.1.5 Headroom checking			☑ 5 Headroom Checking - working area - corridor width - staircase height **HAA - AR - CR** 5 HAA - CL - M3 {layout} HAA - AR - M3 {layout} HAB - BS - M3 {layout} HAS - SS - M3 {layout}		☑ 5 Headroom Checking - working area - corridor width - staircase height **HAA - AR - CR** 5 HAA - CL - M3 {layout} HAA - AR - M3 {layout} HAB - BS - M3 {layout} HAS - SS - M3 {layout}	

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



Notes

sheet model	- use this file to generate the deliverables
authoring model	- concerned information should be input in this model
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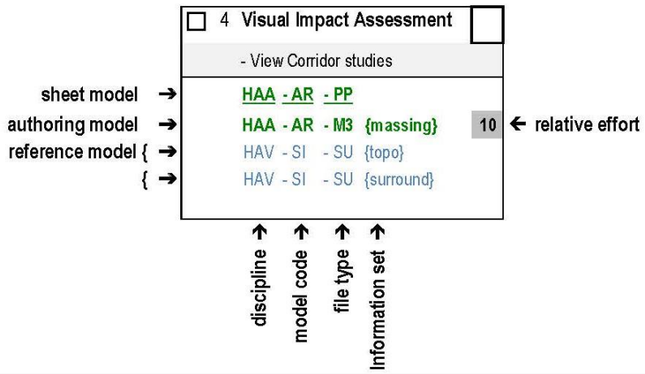
relative effort	- relative effort, presented in a scale from 1 (least effort) to 10 (most effort), indicated in terms of man-days necessary for this BIM application

DCD's BIM Uses	Project Stage & Milestones					
	Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
	Public Consultation, DipCON, AAP, EAP, PDRC(1) & SPC	PDRC(2), SOM, BSDRP(1), BC & DDRP(1), Public Consultation	BSDRP(2), DDRP(2), Statutory Submissions	Tender, Housing Department Tender Board, Tender Committee	Contract Commencement	
MULTI-DISCIPLINARY DESIGN COLLABORATION	7.1.6 Ceiling Design		☑ 6 Ceiling Design - false ceiling mounted light fittings, FS equipment coordination HAA - AR - DR HAA - CL - M3 {layout} 5 HAA - AR - M3 {layout} HAB - BS - M3 {layout}		☑ 6 Ceiling Design Shop Drawings - false ceiling mounted light fittings, FS equipment coordination HAA - AR - DR HAA - CL - M3 {layout} 5 HAA - AR - M3 {layout} HAB - BS - M3 {layout}	
⑧	**EXISTING CONDITION SURVEY & 3D SCANNING**					
EXISTING CONDITION SURVEY & 3D SCANNING	**8.1 EXISTING SURVEY AND AS-BUILT 3D SCANNING VERIFICATION**					
	8.1.1 Civil		☑ 1 Civil - existing road and infrastructure - existing underground drain HAC - SI - SU {road} 3 HAC - SI - SU {drainage} 3 HAV - SI - SU {topo}		☑ 1 Civil - as-built road and infrastructure record - as-built underground drain record HAC - SI - M3 {road} 8 HAC - SI - M3 {drainage} 8 HAG - SI - M3 {SF}	
	8.1.2 Ground Investigation		☑ 2 Ground Investigation - existing underground condition - existing borelog information HAG - SI - SU {GI} 3 HAV - SI - SU {topo}			

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



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DCD's BIM Uses		Project Stage & Milestones					
		Inception & Feasibility	Scheme Design	Detailed Design	Tender	Construction	Post-Completion
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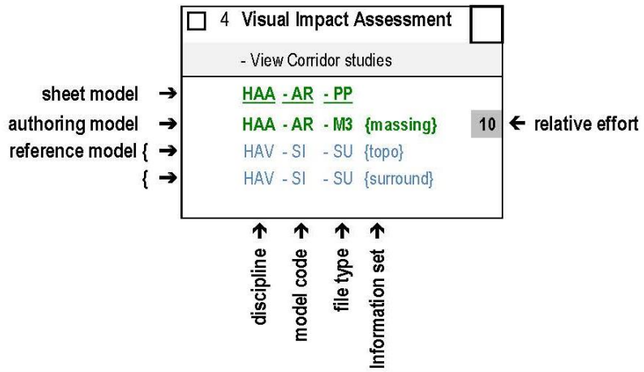
EXISTING CONDITION SURVEY & 3D SCANNING	8.1.3 Building Structures	☑ 3 Building Structures - existing building structures by manual modelling HAS - SS - SU {layout} 3 HAV - SI - SU {topo}				☑ 3 Building Structures - complex structural geometry alignment verification by laser scanning CTR - SS - SU {scan} 7 HAS - SS - M3 {layout}	☑ 3 Building Structures - complex structural geometry alignment verification by laser scanning CTR - SS - SU {scan} 7 HAS - SS - M3 {layout}
	8.1.4 Underground Structures	☑ 4 Underground Structures - existing underground structures by manual modelling HAS - SS - SU {UG} 3 HAV - SI - SU {topo}					
	8.1.5 Architectural	☑ 5 Architectural - existing building layout by laser scanning / manual modelling HAA - AR - SU {layout} 3 HAA - AR - SU {scan} 3 HAV - SI - SU {topo}					☑ 5 Architectural - complex architectural geometry alignment verification by laser scanning CTR - AR - SU {scan} 7 HAA - AR - M3 {layout}
	8.1.6 Drainage	☑ 6 Drainage - existing building drainage - existing external aboveground drainage HAA - DD - SU {layout} 4 HAV - SI - SU {topo}				☑ 6 Drainage - as-built concealed drainage laser scanning HAA - DD - SU {scan} 10 HAA - DD - M3 {layout}	☑ 6 Drainage - as-built laser scanning HAA - DD - SU {scan} 10 HAA - DD - M3 {layout}

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



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DCD's BIM Uses		Project Stage & Milestones					
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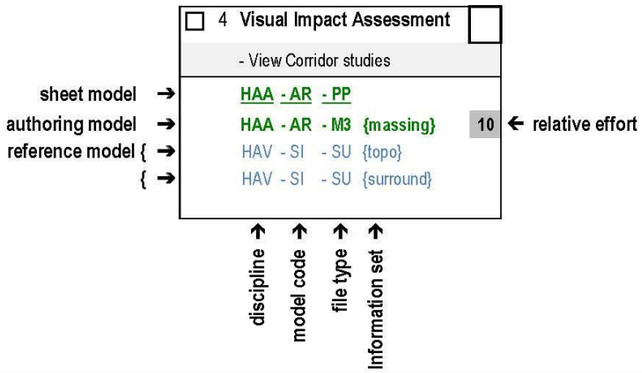
EXISTING CONDITION SURVEY & 3D SCANNING	8.1.7 Building Services	☑ 7 Building Services - existing internal building services - existing external services HAB - BS - SU {layout} 6 HAV - SI - SU {topo} HAA - AR - SU {layout} HAA - AR - SU {scan}				☑ 7 Building Services - concealed services alignment laser scanning HAB - BS - SU {scan} 10 HAB - BS - M3 {layout} HAA - AR - M3 {layout}	☑ 7 Building Services - as-built laser scanning HAB - BS - SU {scan} 10 HAB - BS - M3 {layout} HAA - AR - M3 {layout}
	8.1.8 Tree Survey	☐ 8 Tree Survey - Old & Valuable Trees (OVTs) HAL - SI - SU {OVT} 3 HAV - SI - SU {topo}					
	8.1.9 Topographic	☑ 9 Topographic - topographic survey - GIS - 3D terrain by 3D site scanning (LiDAR / photogrammetry) HAV - SI - SU {topo} 2 HAV - SI - SU {lidar} 2 HAV - SI - SU {photogmtry} 2 HAV - SI - SU {GIS} 2					☑ 9 Site Formation - as-built record by 3D scanning - as-built GIS information record HAG - SI - SU {SF} 3 HAG - SI - SU {lidar} 3 HAG - SI - SU {photogmtry} 3 HAV - SI - SU {GIS} 3
	8.1.10 Surrounding context	☑ 10 Surrounding Context - 3D model from Lands - 3D site scanning (LiDAR / photogrammetry) HAV - SI - SU {surround} 2 HAV - SI - SU {lidar} 2 HAV - SI - SU {photogmtry} 2					

Q2. QUICK GUIDE Level 2 - BIM Application Detail

Legend



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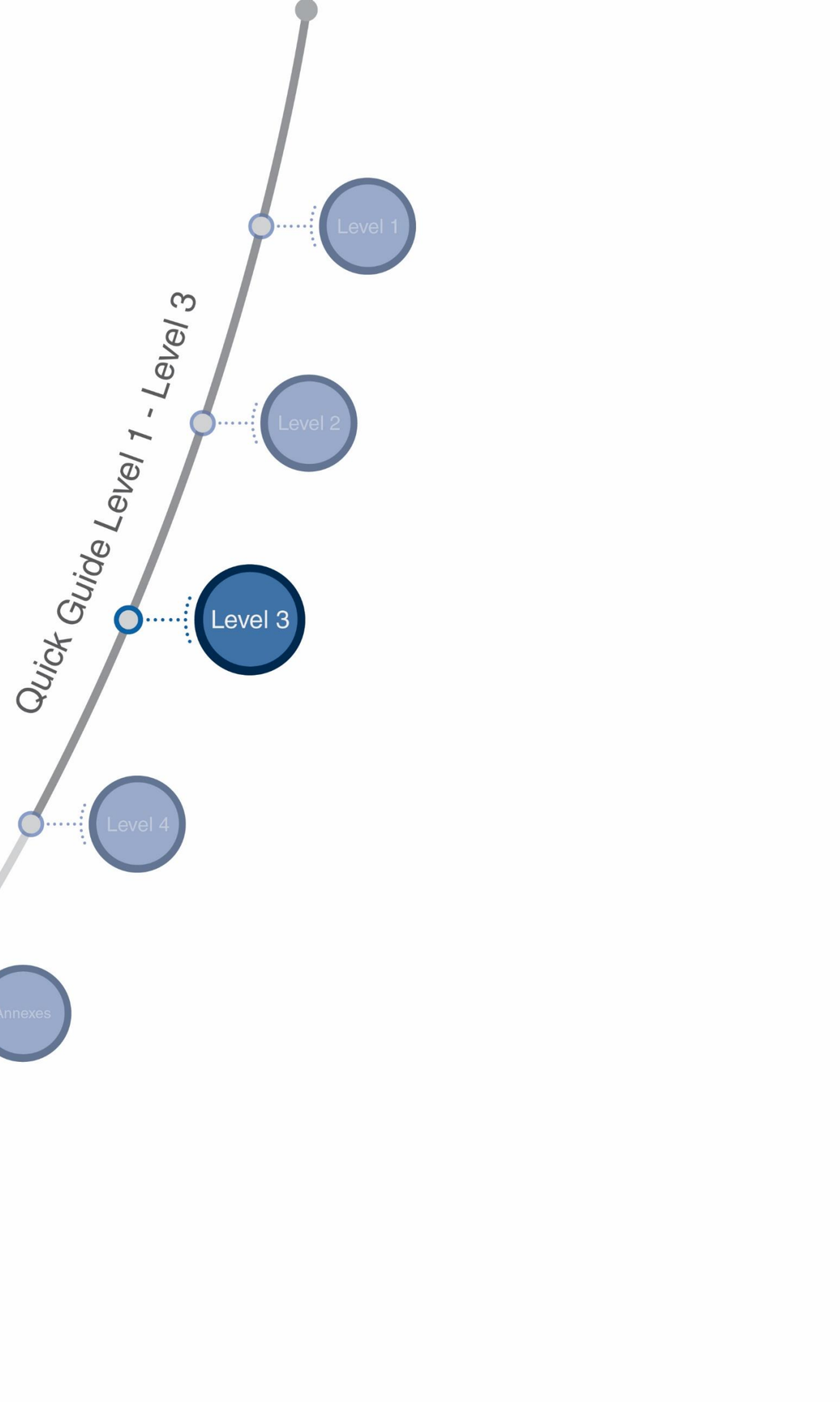
EXISTING CONDITION SURVEY & 3D SCANNING						
8.1.11 Underground Utilities	☑ **11 Underground Utilities** - records from utility companies HAB - SI - SU {UU} 2 HAB - SI - SU {utilities} 2				☑ **11 Underground Utilities** - as-built concealed services laser scanning HAB - BS - SU {scan} 7	
8.2 TENANCY MANAGEMENT						
8.2.1 Space management						☐ 1 Space Management of Commercial Center and Visualization Before Bidding
8.2.2 Space visualization						☐ 2 Visualization of Space Before Prospective Tenants Bidding
8.2.3 Point cloud as-built survey						☐ 3 Point Cloud As-built Survey
8.3 O&M MANUALS						
8.3.1 Linking information & As-fitted Drawings to BIM Model						☐ 1 **Linking Information & As-fitted Drawings to BIM Model** - e.g. detailed shop drawings linked to balustrades - e.g. easy retrieval of glass wall information from BIM - e.g. easy retrieval of building services installations from BIM

QUICK GUIDE

Level 3 -
BIM Workflow



Q3 Index

	Index Number	File Description: Model		File Description: File Type	File Code: Model Code		File Code: File Type
Modelling	Q3-01	Architectural	-	Modelling	(AR	-	M3)
	Q3-02	Modular Flat	-	Modelling	(MF	-	M3)
	Q3-03	Interior Design		Modelling	(IN	-	M3)
	Q3-04	Ceiling	-	Modelling	(CL	-	M3)
	Q3-05	Site / External	-	Modelling	(SI	-	M3)
	Q3-06	Drainage	-	Modelling	(DD	-	M3)
	Q3-07	Foundation	-	Modelling	(FD	-	M3)
	Q3-08	Lateral Support	-	Modelling	(LS	-	M3)
	Q3-09	Superstructure	-	Modelling	(SS	-	M3)
	Q3-10	Building Services	-	Modelling	(BS	-	M3)
	Q3-11	MVAC	-	Modelling	(MV	-	M3)
	Q3-12	Plumbing	-	Modelling	(PB	-	M3)
	Q3-13	Fire Services	-	Modelling	(FS	-	M3)
	Q3-14	Electrical	-	Modelling	(EE	-	M3)
	Q3-15	Gas	-	Modelling	(TG	-	M3)
	Q3-16	Building Services Miscellaneous	-	Modelling	(MI	-	M3)
	Q3-17	Landscape	-	Modelling	(LA	-	M3)
Survey	Q3-18	Architectural	-	Survey	(AR	-	SU)
	Q3-19	Site / External	-	Survey	(SI	-	SU)
	Q3-20	Drainage	-	Survey	(DD	-	SU)
	Q3-21	Superstructure	-	Survey	(SS	-	SU)
	Q3-22	Building Services	-	Survey	(BS	-	SU)
Miscellaneous Model	Q3-23	Building Services	-	Combined Model	(BS	-	CM)
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	Q3-25	Architectural	-	Daylight Analysis	(AR	-	DL)
	Q3-26	Electrical	-	Lighting Analysis	(EE	-	LI)
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	Q3-30	Lateral Support	-	Method Statement	(LS	-	MS)
	Q3-31	Superstructure	-	Method Statement	(SS	-	MS)
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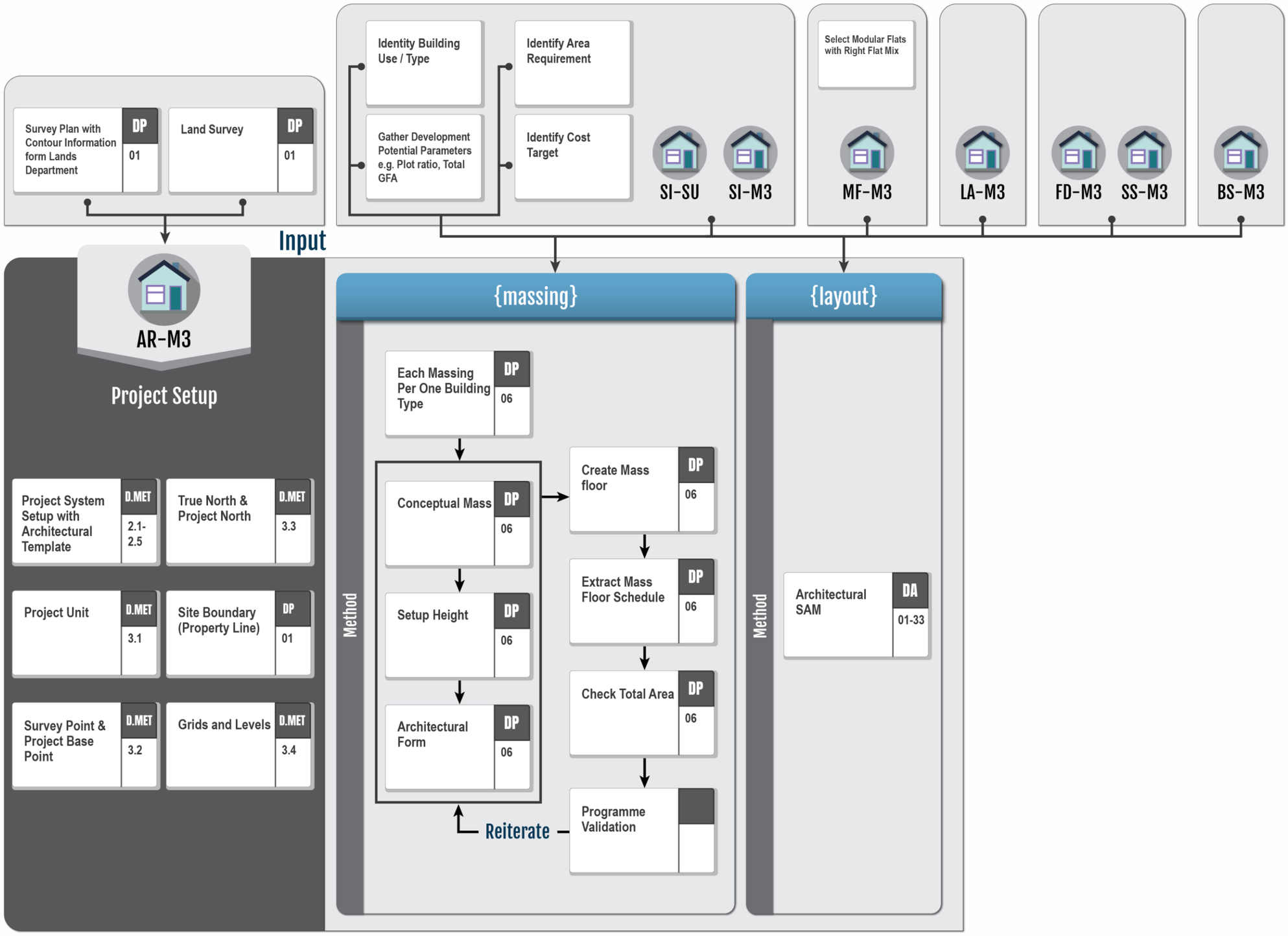
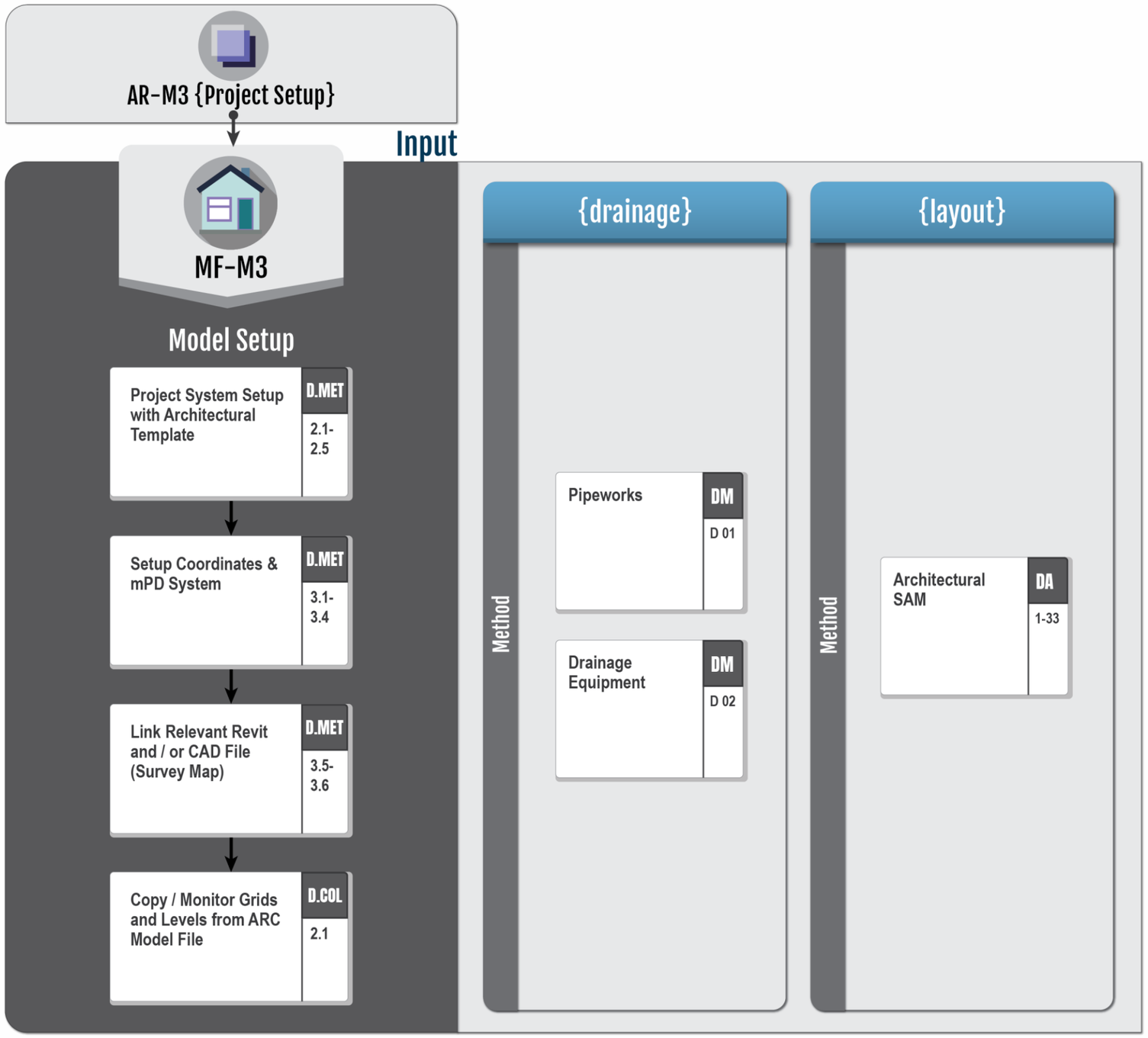
	Q3-33			ICU Submission	(_ _	-	IC)
	Q3-34			Drawing	(_ _	-	DR)
	Q3-35			Bills of Quantities	(_ _	-	BQ)
	Q3-36	Audit		Combined Model	(AU	-	CM)
Clash Detect	Q3-37	C-DRIVE		Combined Model	(CD		CM)

Symbol Legend	
	Authoring Model
	Sheet Model
	Model setup in other external software platform
	Project setup setting

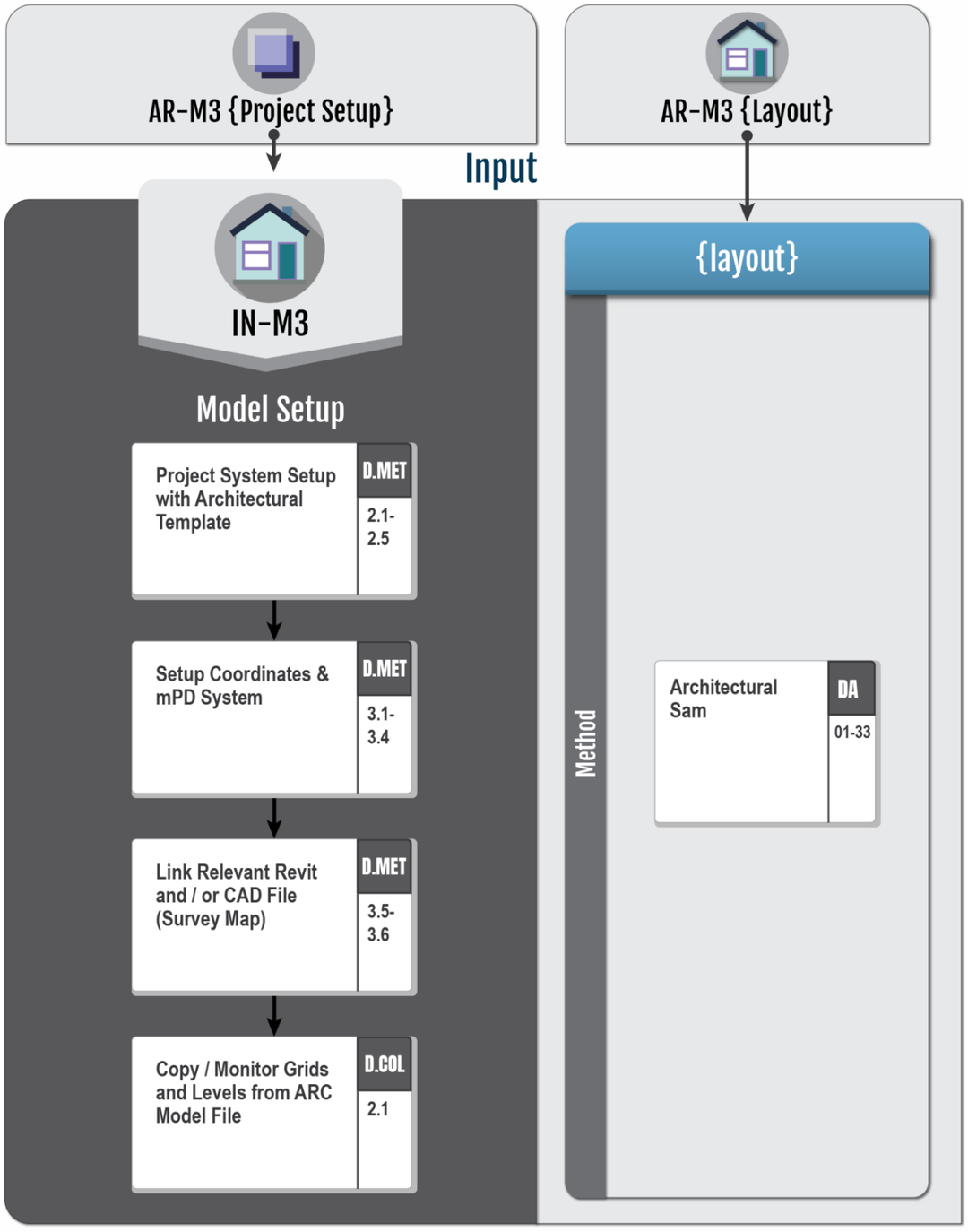
Q3-01 Architectural – Modelling - (AR-M3)



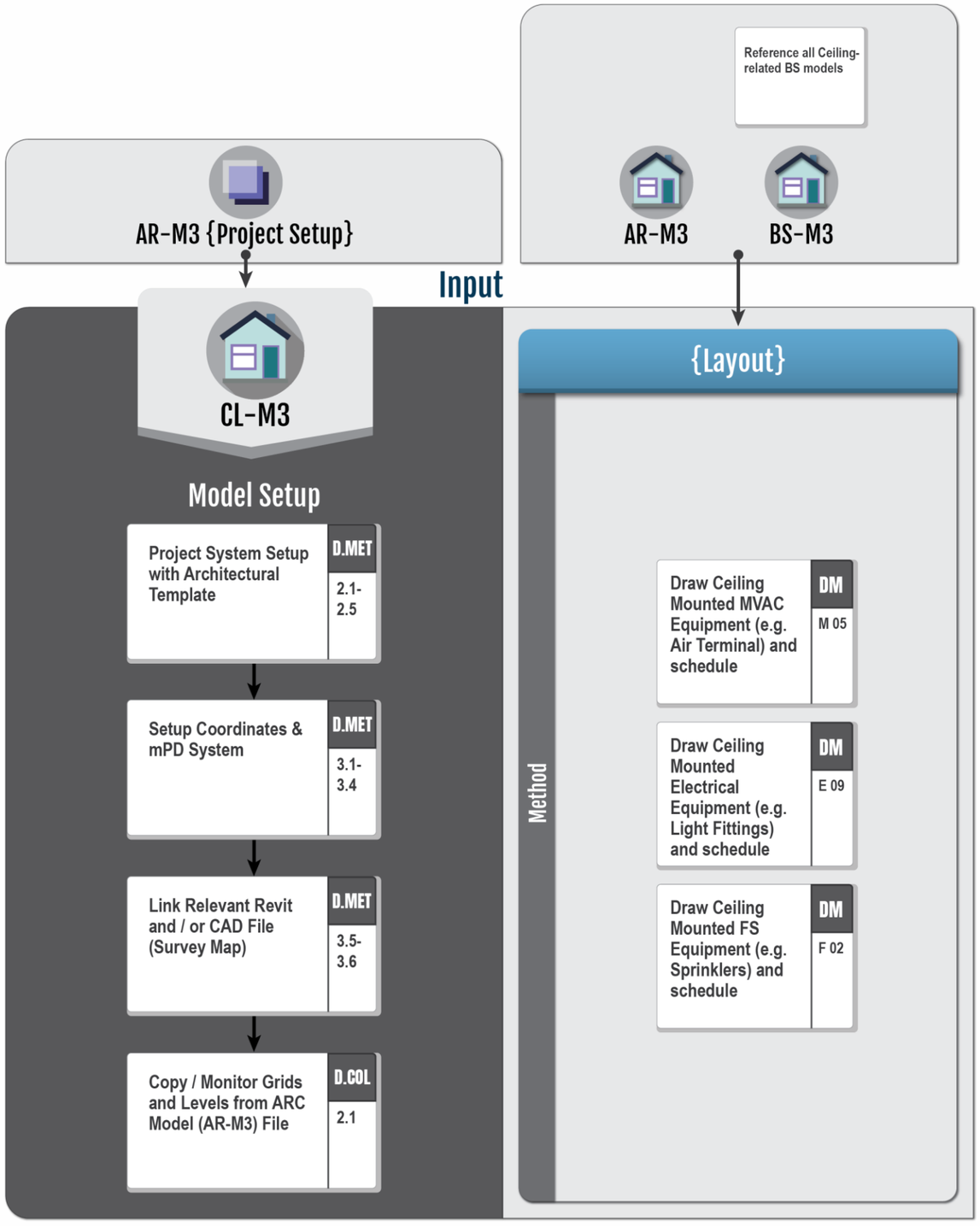
Q3-02 Modular Flat - Modelling - (MF-M3)



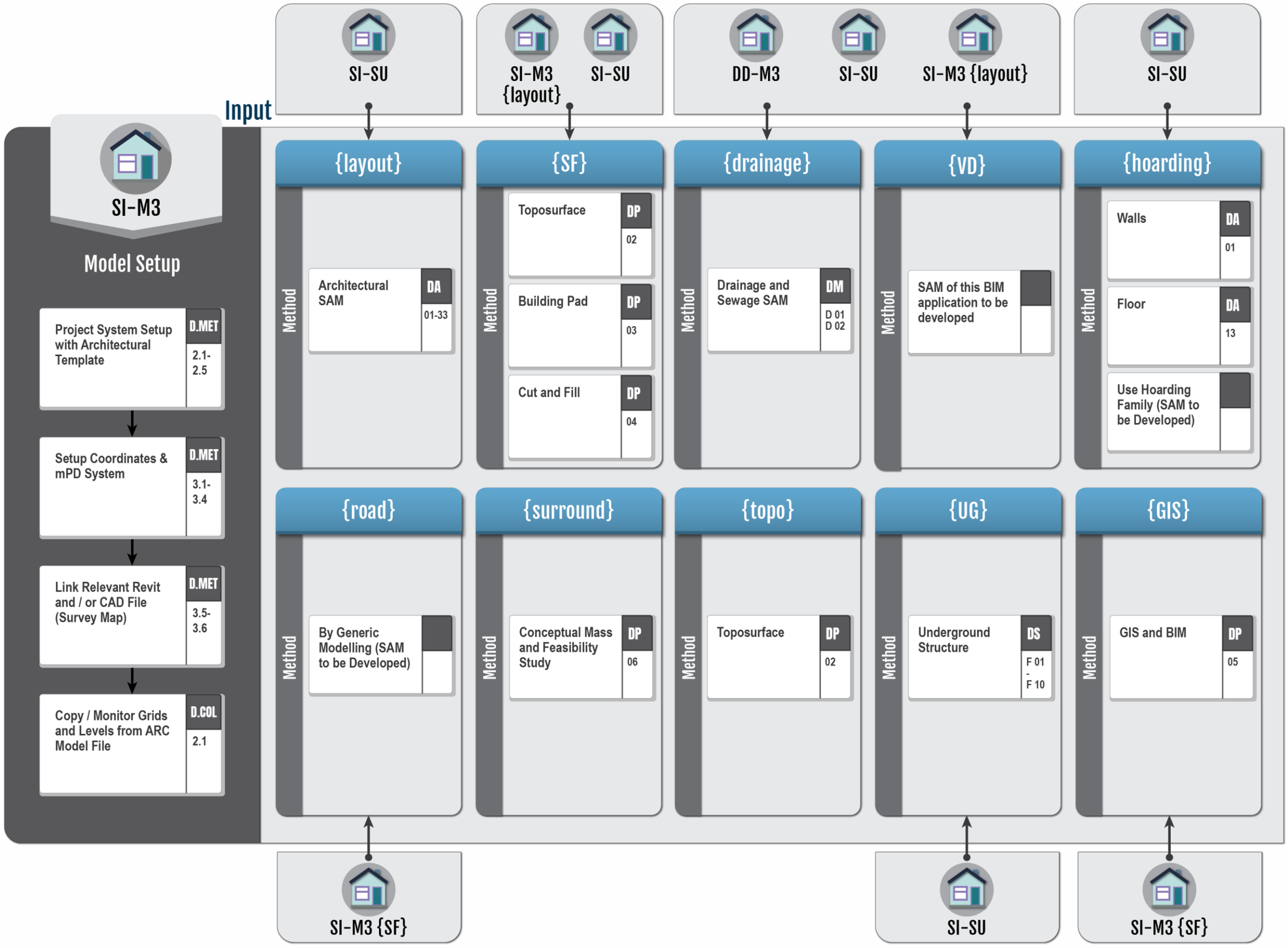
Q3-03 Interior Design - Modelling - (IN-M3)



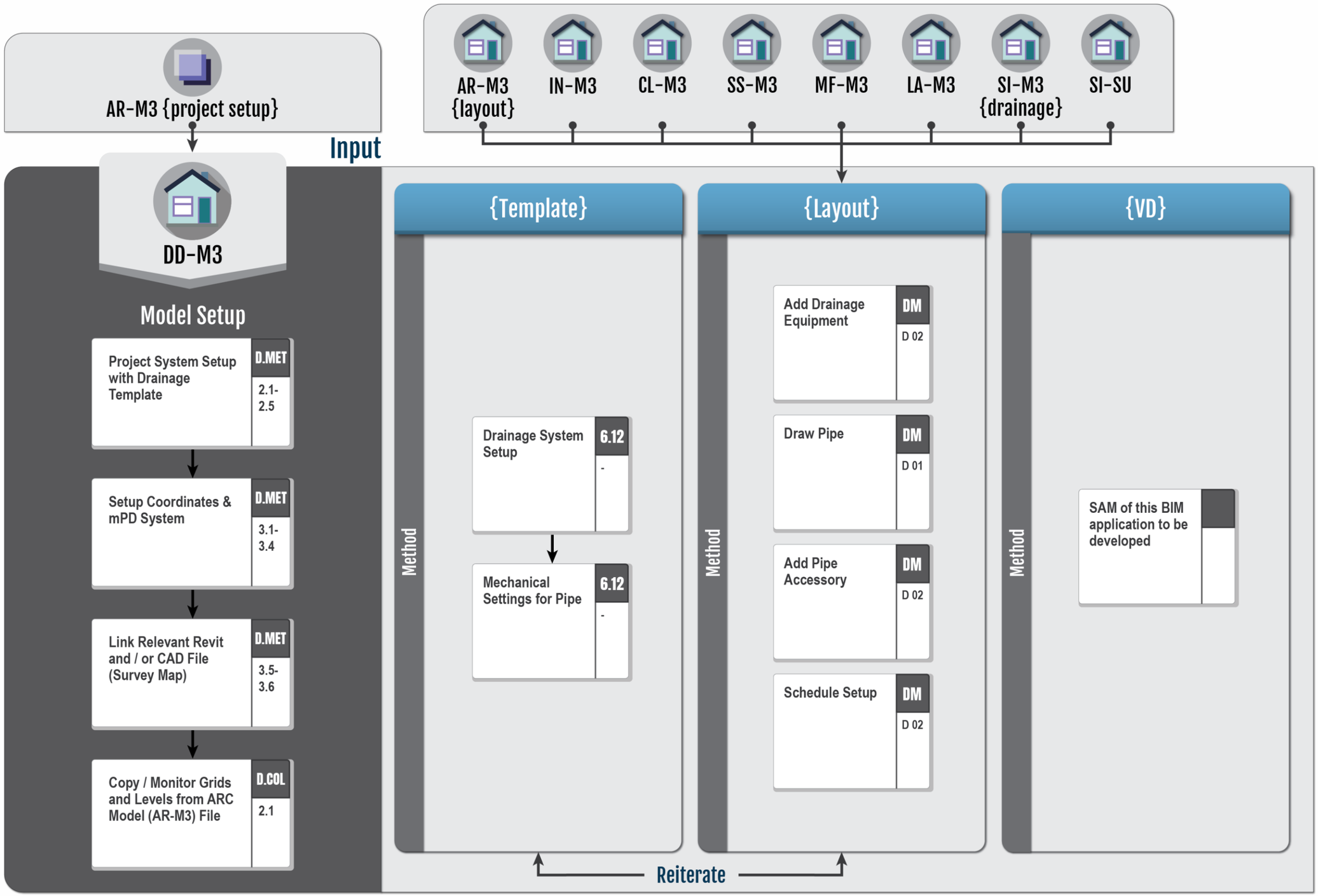
Q3-04 Ceiling - Modelling - (CL-M3)



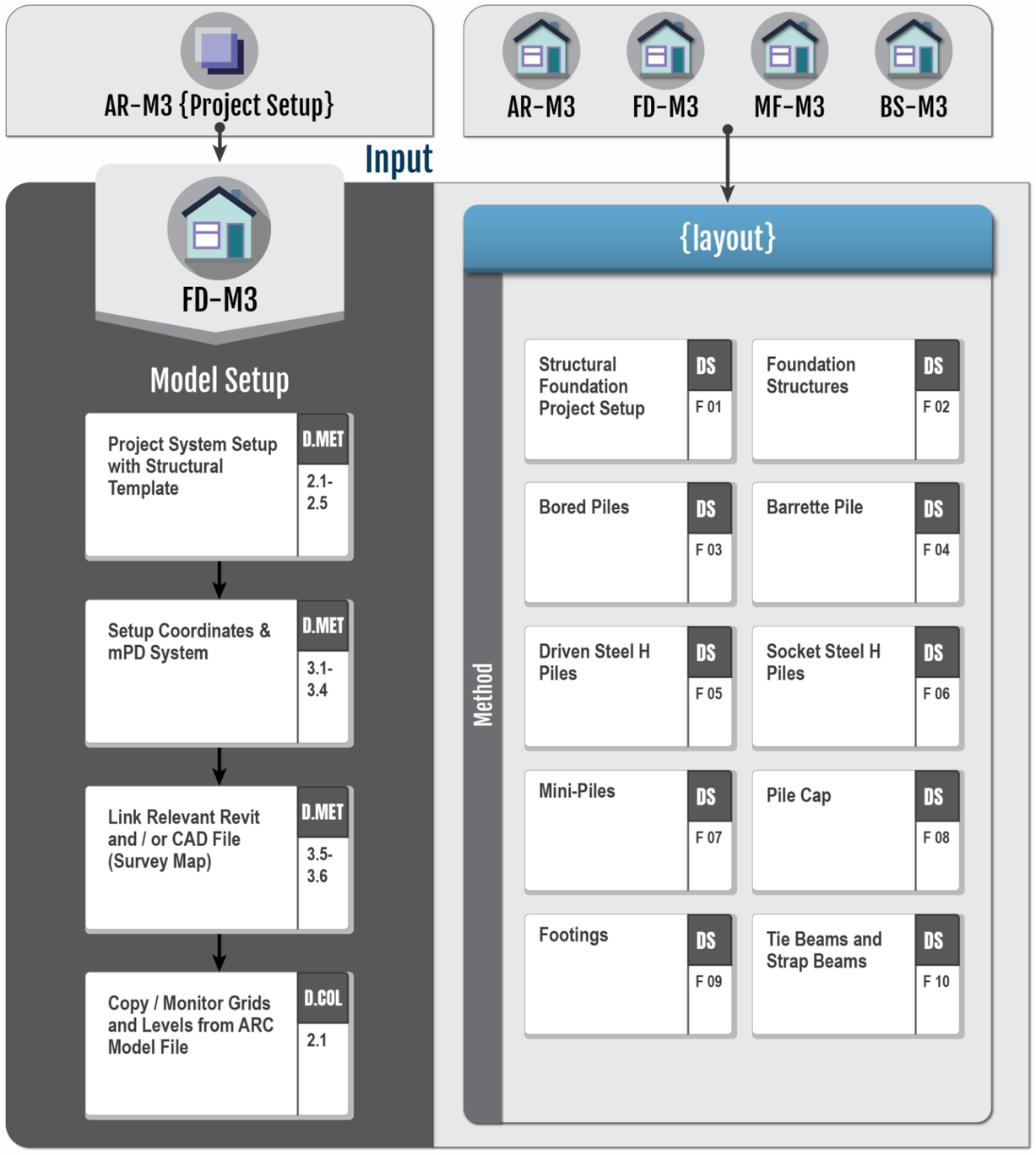
Q3-05 Site / External - Modelling - (SI-M3)



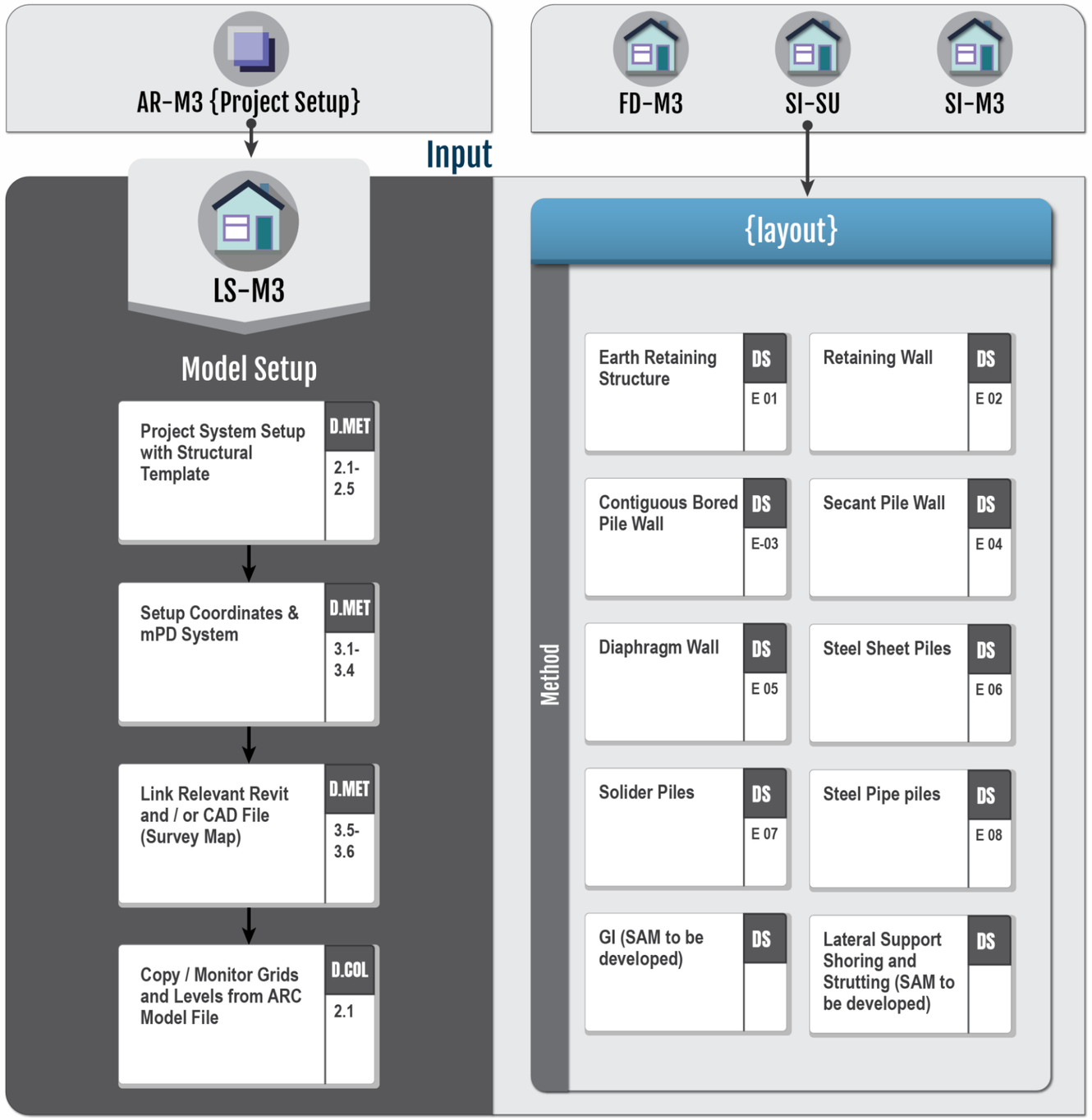
Q3-06 Drainage - Modelling - (DD-M3)



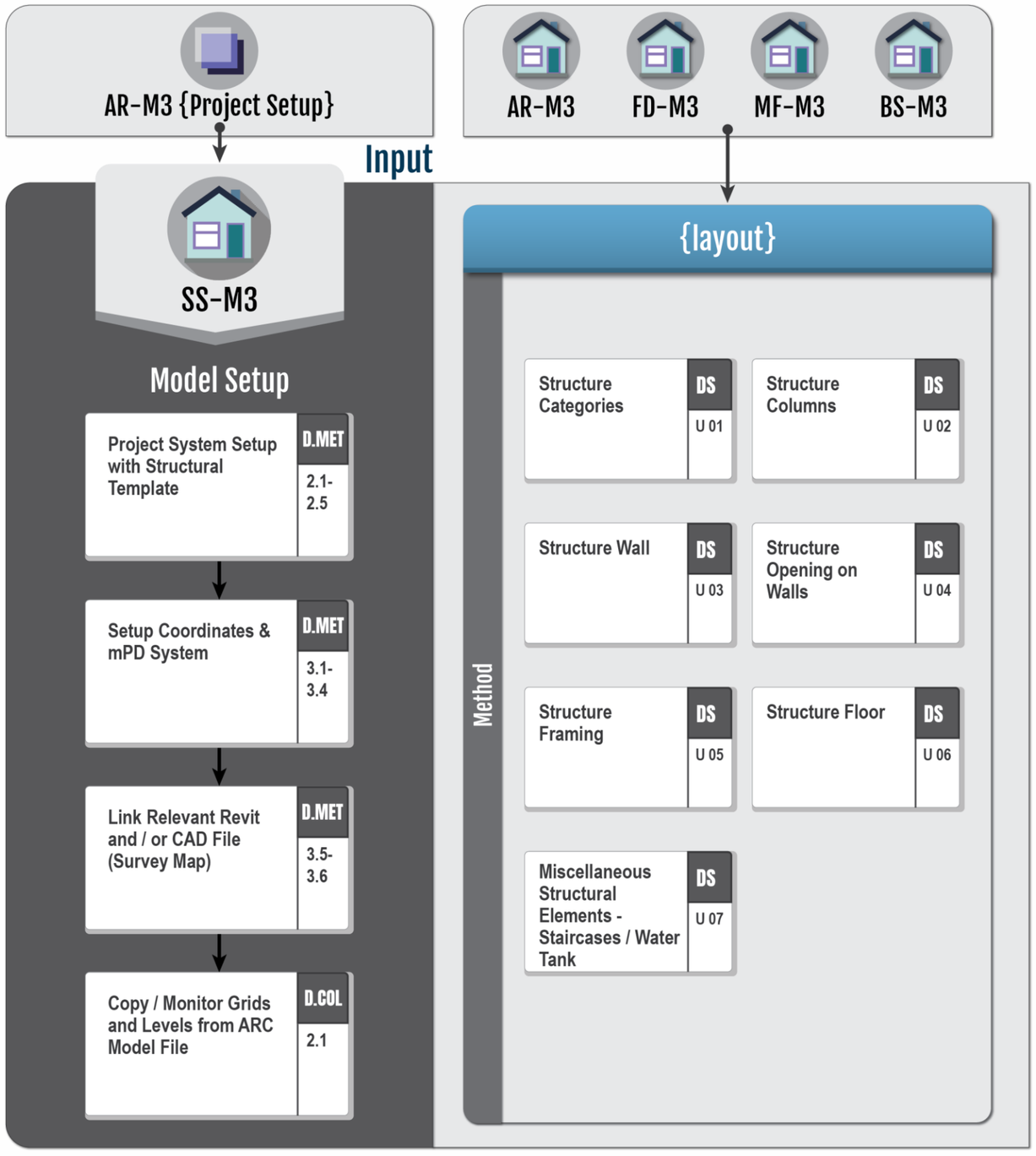
Q3-07 Foundation - Modelling - (FD-M3)



Q3-08 Lateral Support - Modelling - (LS-M3)

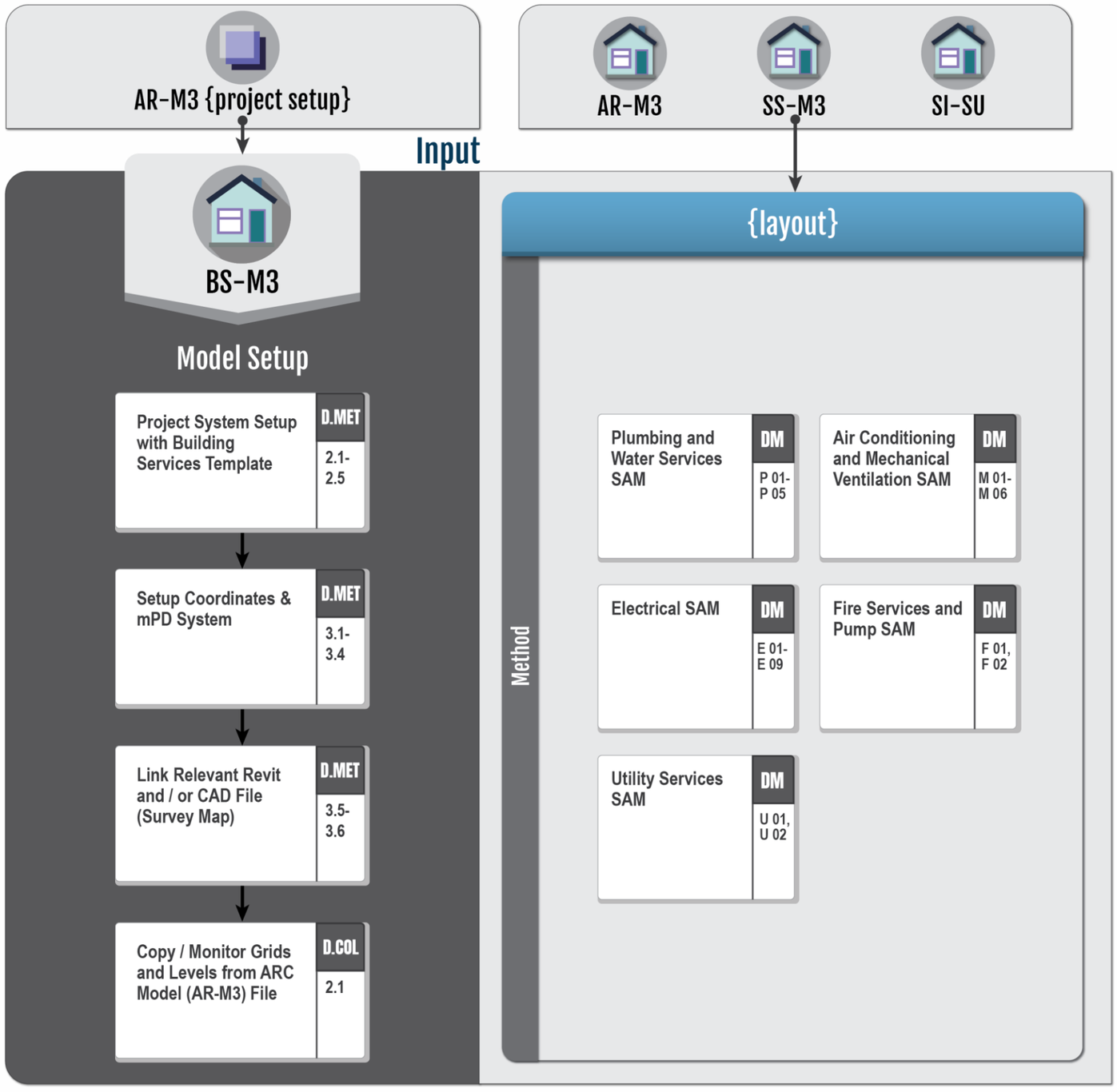


Q3-09 Superstructure - Modelling - (SS-M3)

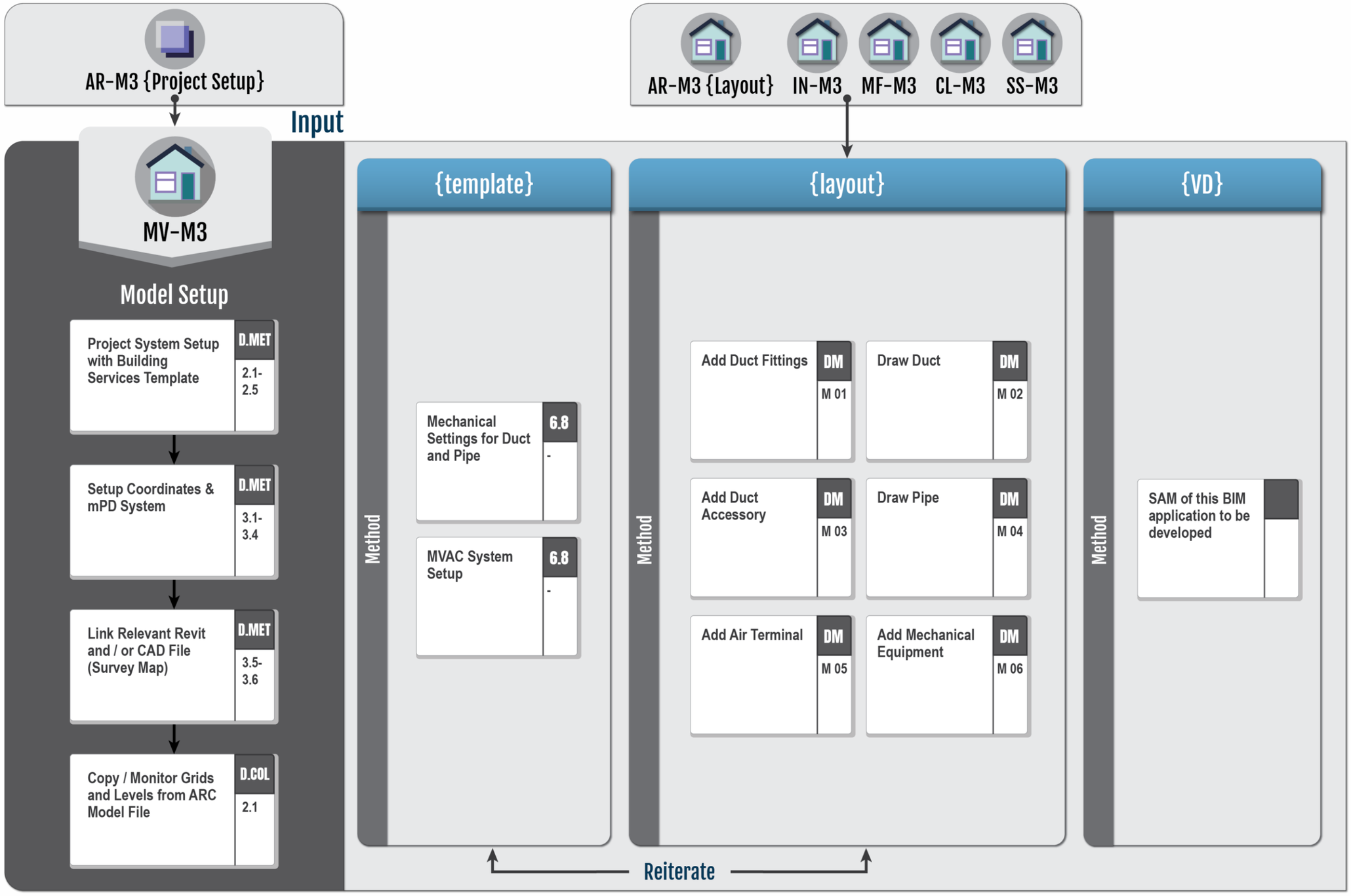


Q3-10 Building Services - Modelling - (BS-M3)

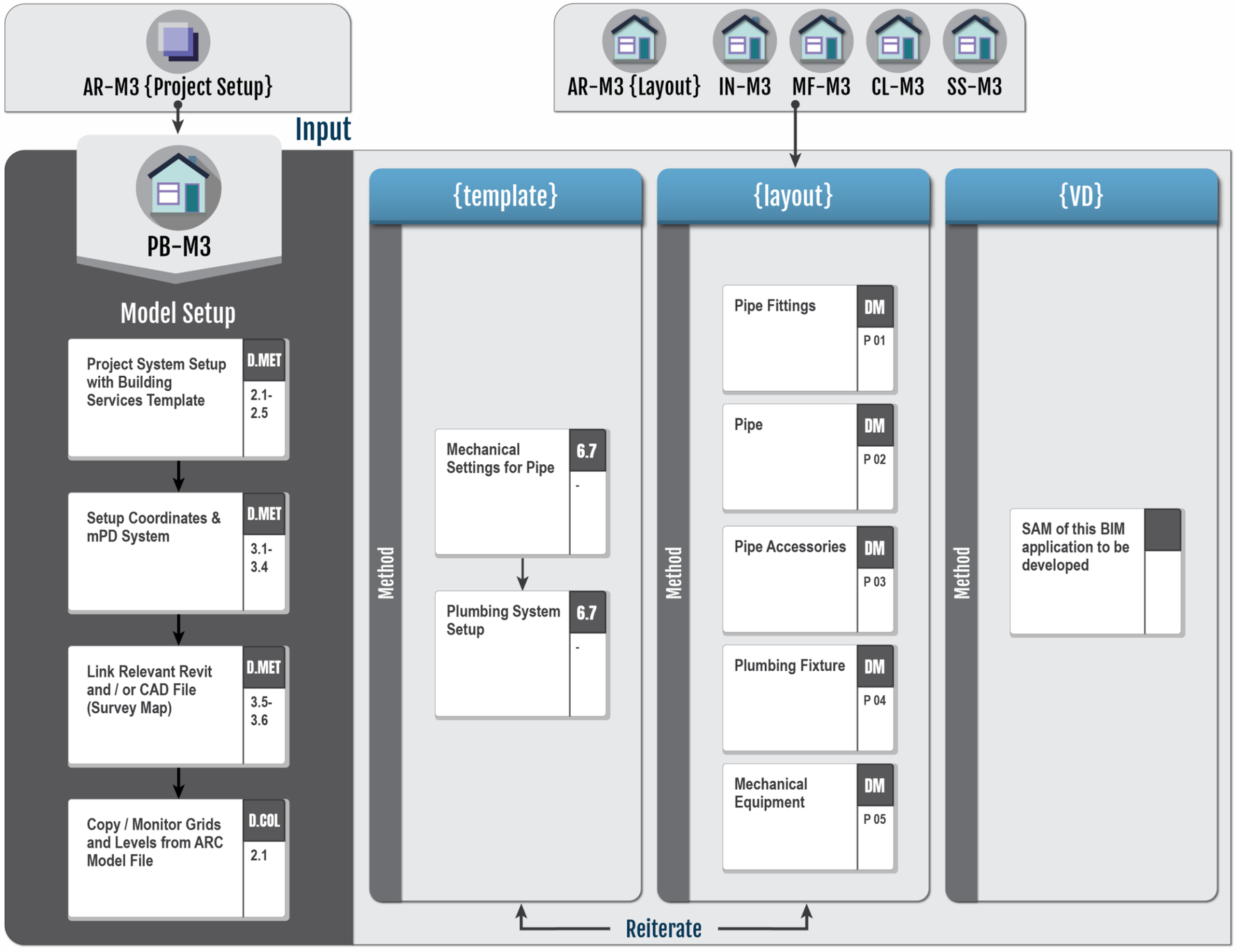
This model is used for holding models for all BS items and should only be used for very small projects. Building services model shall be segregated into individual Building Services disciplines in most cases. (BS-SU) / (BS-M3) under reference model in Level 2 and Level 3 diagrams may mean the collective of segregated Building Services disciplines models.



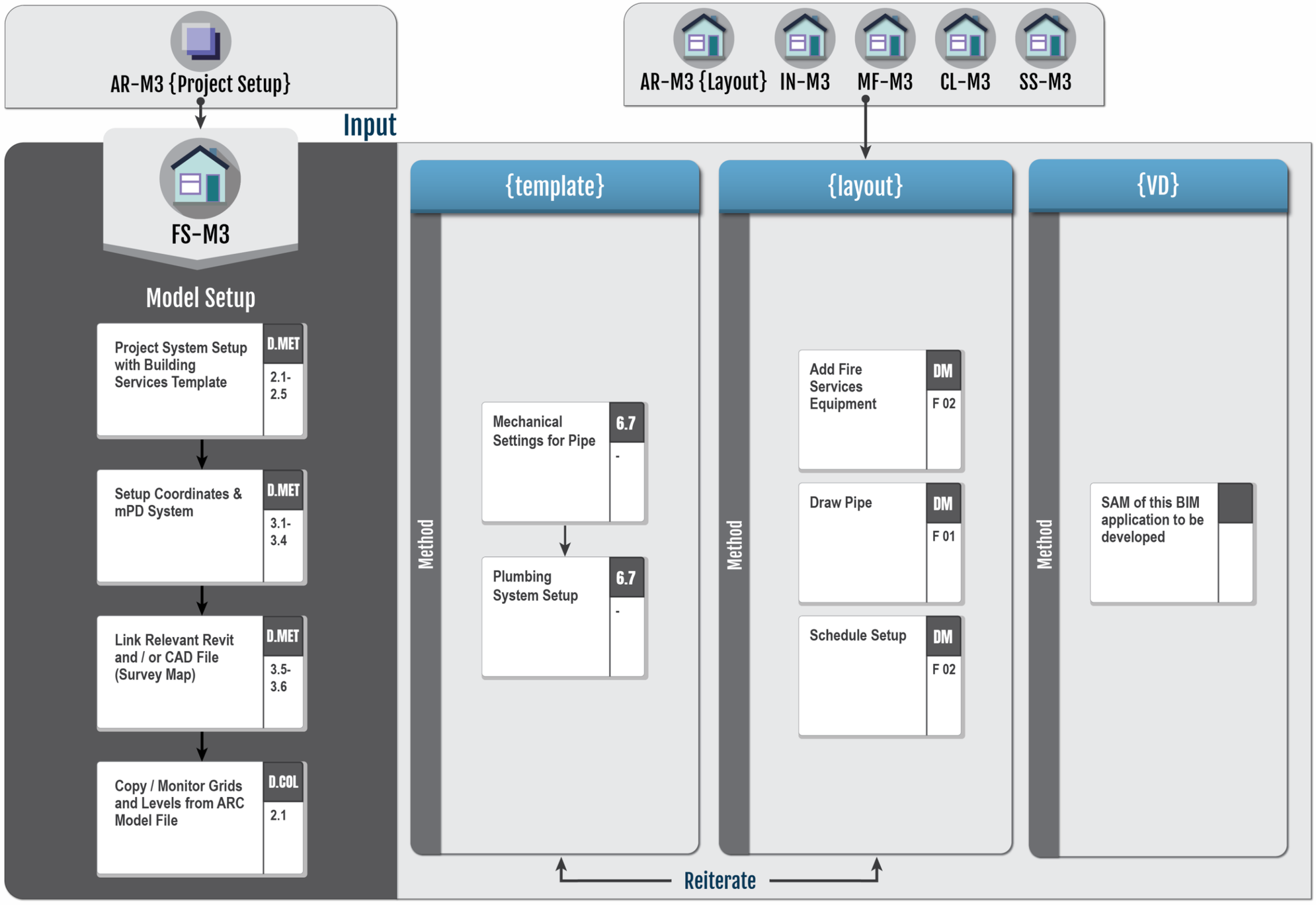
Q3-11 MVAC - Modelling - (MV-M3)



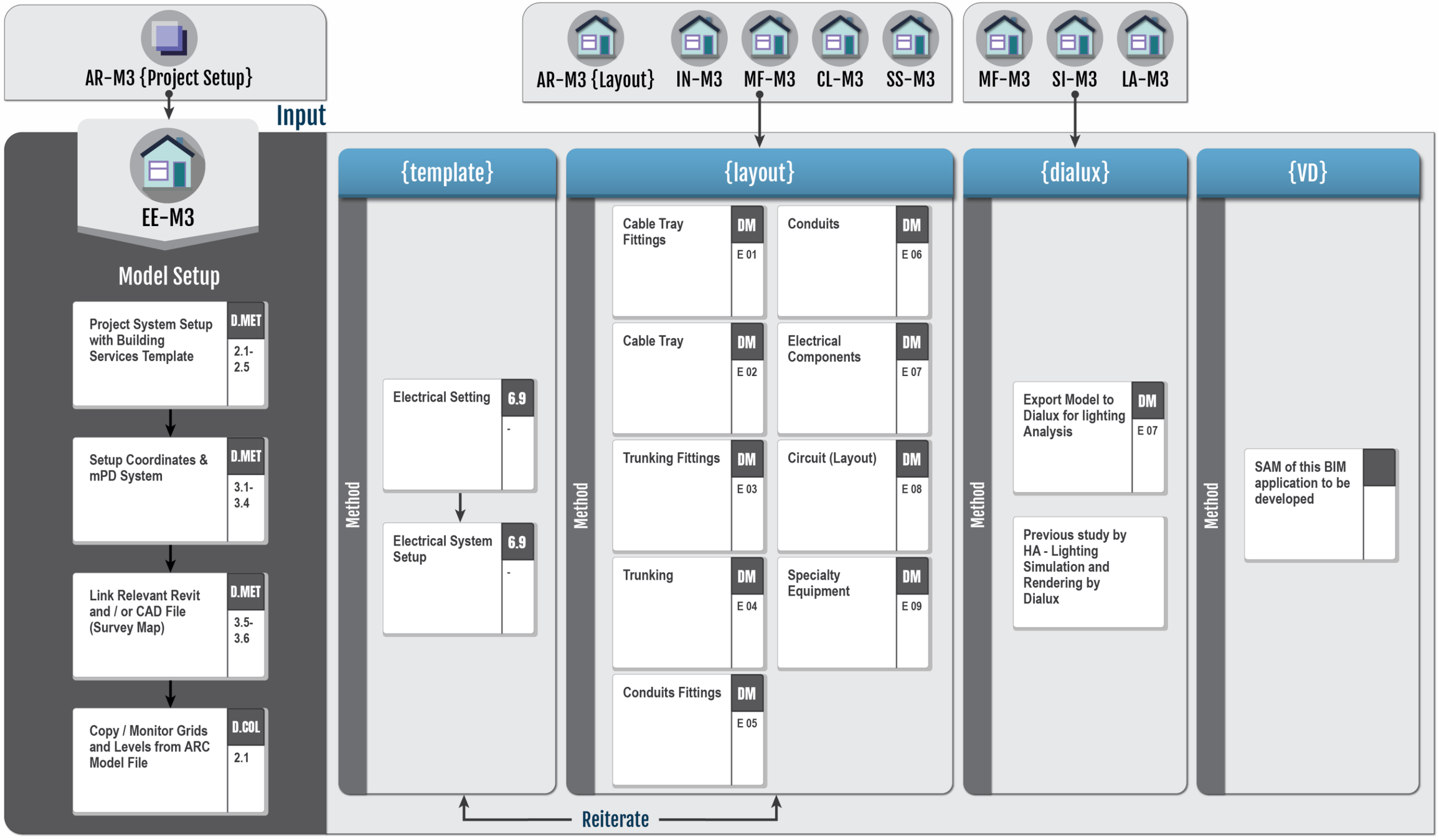
Q3-12 Plumbing - Modelling - (PB-M3)



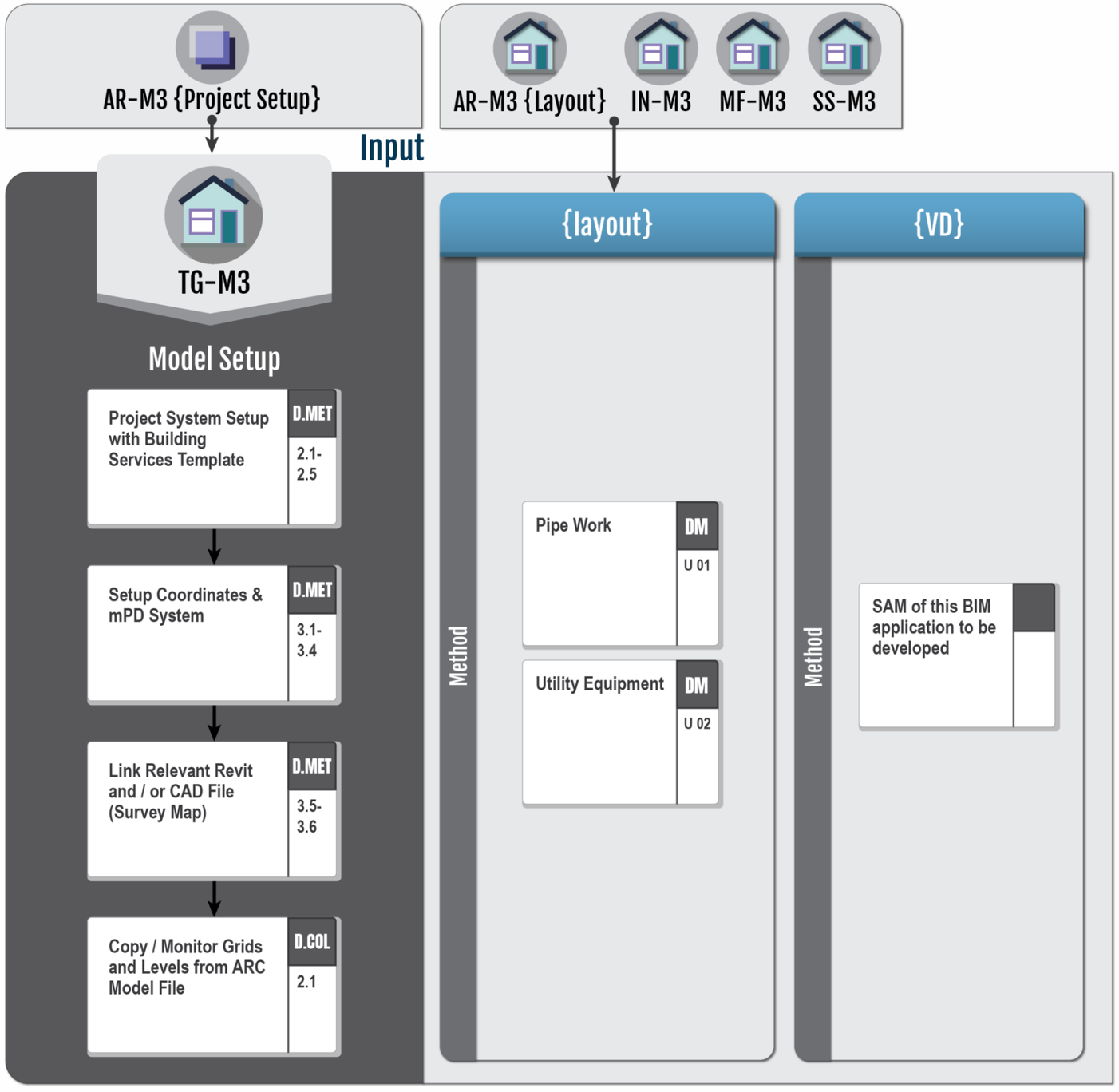
Q3-13 Fire Services - Modelling - (FS-M3)



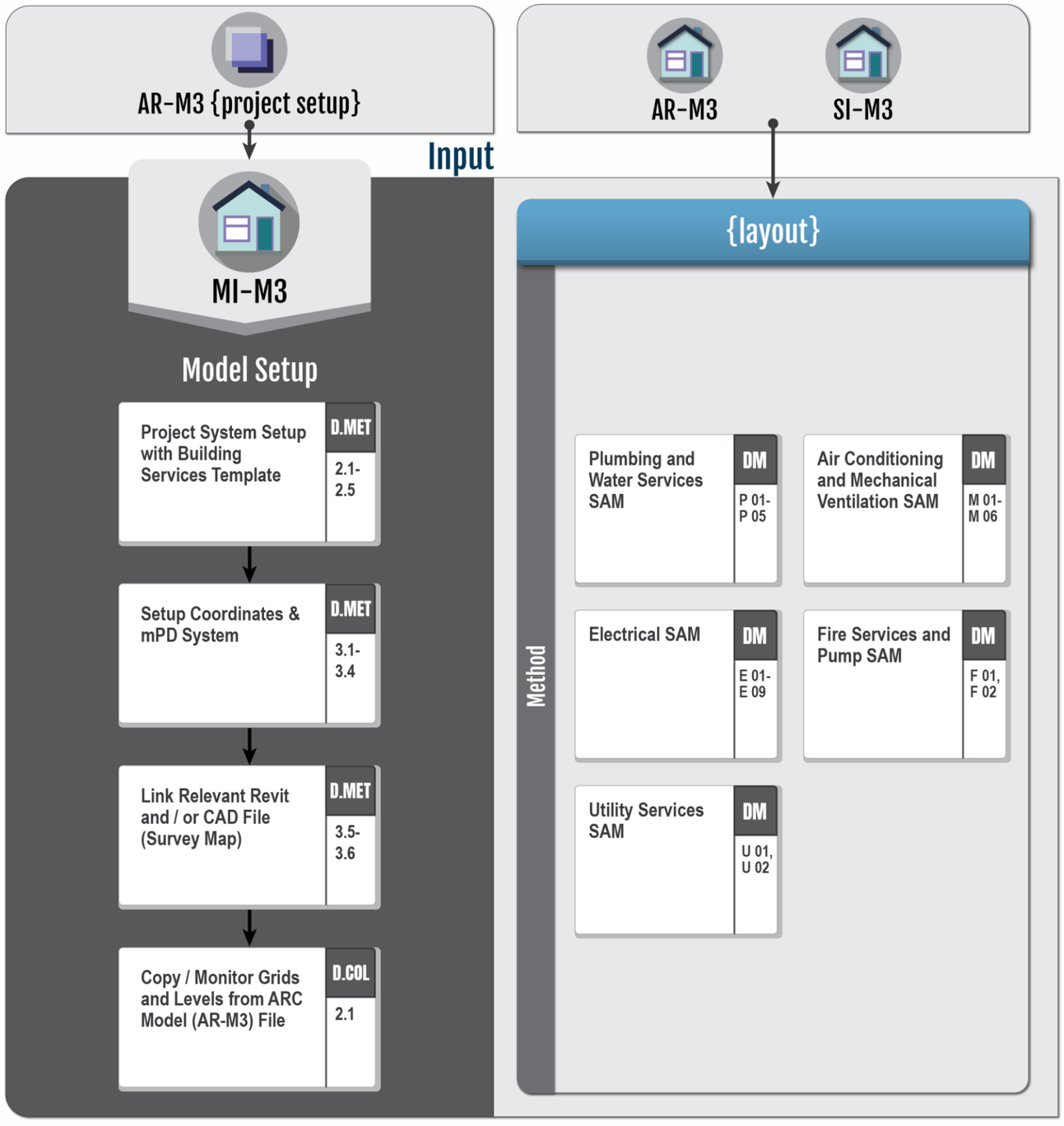
Q3-14 Electrical - Modelling - (EE-M3)



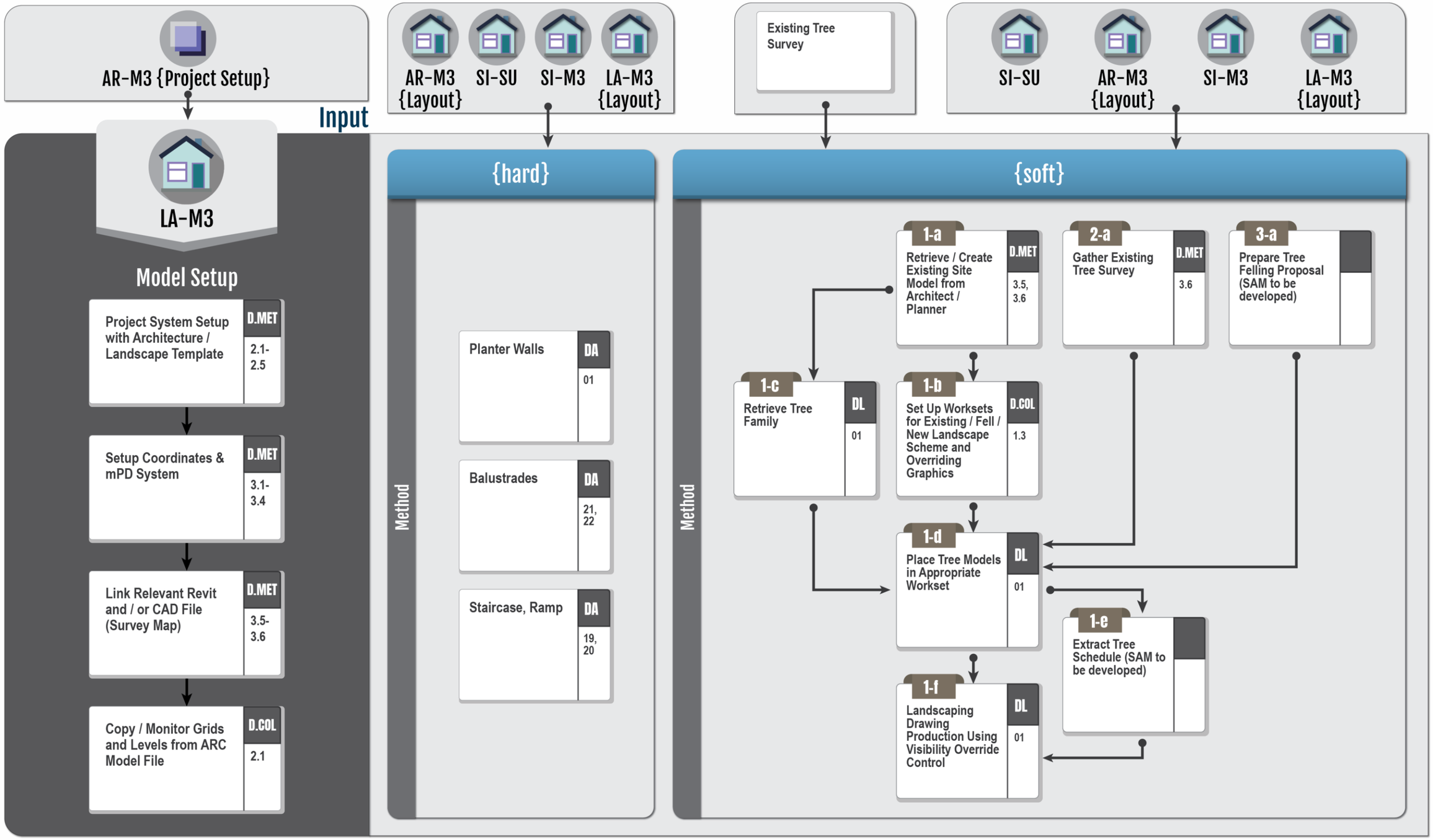
Q3-15 Town Gas - Modelling - (TG-M3)



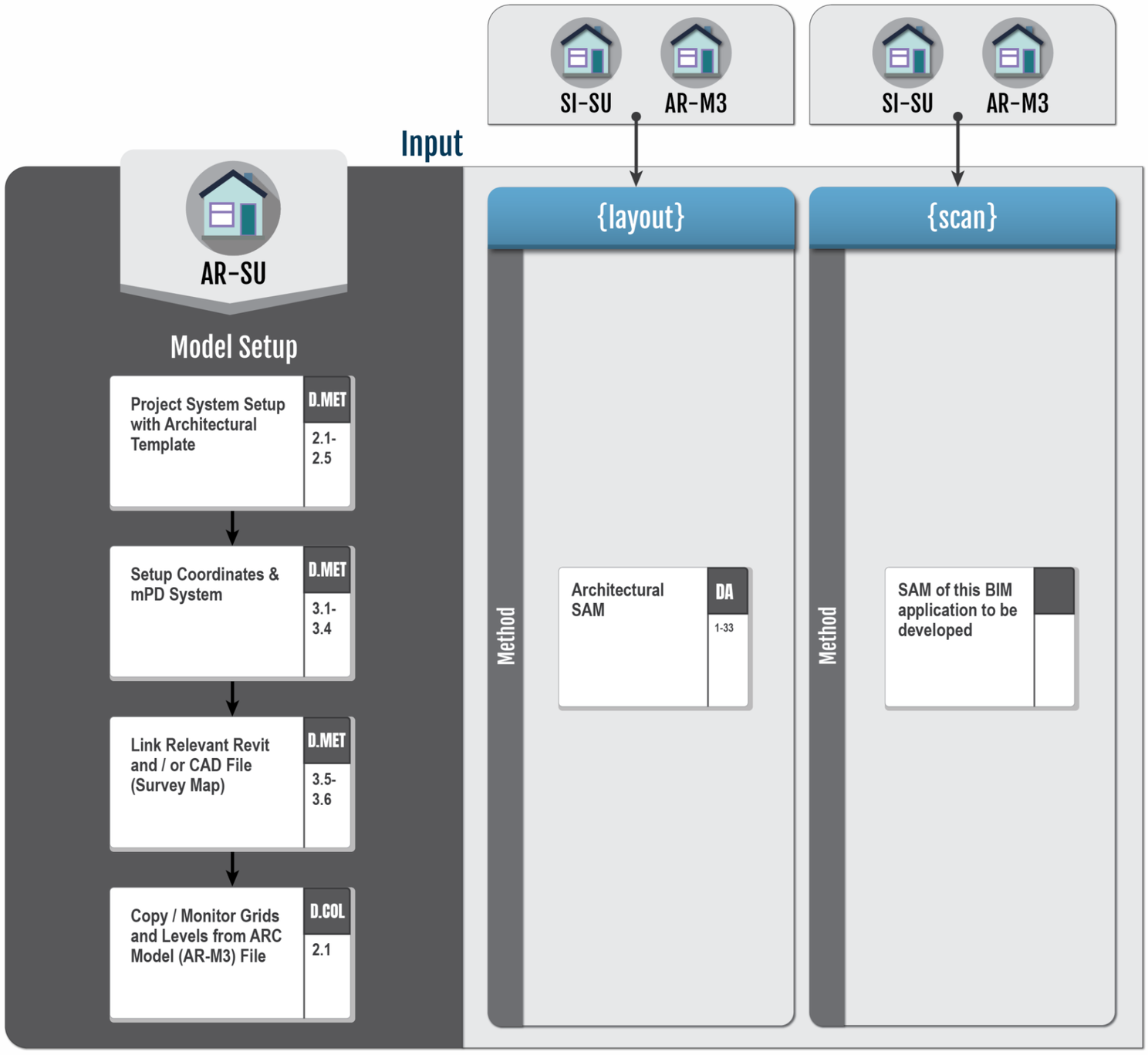
Q3-16 Building Services Miscellaneous - Modelling - (MI-M3)



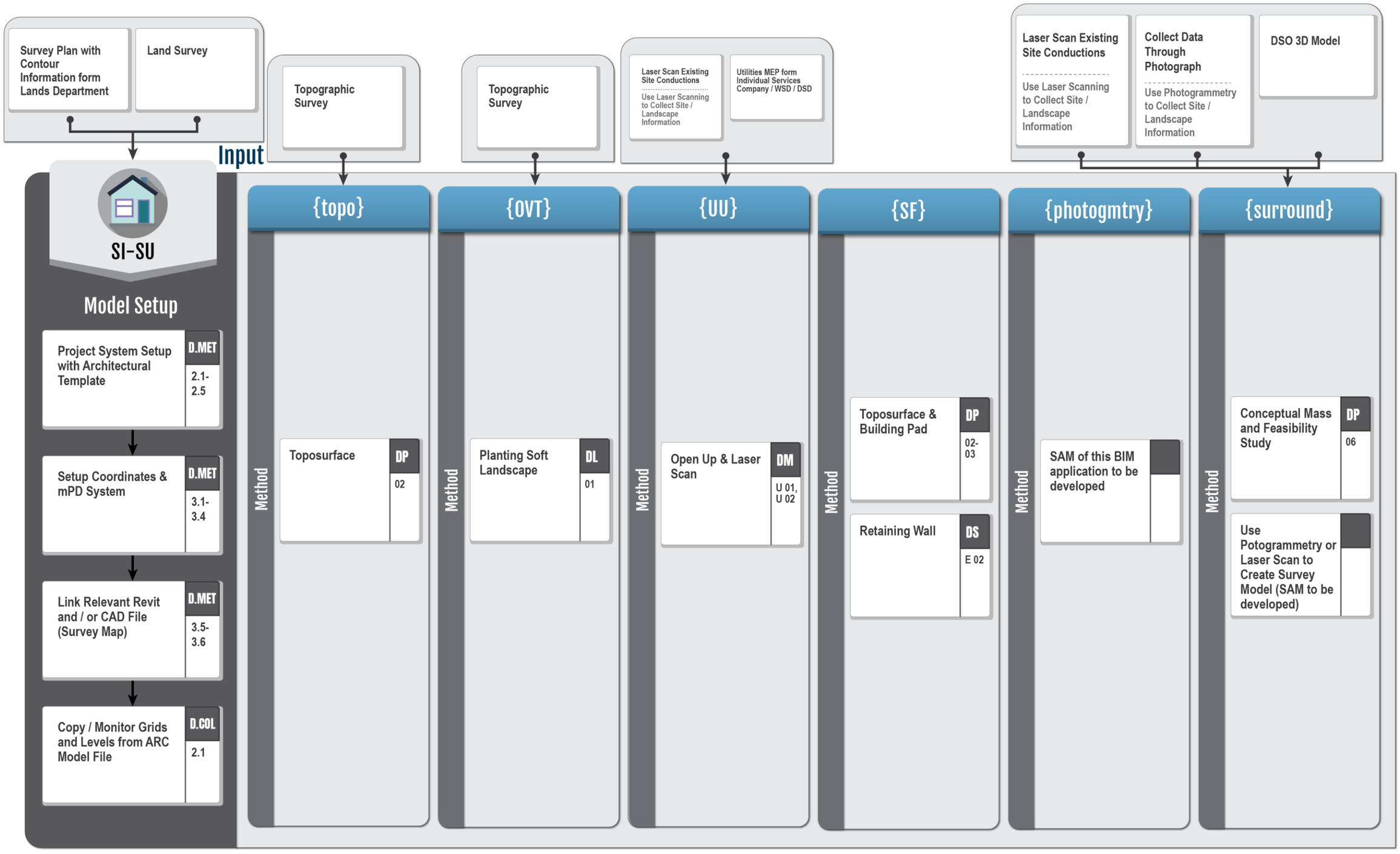
Q3-17 Landscape - Modelling - (LA-M3)



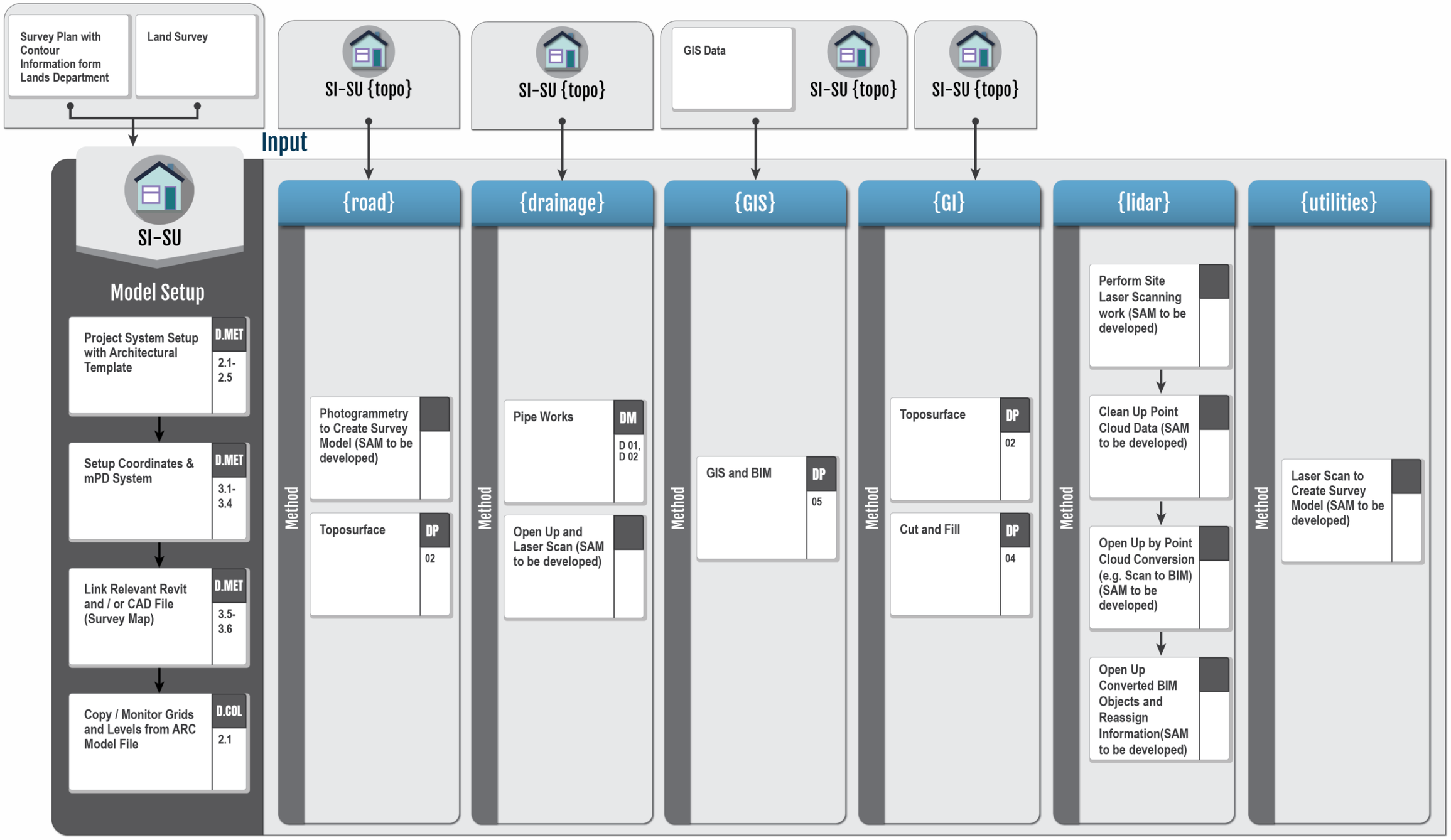
Q3-18 Architectural - Survey - (AR-SU)



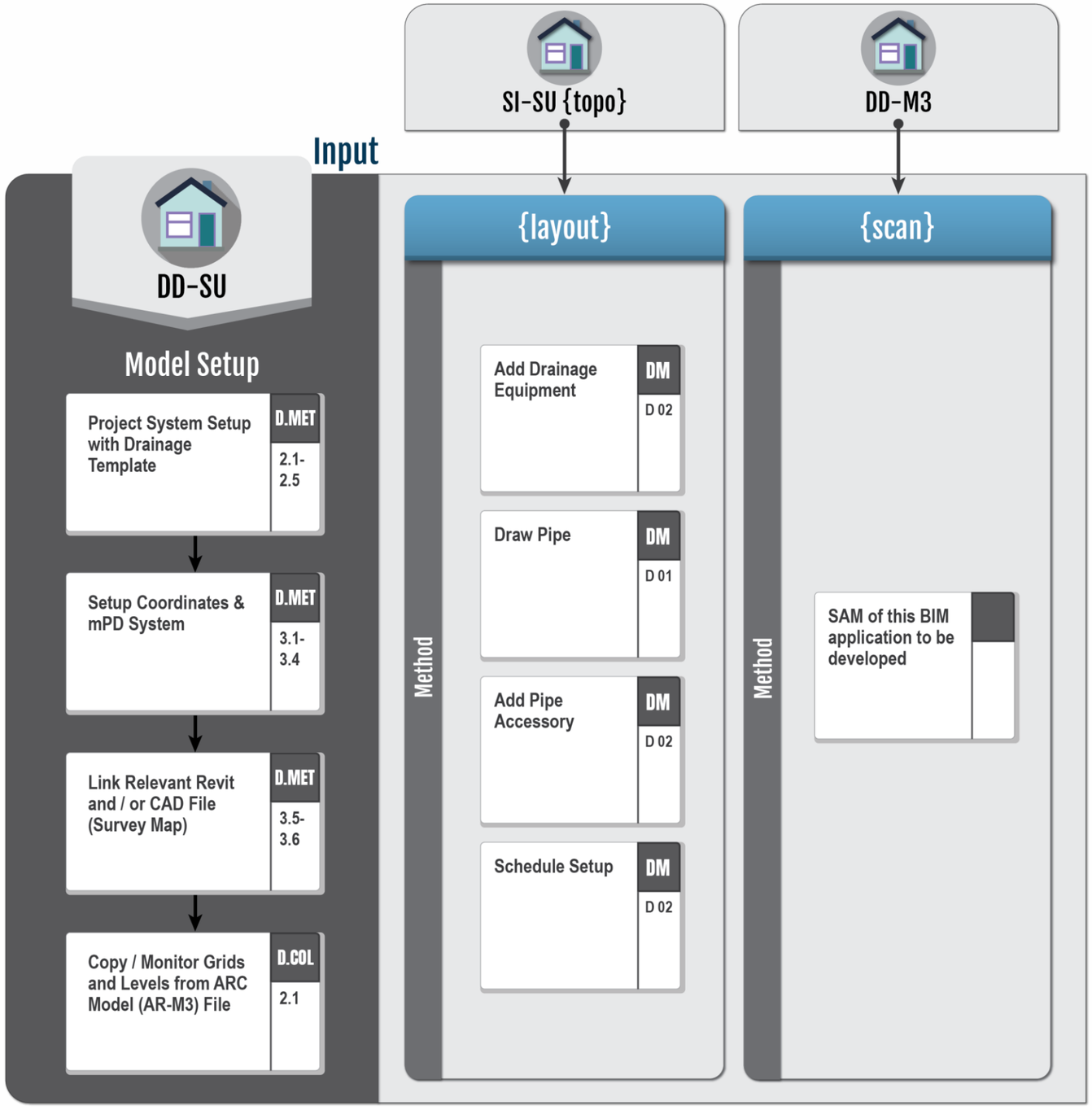
Q3-19 Site / External - Survey - (SI-SU)



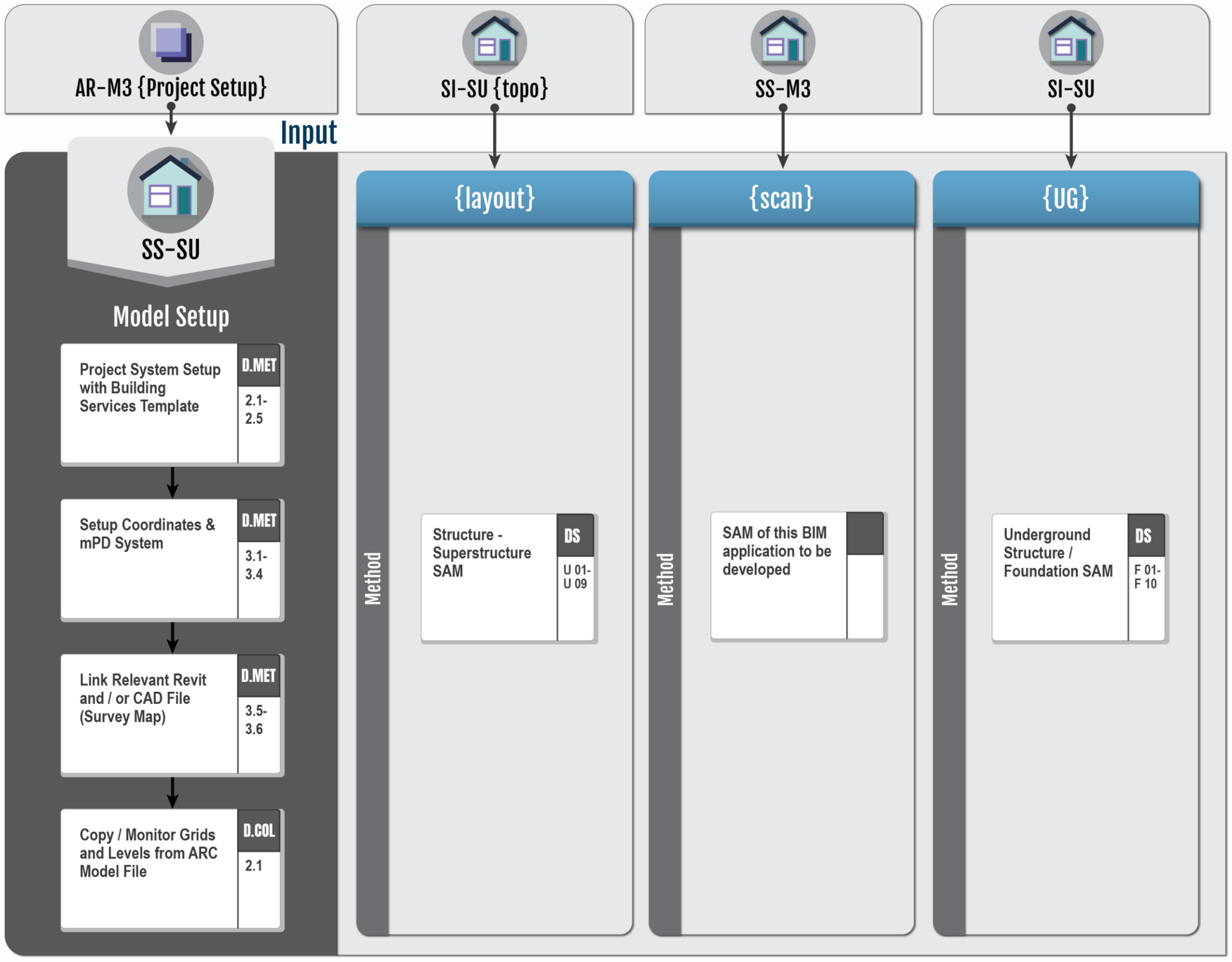
(Continue of Q3-19) Site / External - Survey - (SI-SU)



Q3-20 Drainage - Survey - (DD-SU)

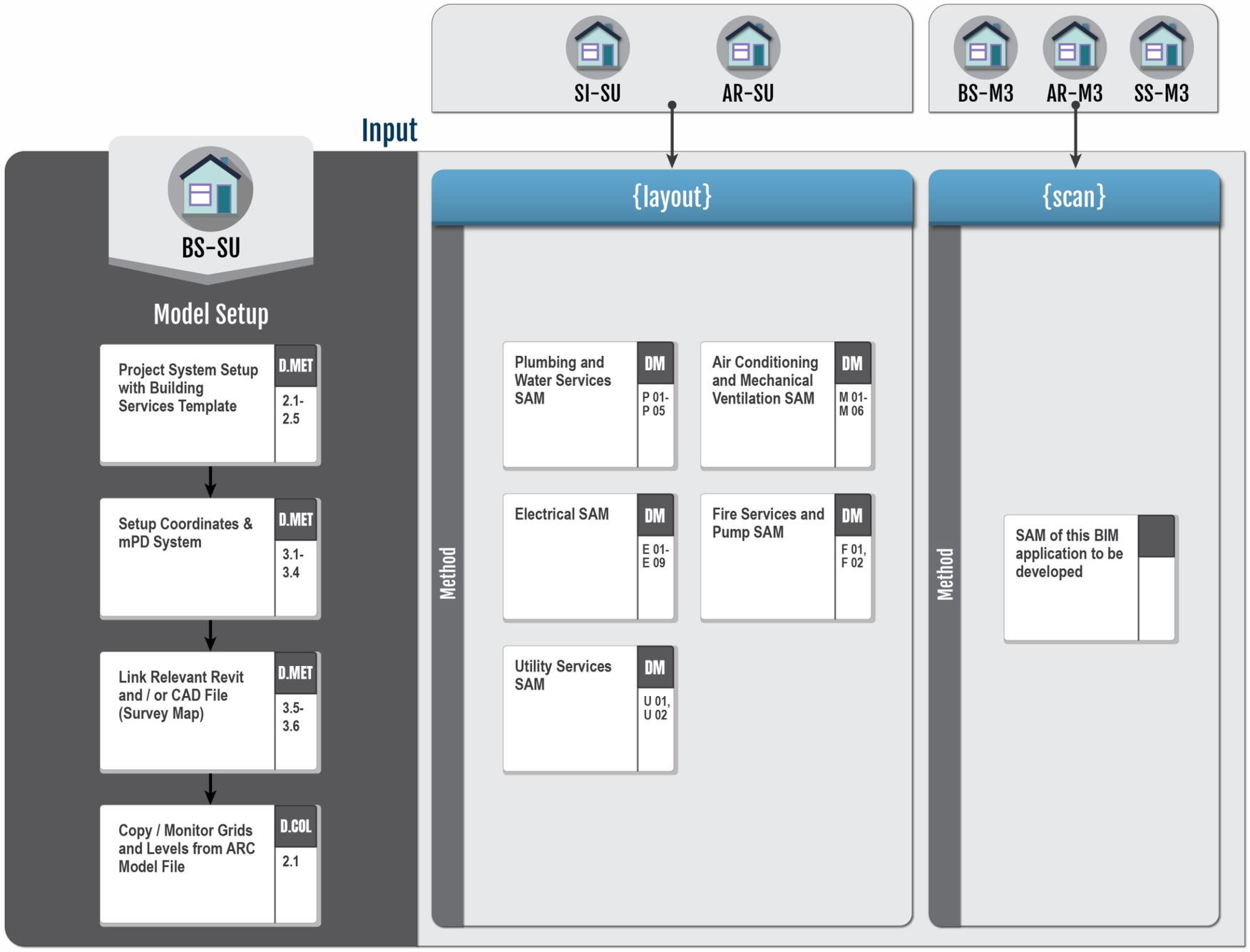


Q3-21 Superstructure - Survey - (SS-SU)

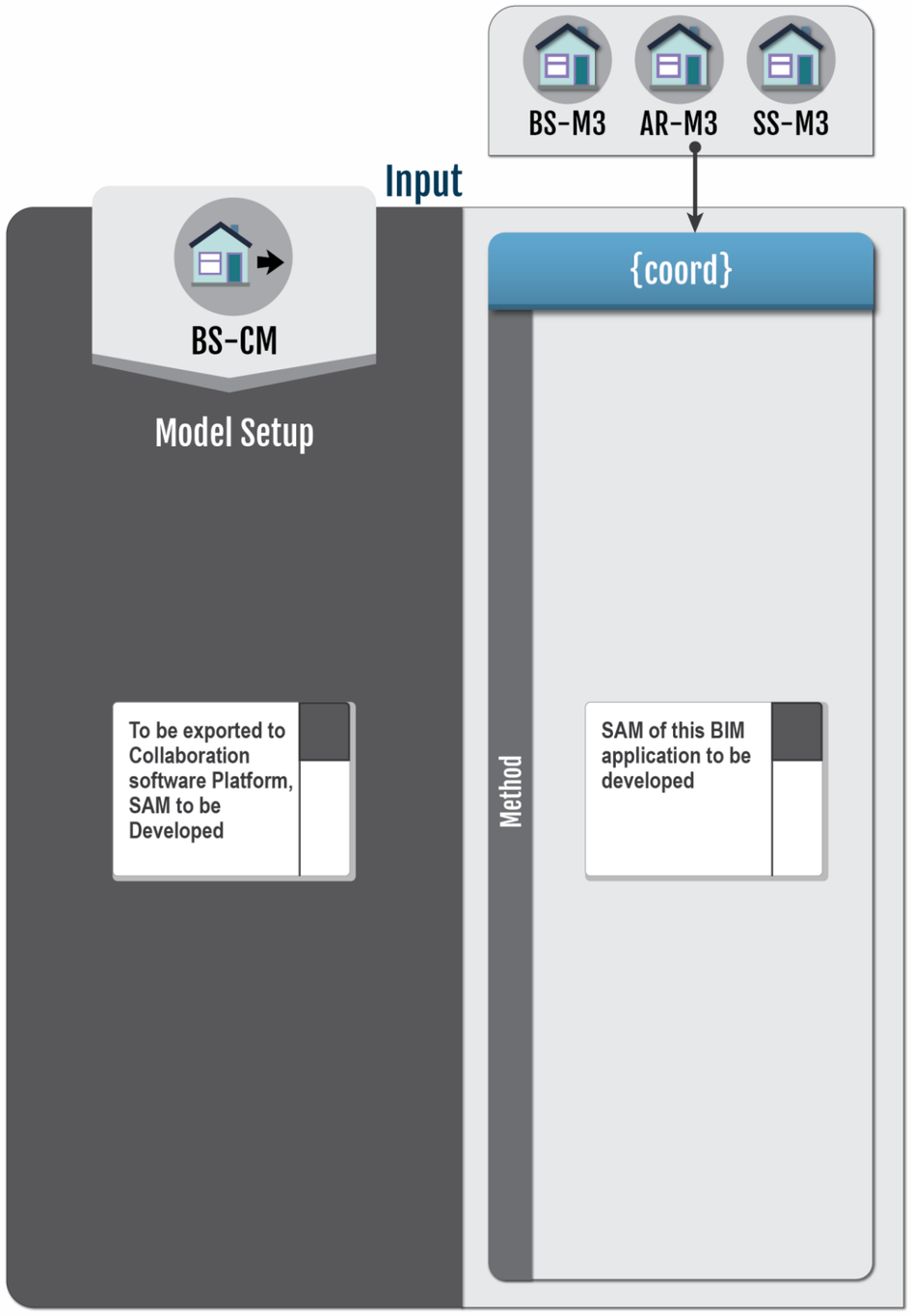


Q3-22 Building Services - Survey - (BS-SU)

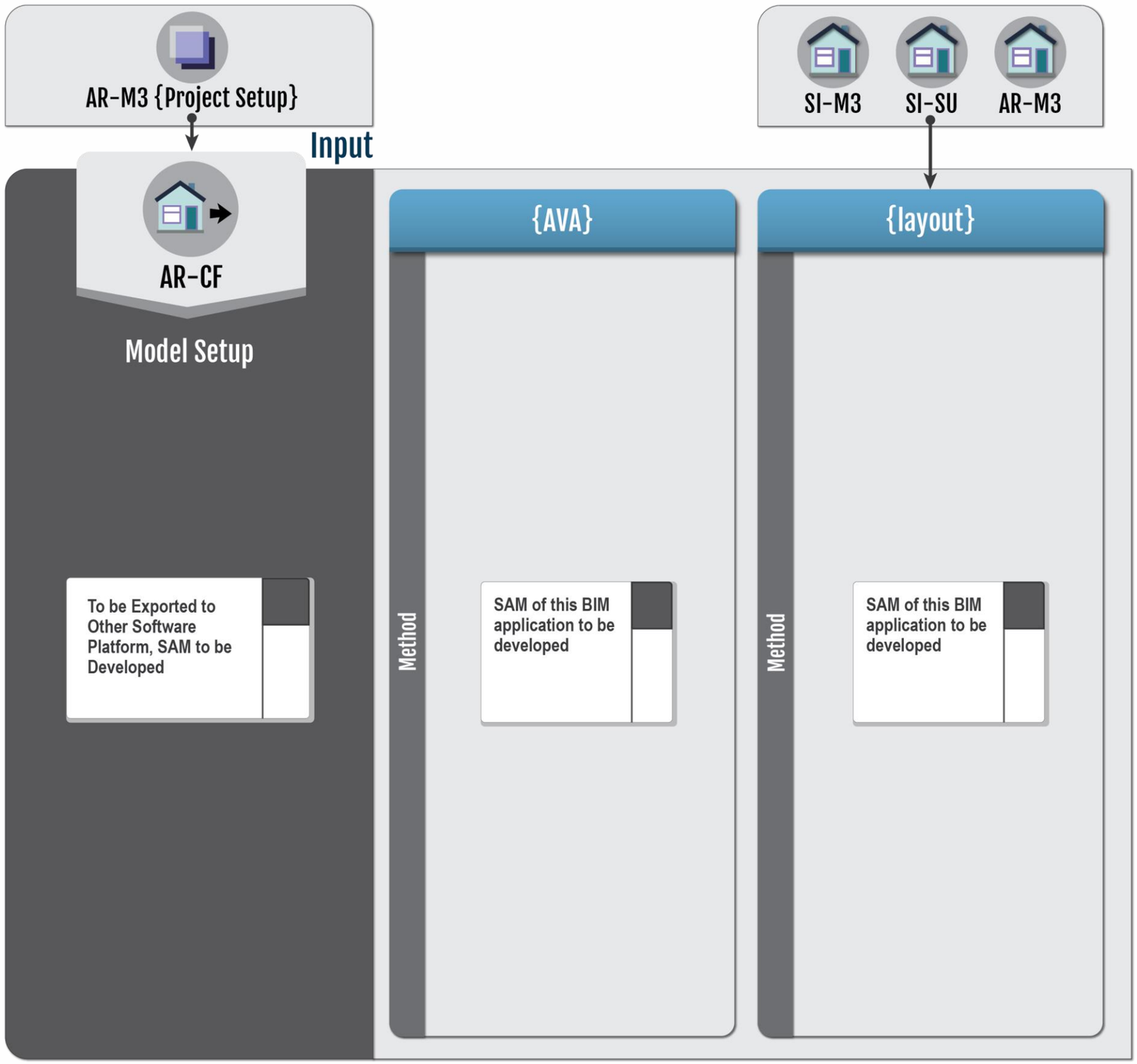
This model is used for holding models for all BS items and should only be used for very small projects. Building services model shall be segregated into individual Building Services disciplines in most cases. (BS-SU) / (BS-M3) under reference model in Level 2 and Level 3 diagrams may mean the collective of segregated Building Services disciplines models.



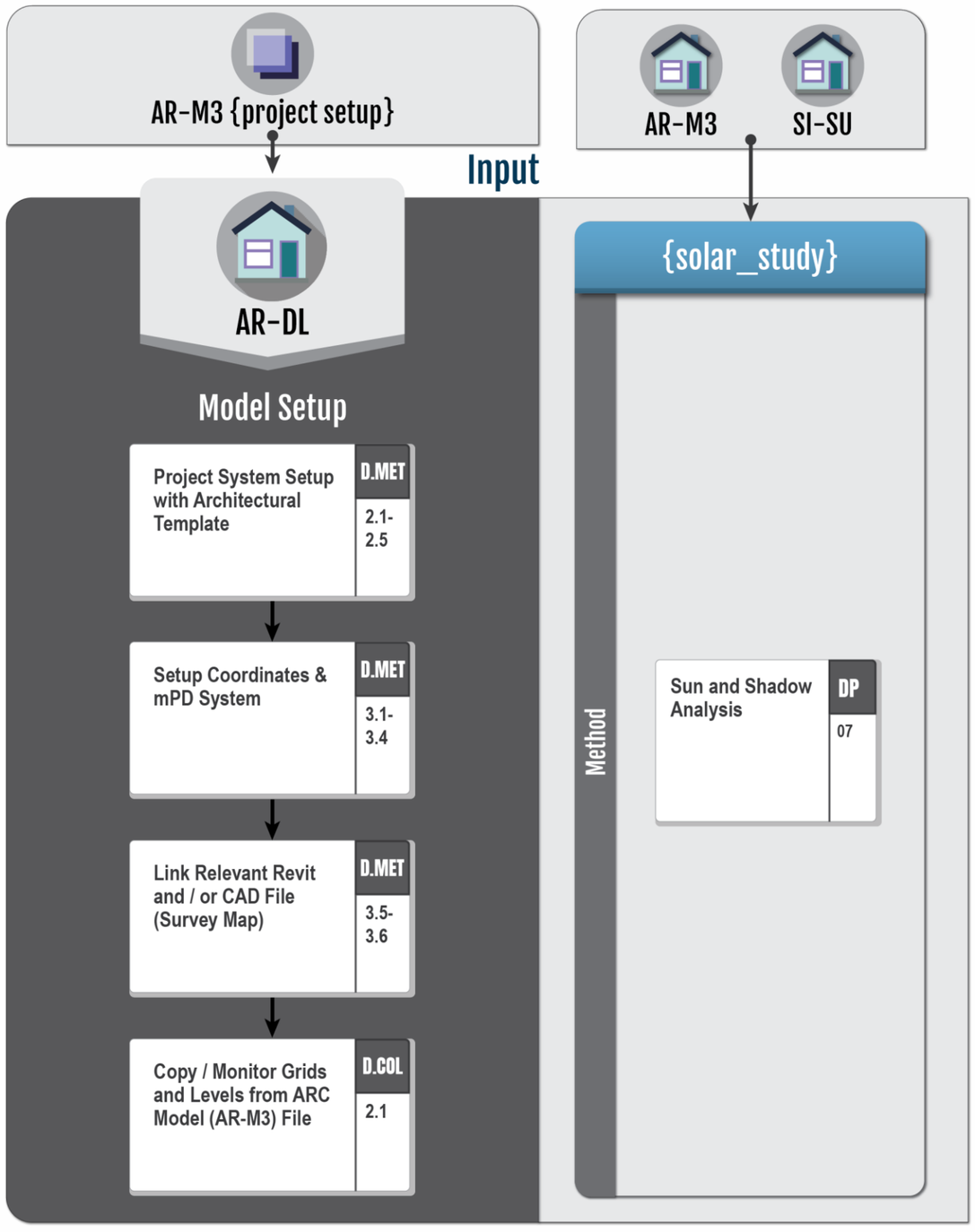
Q3-23 Building Services - Combined Model - (BS-CM)



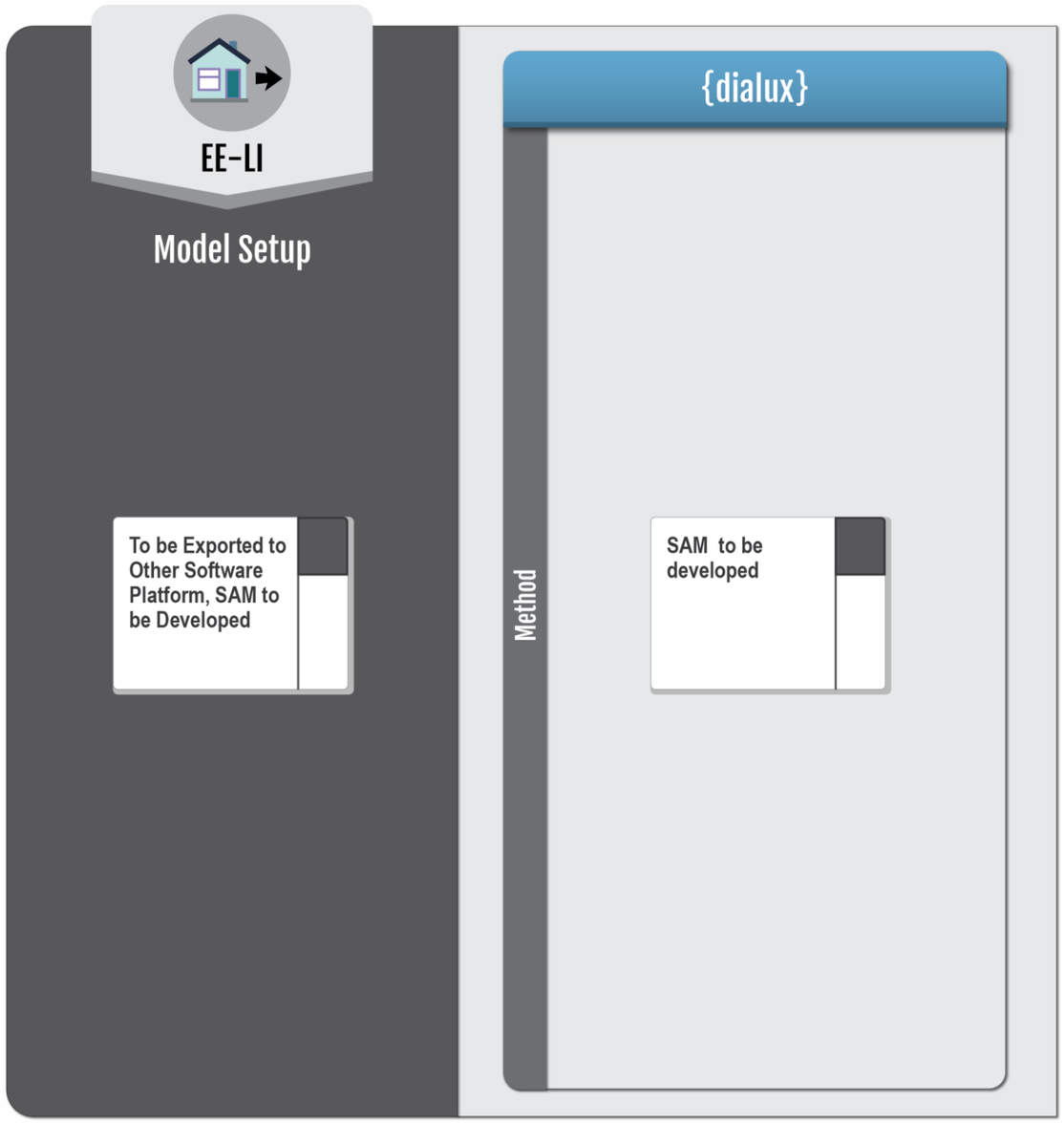
Q3-24 Architectural - Computer Fluid Dynamic - (AR-CF)



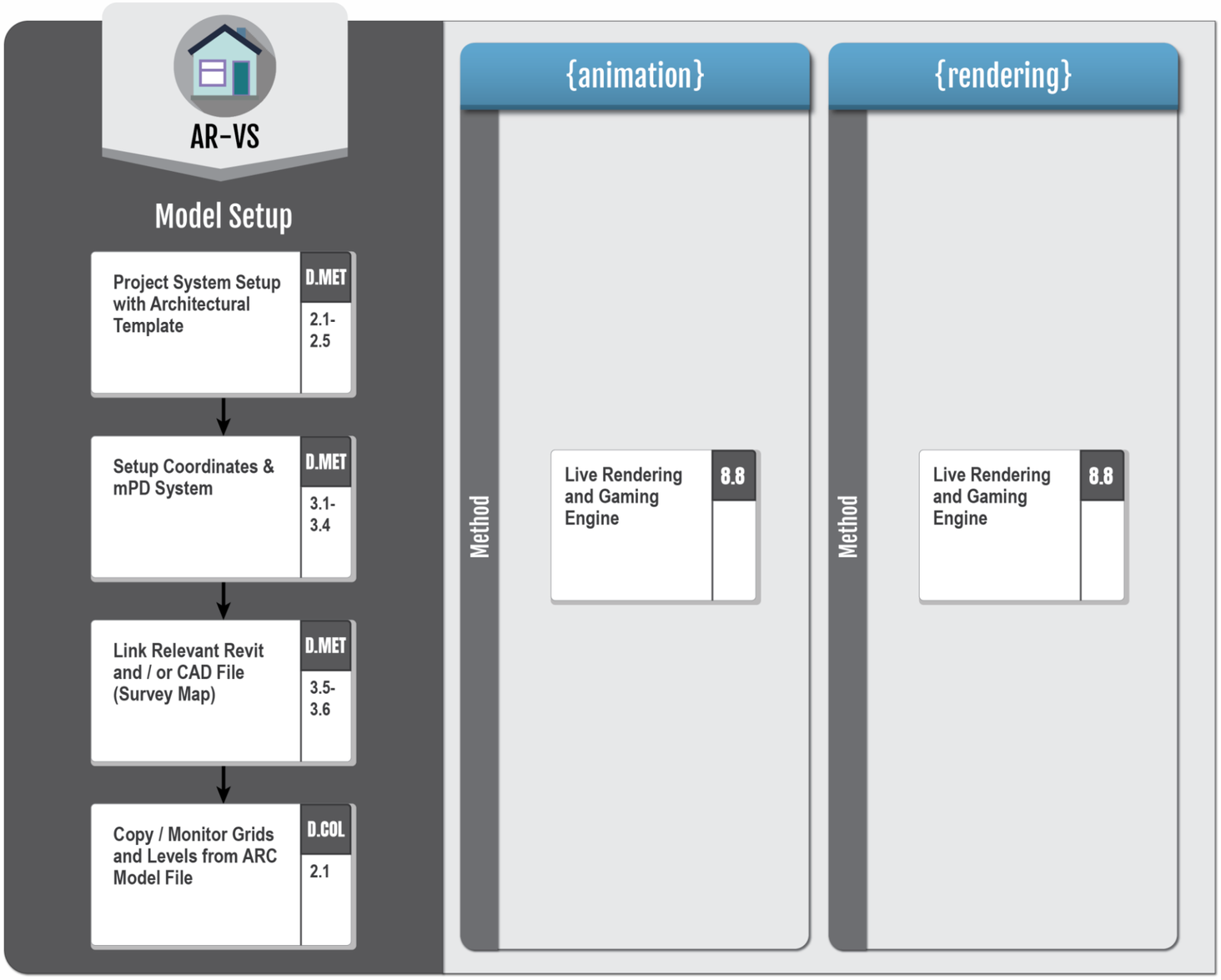
Q3-25 Architectural - Daylight Analysis - (AR-DL)



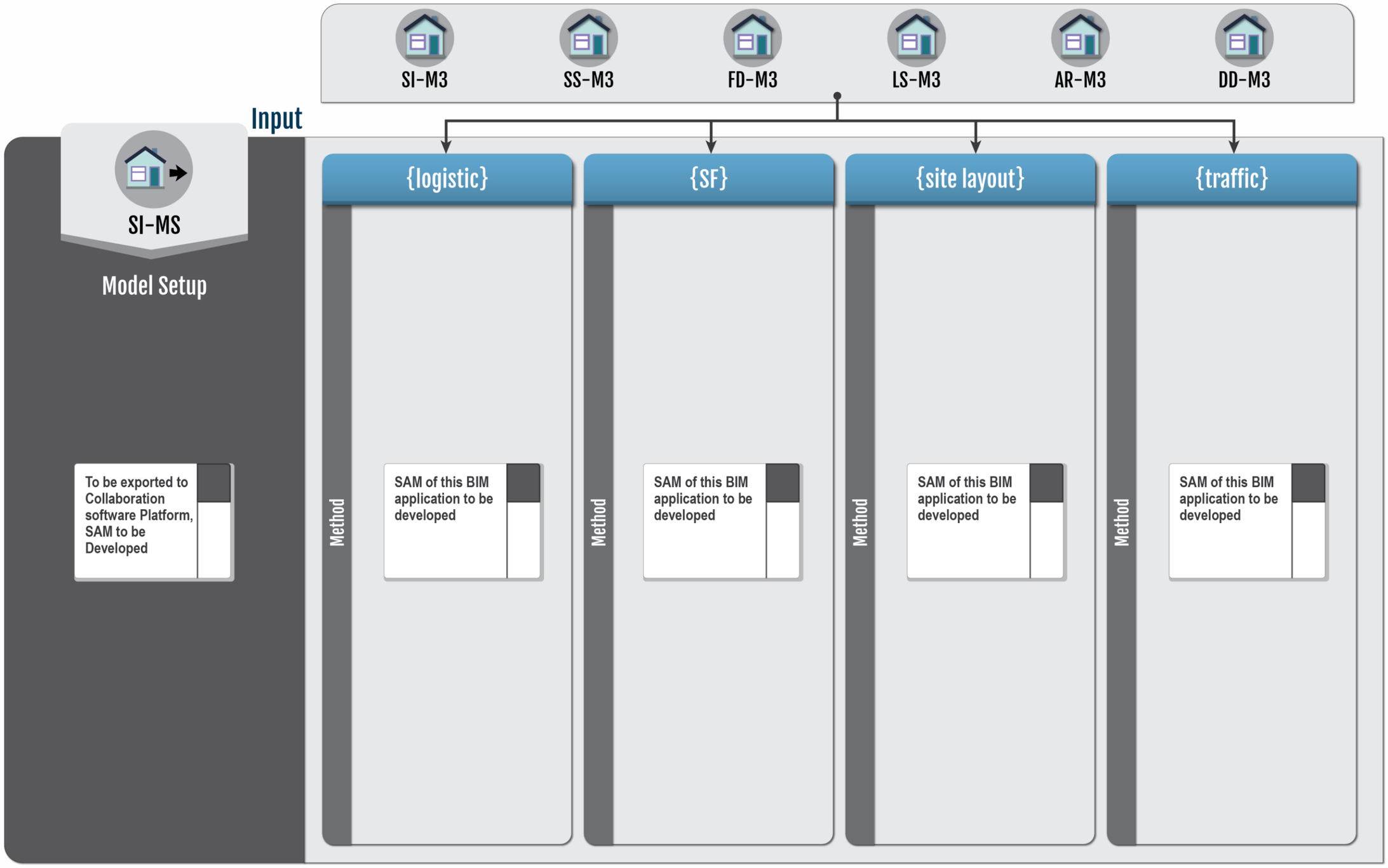
Q3-26 Electrical - Lighting Analysis - (EE-LI)



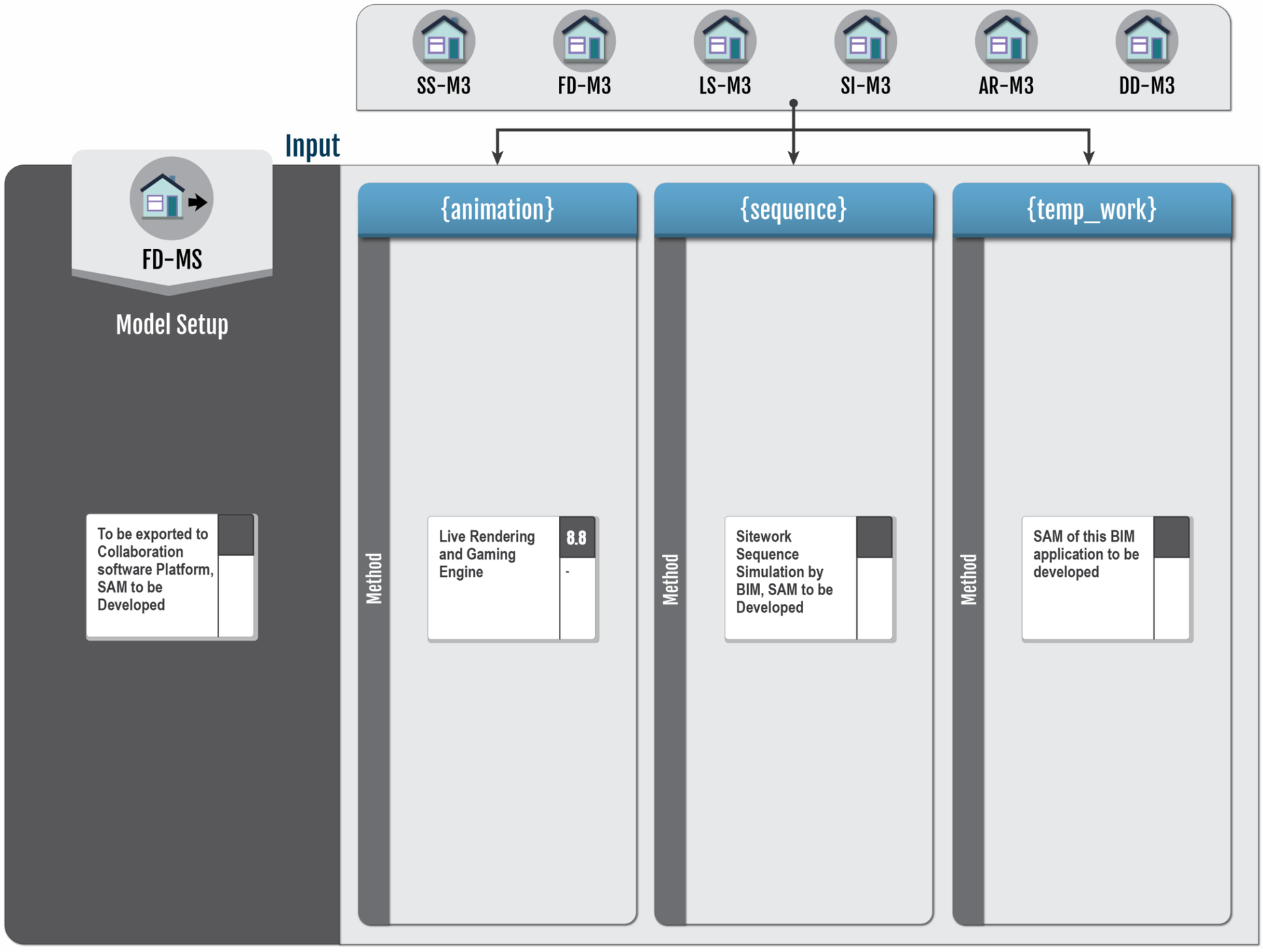
Q3-27 Architectural - Visualization - (AR-VS)



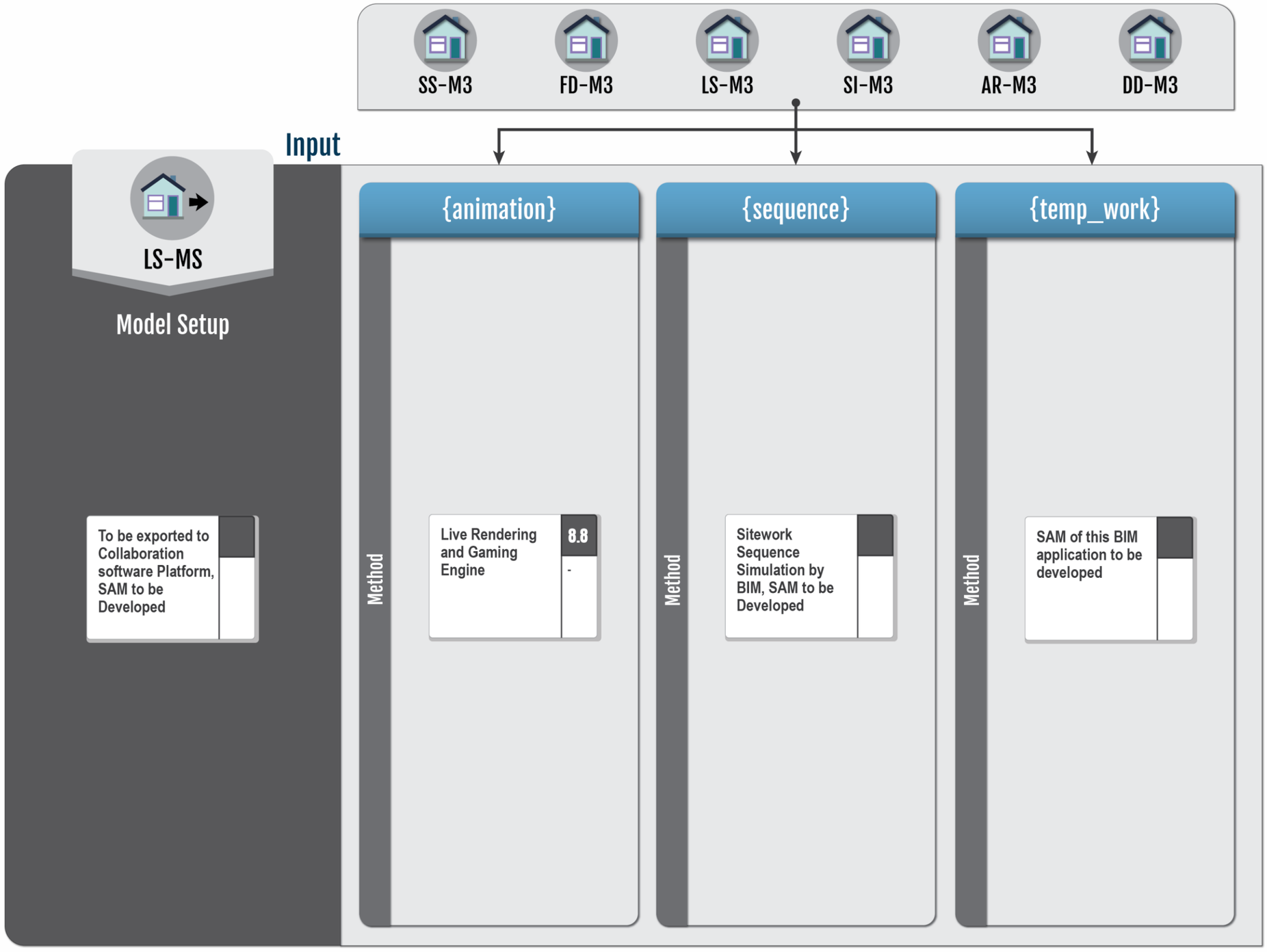
Q3-28 Site / External - Method Statement - (SI-MS)



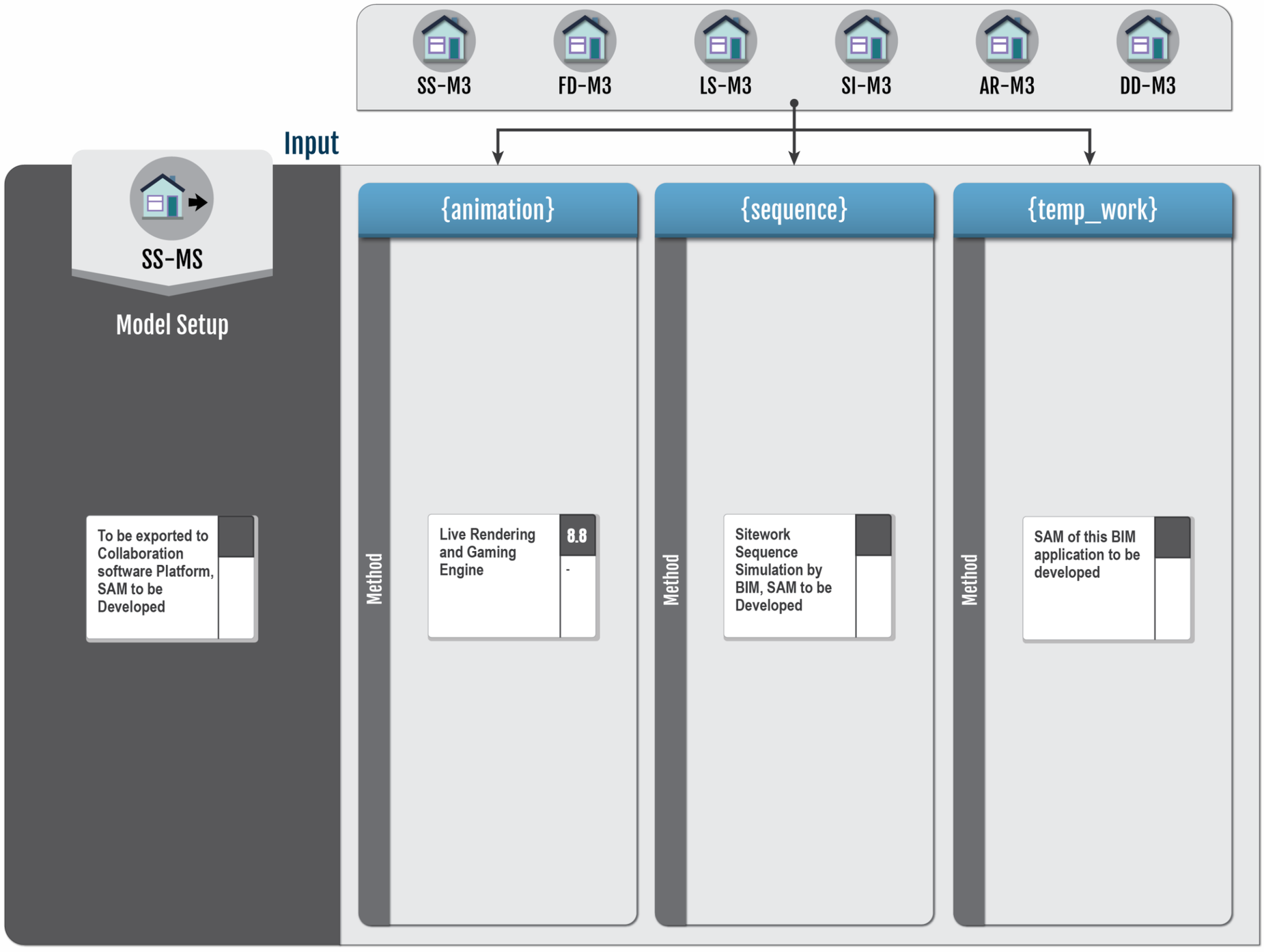
Q3-29 Foundation - Method Statement - (FD-MS)



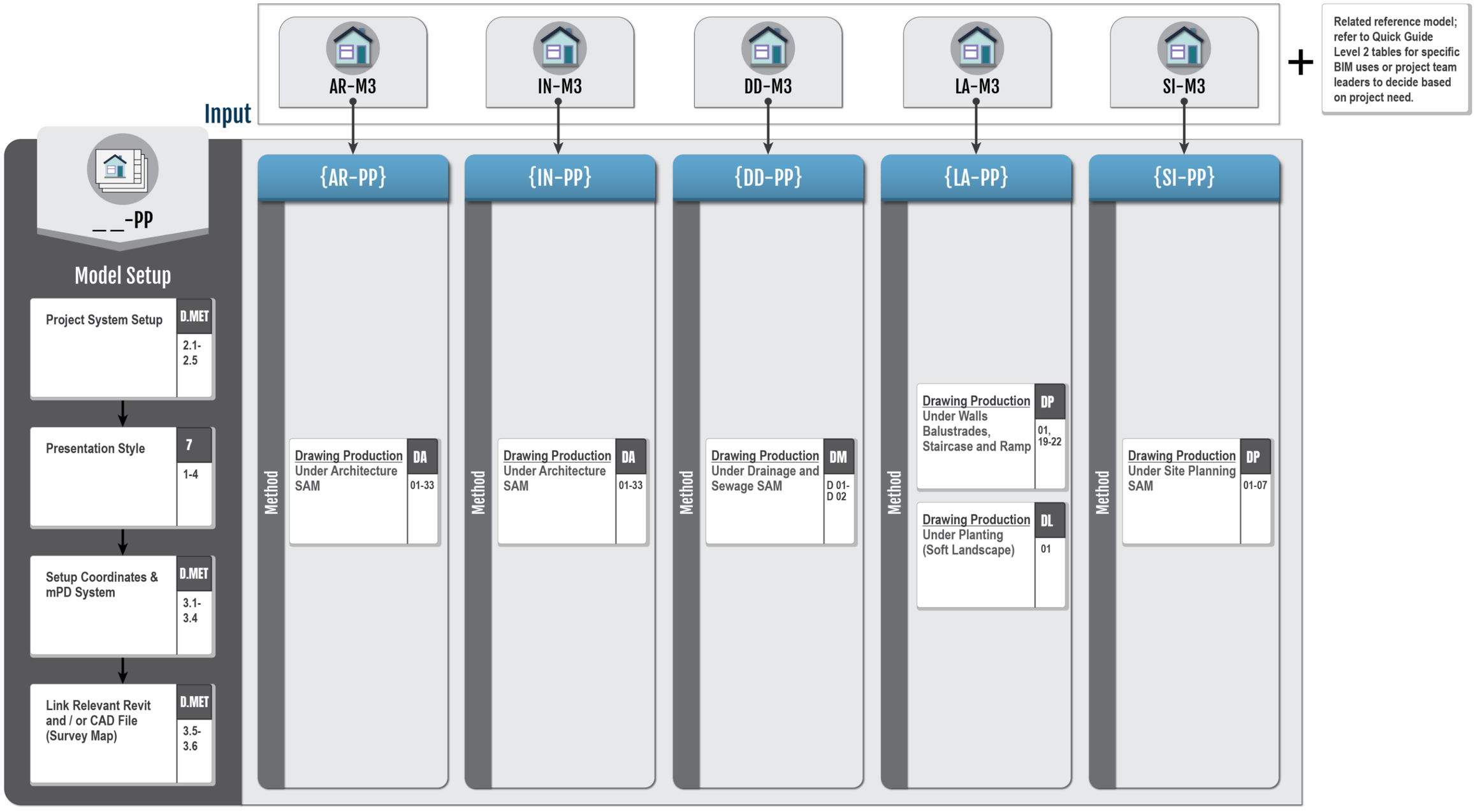
Q3-30 Lateral Support - Method Statement - (LS-MS)



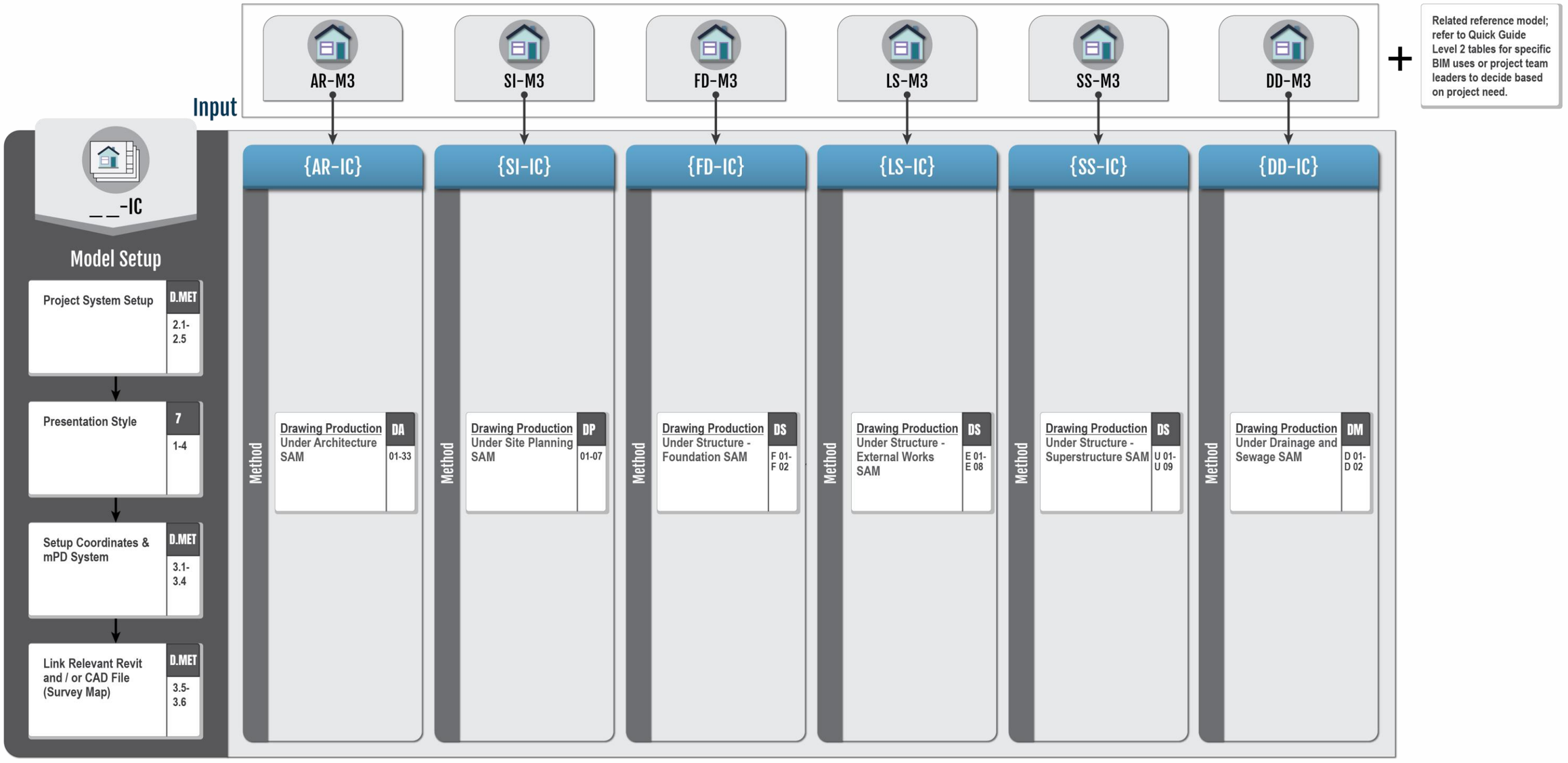
Q3-31 Superstructure - Method Statement - (SS-MS)



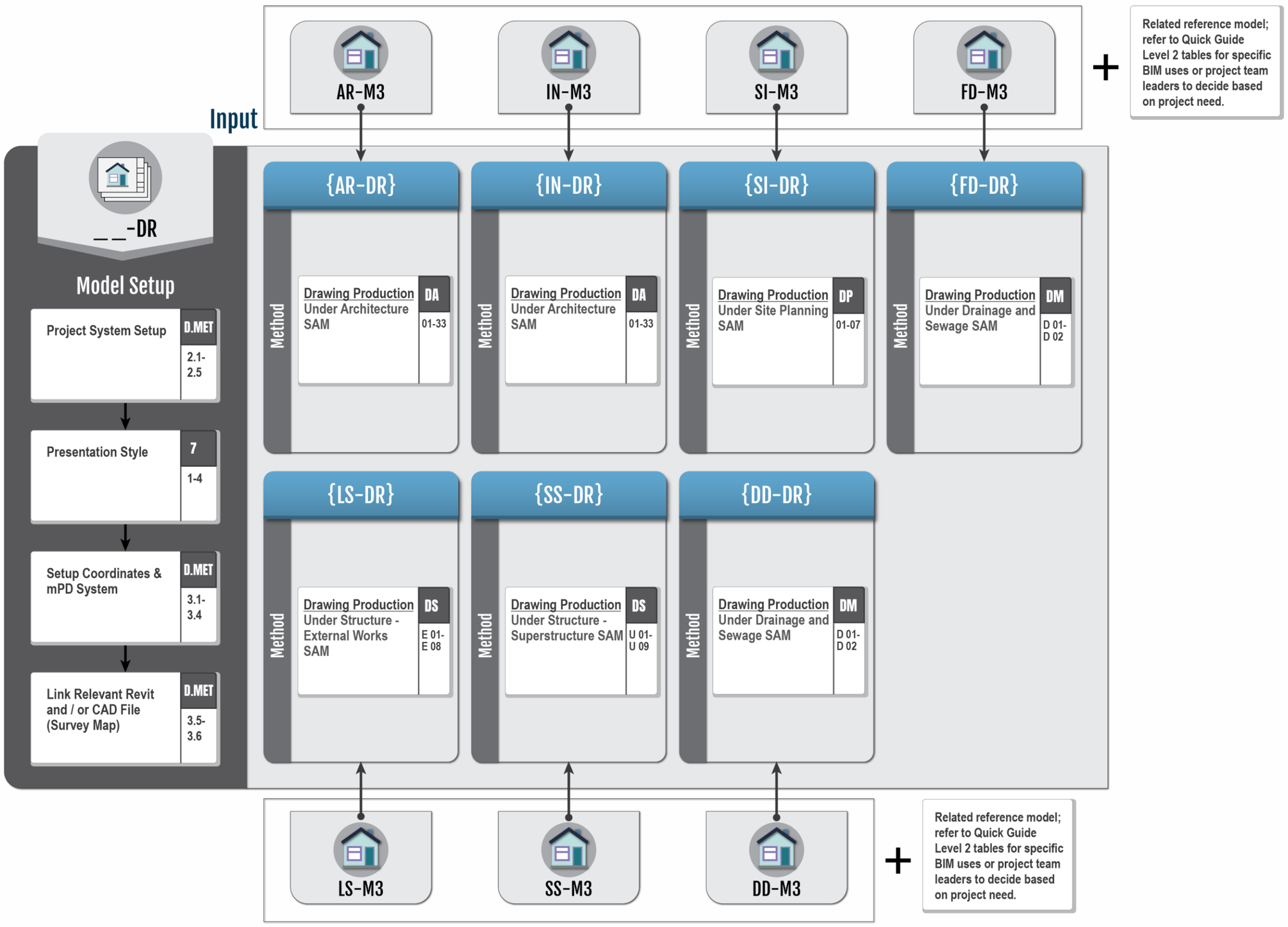
Q3-32 Presentation - (_ _-PP)



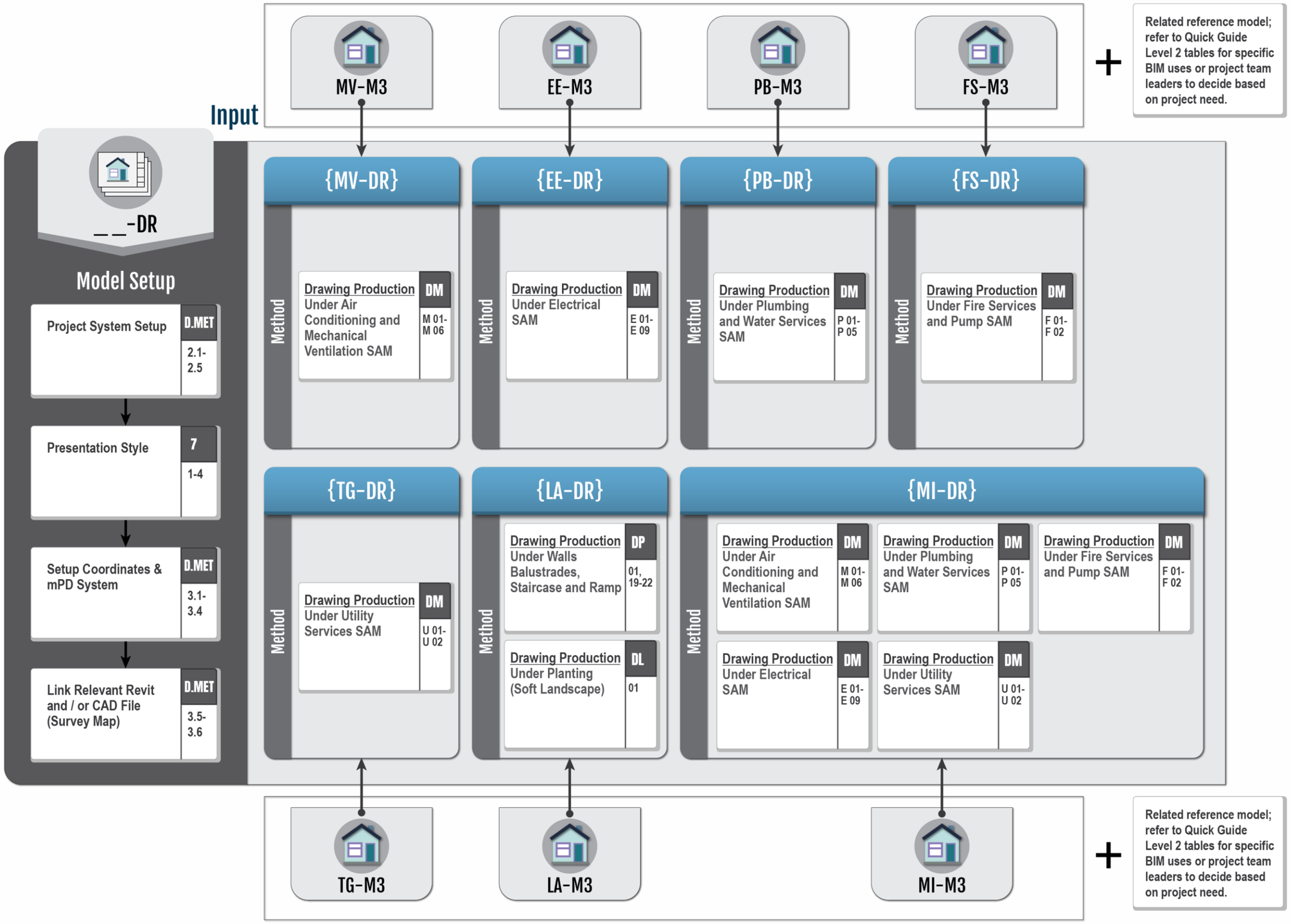
Q3-33 ICU Submission - (_ _-IC)



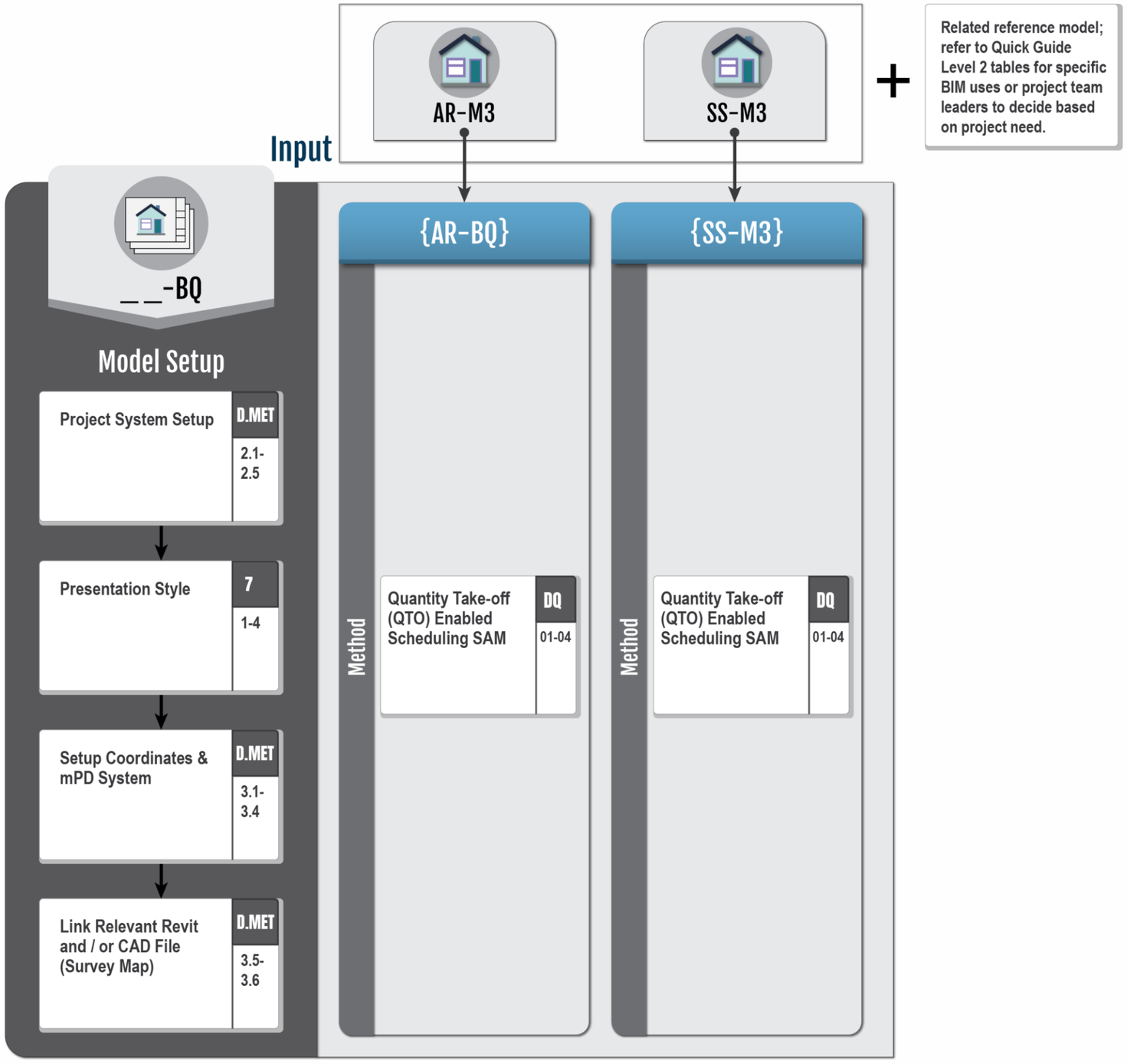
Q3-34 Drawing - (_ _-DR)



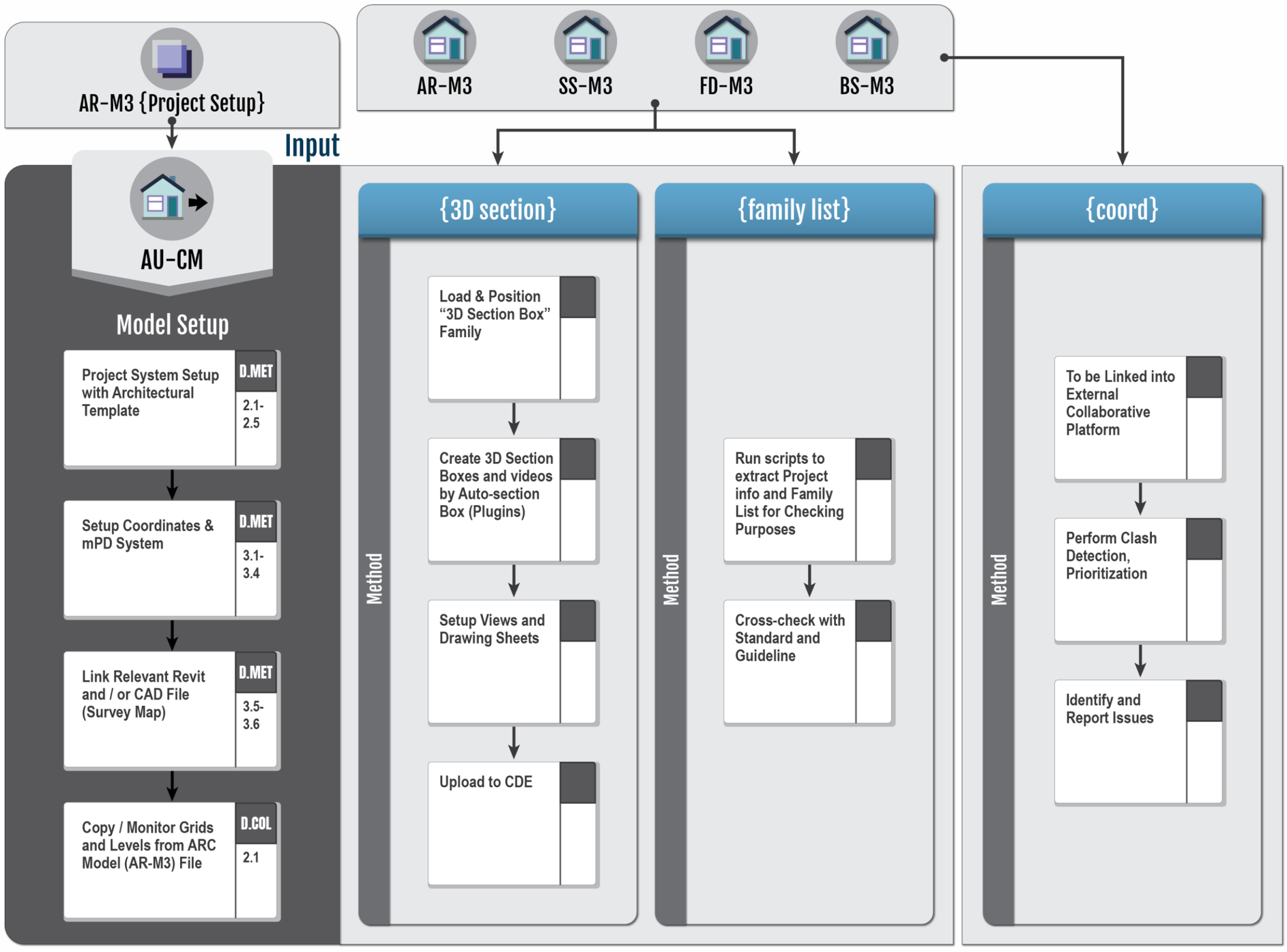
(Continue of Q3-34) Drawing - (_ _-DR)



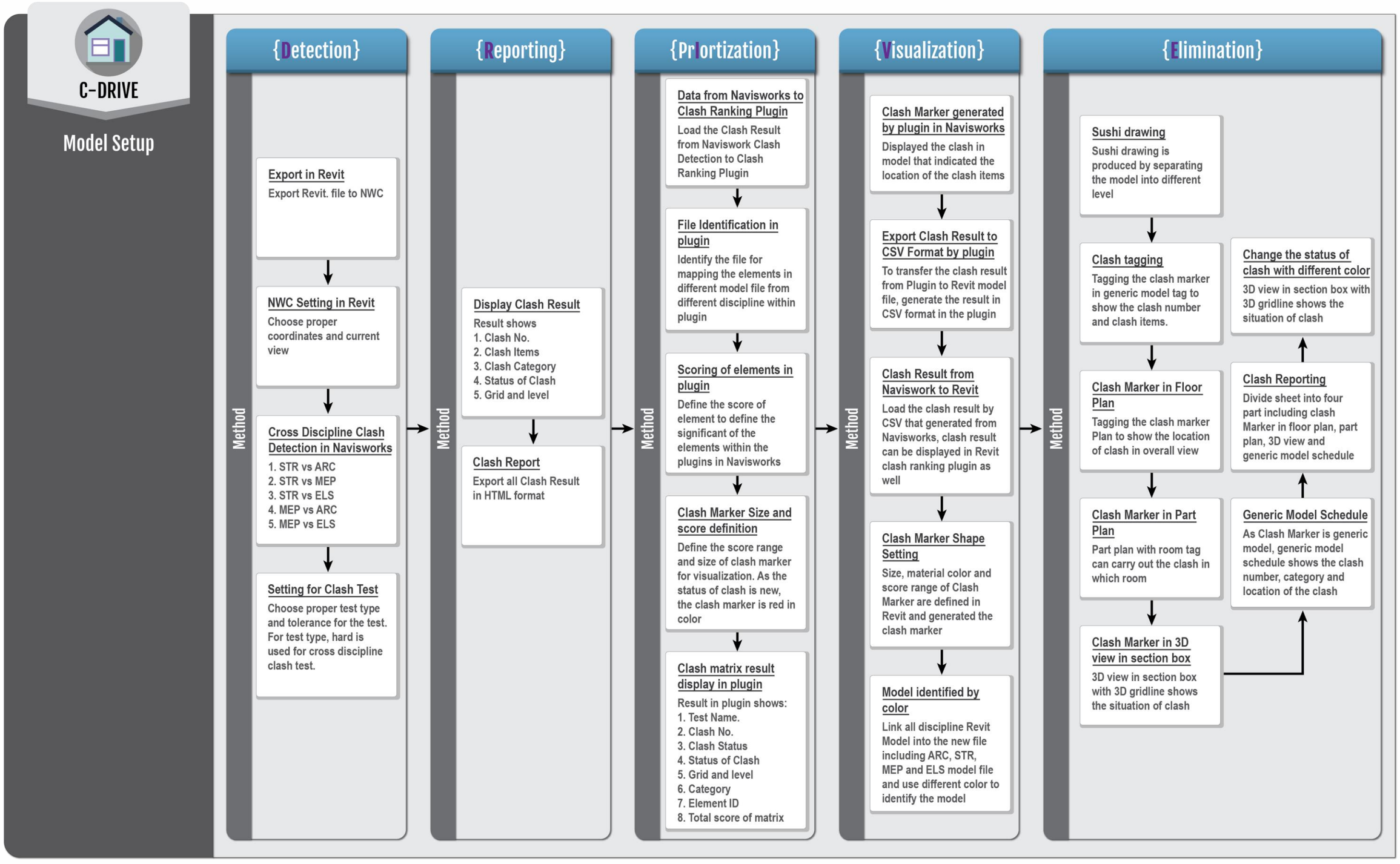
Q3-35 Bills of Quantities - (_ _-BQ)



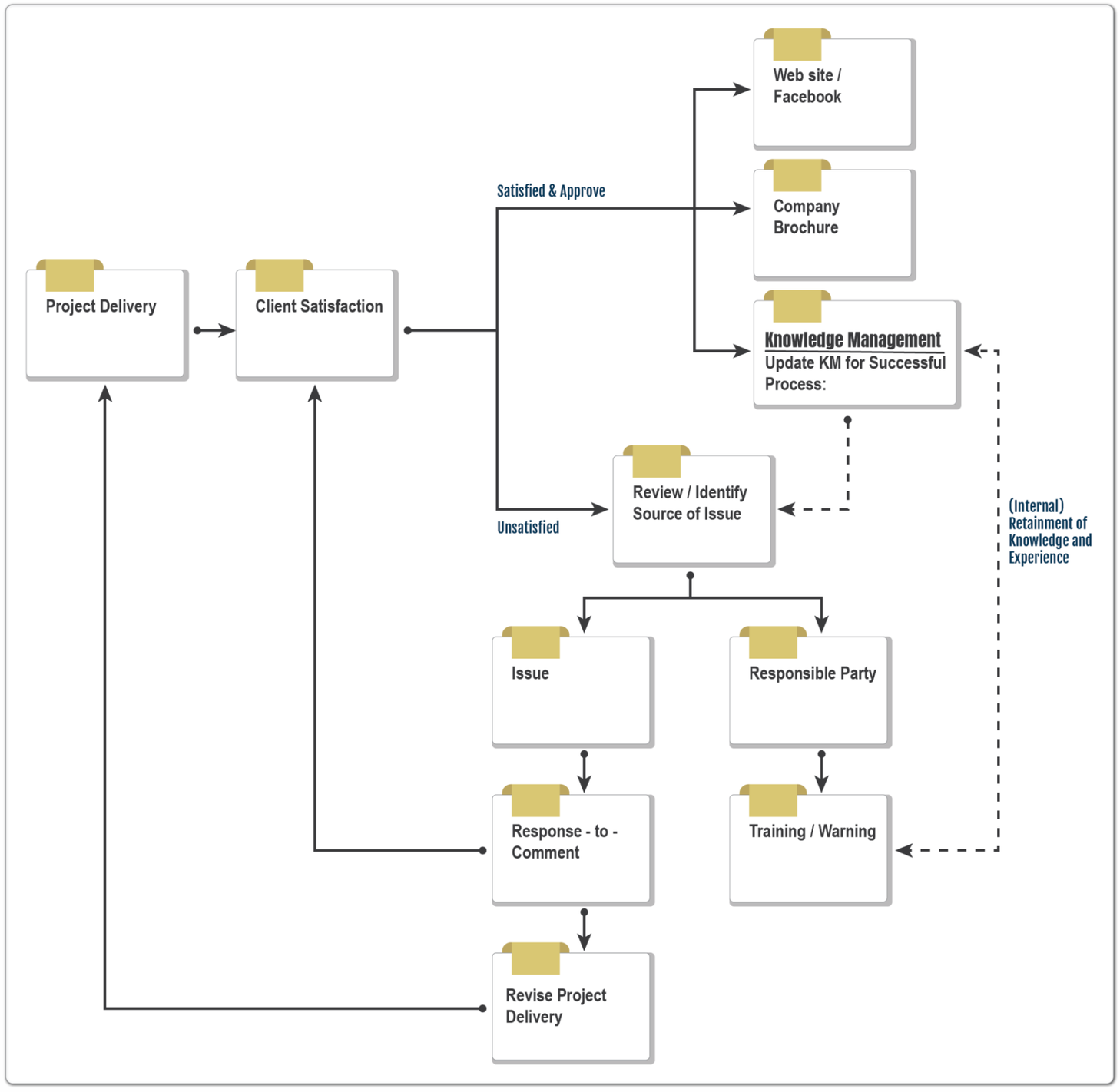
Q3-36 Audit - Combined Model - (AU-CM)



Q3-37 Clash Detection

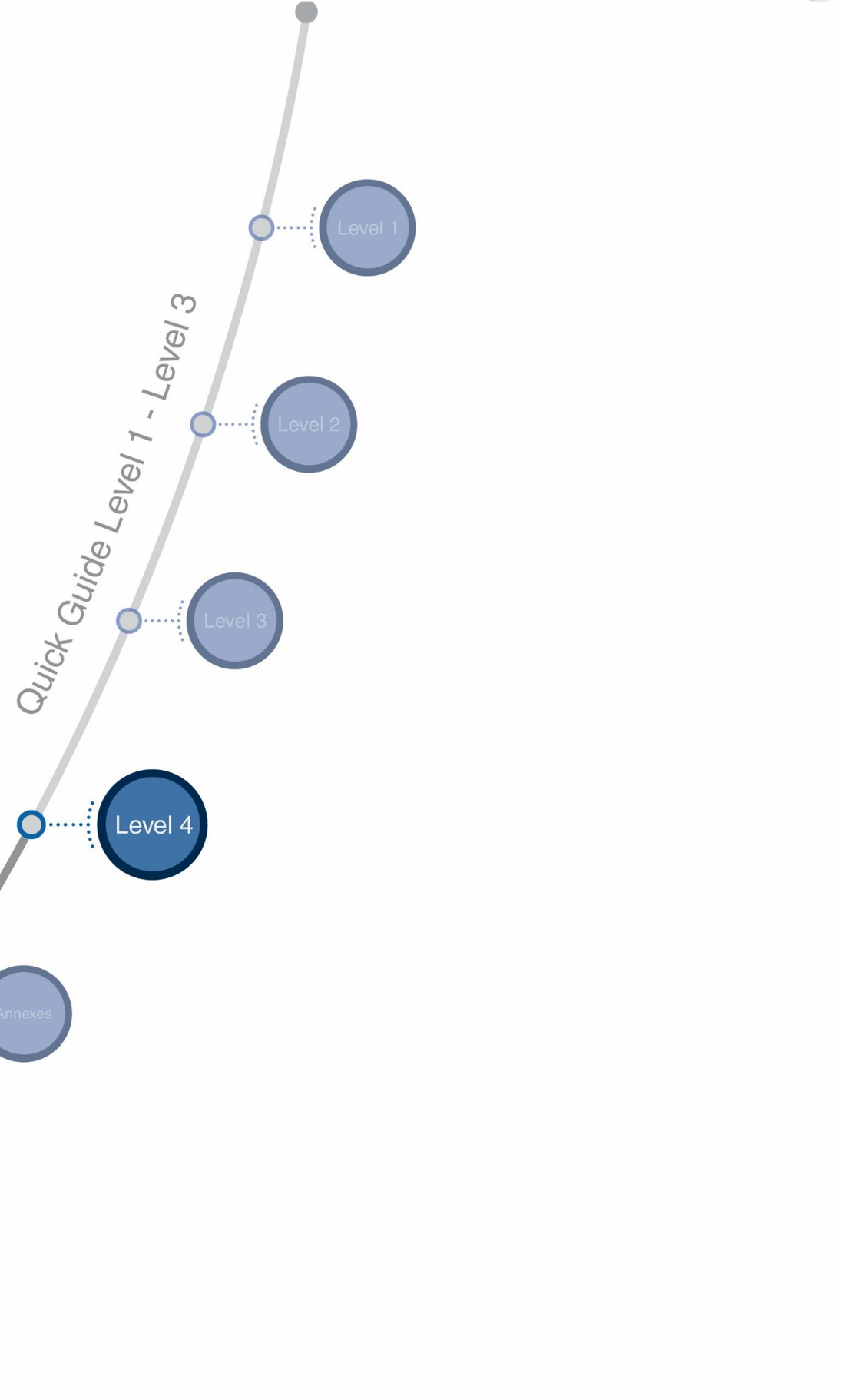


Q3-38 Client Satisfaction



DETAIL GUIDE

Level 4



3 LEVEL OF DEVELOPMENT (LOD)

D.LOD-1 Adoption

The latest version of Level of Development Specification (current version October 19, 2016) ("LOD Spec) shall be adopted whenever "Level of Development" or "LOD" are mentioned in this Guide. Users may download the specification from their website www.bimforum.org/lod for their latest version.

D.LOD-1.1 What is LOD?[1]

Level of Development is the degree to which the element's geometry and attached information has been thought through – the degree to which project team members may rely on the information when using the model.

When BIM is a communication tool among team members, LOD definition is the language to communicate between upstream (model authors) and downstream BIM users. It allows model authors to define what their model elements can be relied on, and allows downstream users to clearly understand the usability and the limitations of models they are receiving.

LOD should only be used to describe model elements and not models as a whole. There is no such thing as an "LOD ### model." Project models at any stage of delivery will invariably contain elements and assemblies at various levels of development.

Therefore, the LODs are not defined by design phases and not necessarily in line with deliverables. The definition of LOD required indicated in this Guide should only be taken as communication among BIM users when referencing other disciplines' upstream model elements for input and should not be considered to be additional requirements for professional deliverables.

Team members should use this LOD guide as a starting point for model exchange and, as projects progress, should continue to develop this Guide by identifying the need for an LOD that would define model elements sufficiently developed to enable detailed coordination between disciplines.

D.LOD-1.2 Fundamental LOD Definitions[2]

LOD 100

LOD 100 elements are **not geometric representations**. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.

LOD 200

At this LOD elements are **generic placeholders**. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.

LOD 300

The **quantity, size, shape, location, and orientation** of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs. The project origin is defined and the element is located accurately with respect to the project origin.

LOD 350

Parts necessary for coordination of the element with nearby or attached elements are modelled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs.

LOD 400

An LOD 400 element is modelled at sufficient detail and accuracy for **fabrication** of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs.

LOD 500

LOD 500 relates to **field verification** and is not an indication of progression to a higher level of model element geometry or non-graphic information.

Specification for LOD500 was intentionally left out in LOD Spec. In this Guide, various field verification methods are mentioned and results of which may be feedback for necessary adjustment to the LOD 400 model, and thus achieving LOD 500.

[1] The concept of LOD and large part of texts in this section are referenced or partly modified from Level of Development Specification version 2016, BIMForum.

[2] BIMForum's interpretation to AIA's BIM protocol document, G202-2013, Building Information Modelling protocol Form is adopted. Extracts of which are reproduced here for quick reference.

D.LOD-1.3 LOD Explained by Example[3]

In simpler terms, LOD 100, represents a conceptual level. For example, in a massing model the interior walls may not yet be modelled, but the architect can use the approximate floor area to generate an area-based interior construction cost. Therefore the interior walls are at LOD 100 as they are not modelled, but information about them can be obtained from elements that are modelled (the floors) coupled with other information (area-based cost tables).

To continue with the wall example, a floor plan is often first laid out using generic walls. The walls can now be measured directly, but the specific wall assemblies are not known and the quantity, thickness, and location measurements are approximate. The walls are now at LOD 200. To step back to the massing model, if generic exterior walls are modelled and can be measured directly, they are actually at LOD 200, even though there is little detail.

At LOD 300, the wall element is modelled as a specific composite assembly, with information about its framing, wallboard, insulation if any, etc. The element is modelled at the thickness of the specified assembly, and is located accurately within the model. Non- geometric information such as fire rating may be attached as well. This means that it's not necessary to model every component of the wall assembly—a solid model element with accurate thickness and location and with the information usually included in a wall type definition satisfies the requirements of LOD 300.

At LOD 350, enough detail for installation and cross-trade coordination is included. For the wall example, this would include such things as blocking, king studs, seismic bracing, etc.

LOD 400 can be thought of as similar to the kind of information usually found in shop drawings.

D.LOD-1.4 LOD of Level 4 Detail Guide

The modelling standard and methodology as described in **Section 6** of this Guide aims to enable users to produce drawings for professional deliverables. These methodologies largely satisfy LOD 300, or LOD350 for curtain walls.

If certain BIM use requires LOD above those as required for their deliverables, the concerned downstream disciplines should raise request to the model originators for agreement. The final decision should be documented in the Project Execution Plan.

[3] Extracted from CIC Building Information Modelling Standards (Phase One), September 2015, Construction Industry Council, Hong Kong.

D.LOD-2 LOD Responsibility Matrix

The following tables indicate which LOD is typically expected for each model element at the completion of each project stage. The pre-filled value is provided as a starting point for further adjustment by model authors and receivers as project progress.

It should be stressed that this table is not additional requirements to professional deliverables. It should be adjusted from time to time to reflect the LOD of elements within models.

D.LOD-2.1 Site Model (Topography, Slopes, Roadworks, Landscape, Street Furniture)

Model Element List	QTO	Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Topography (Existing Site and surrounding land use)	$_{m}3$	HAV	100	HAV	200	HAV	300	HAV	300	CTR	400	CTR	500
Topography (Site Formation)	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Natural Slope	$_{m}3$	HAV	100	HAV	200	HAV	300	HAV	300	CTR	400	CTR	500
Artificial Slope	$_{m}3$	HAG	100	HAG	200	HAG	300	HAG	300	CTR	400	CTR	500
Flexible Barrier	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Rigid Barrier	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Massing model of adjacent areas or surrounding buildings	-	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500
Geological model (soil, fill, rock)	$_{m}3$	HAG	100	HAG	200	HAG	300	HAG	300	CTR	400	CTR	500
Pavement (Carriageway, Footpath, Cycle Track)		HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500
Profile Barrier, Parapet, Kerbs, Traffic island	$_{m}3$	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500
Noise Barrier	$_{m}3$	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500
Planter	No.	HAL	100	HAL	200	HAL	300	HAL	300	CTR	400	CTR	500
Bollard	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500
Phone Booth	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500
Signage	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500
Gully	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.2 Architecture Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Building Massing Model	$_m$2	HAP / HAA	100	HAA	200	-	300	HAA	300	-	-	HAA	500	FM	500
Room space, corridor, plant & equipment room	$_m$2	HAA	100	HAA / HAB	200	HAA / HAB	300	HAA	300	CTR	400	CTR	500	FM	500
Elevator shaft space	-	HAA	100	HAA / HAB	200	HAA / HAB	300	HAA	300	CTR	400	CTR	500	FM	500
Floor, slab, ramp, roof	$_m$2	HAA	100	HAA	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Basic structural columns and walls	-	HAA	100	HAA / HAS	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Basic structural beams and framing	-	HAA	100	HAA / HAS	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Exterior wall	$_m$2	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Interior wall / Partition / Non-structural wall	$_m$2	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Curtain wall, including shading devices	$_m$2	HAA	100	HAA	200	HAA / HAS	300	HAA / HAS	300 / 350	CTR	400	CTR	500	FM	500
Precast Facade	$_m$2	HAA	100	HAA	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Door	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Window	No.	HAA	100	HAA	200	HAA	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Louver	No.	HAA	100	HAA / HAB	200	HAA / HAB	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Skylight	No.	HAA	100	HAA	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Ceiling	$_m$2	-	-	HAA / HAB	200	HAA / HAB	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Stairs, Steps	$_m$2	HAA	100	HAA	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Railing, balustrade, handrail	No.	-	-	HAA	200	HAA / HAS	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Access ladder and catwalk	No.	-	-	HAA / HAB	200	HAA / HAB	300	HAA / HAS	300	CTR	400	CTR	500	FM	500
Building Maintenance Unit	No.	-	-	HAA / HAB / HAS	200	HAA / HAB / HAS	300	HAA	300	CTR	400	CTR	500	FM	500
Furniture, fixtures & fittings including desks, workstations, casework, cabinets, appliances, loose equipment	No.	HAA	100	HAA	200	HAA	300	-	-	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.3 Structure Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION MODEL		AS-BUILT MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Foundations (piles , pile caps, tie/ground beams & footings)	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Diaphragm wall, retaining wall	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Excavation & lateral support system	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Beam	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Column, post, hangar	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Wall	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Slab, floor, ramp, roof	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Transfer Structure (transfer plate, truss)	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Stairs (steps, risers, threads, landings)	$_{m}3$	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Steel bracing	Ton	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500
Temporary works, temporary structures, platforms	Ton	HAS	100	HAS	200	HAS	300	HAS	300	CTR	400	CTR	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.4 Mechanical Ventilation & Air Conditioning Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Air Terminals: Diffuser, air-boot, air grill, air filter, register etc.	No.	HAA / HAB	100	HAA / HAB	200	HAA / HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Ductwork	$_{m}2$	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Duct Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Duct Accessories: Dampers	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Fan, Fan Coil unit, Air Handling unit etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipework	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Chiller Plant unit, Cooling Tower,Water storage tank, Pump, Heater, Boiler etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.5 Plumbing and Water Services Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION		AS-BUILT MODEL		OPERATION	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Pipework	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Chiller Plant unit, Cooling Tower,Water storage tank, Pump, Heater, Boiler etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Plumbing Fixture: Sink, washbasin, Tap, Faucet etc.	No.	HAA / HAB	100	HAA / HAB	200	HAA / HAB	300	HAB	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.6 Drainage & Sewerage Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Undergound/ Outside Footprint															
Pipework	m	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter etc.	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Water tank, Pump, Heater, Boiler, Grease Trap etc.	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Plumbing Fixture: Toilet Fixture, Sump or sewage pit etc.	No.	HAA / HAC	100	HAA / HAC	200	HAA / HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Site: Manhole, Terminal manhole, Sand Trap, Box Culvert, Nullah etc	No.	HAS / HAC	100	HAS / HAC	200	HAS / HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Under Footprint															
Pipework	m	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter etc.	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Water tank, Pump, Heater, Boiler, Grease Trap etc.	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500
Plumbing Fixture: Toilet Fixture, Sump or sewage pit etc.	No.	HAA	100	HAA	200	HAA	300	HAA	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.7 Fire Services Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Pipework	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Sprinklers: Sprinkler Head, Drenchers etc.	No.	HAA / HAB	100	HAA / HAB	200	HAA / HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Electrical Device: Fire alarm, detector etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Special Equipment: Fire Extinguisher, Fire Shutter etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Mechanical Equipment: Water tank, Pump, Heater, Boiler etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.8 Electrical Model

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION MODEL		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Cable Tray	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Cable Tray Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Trunking (Cable Tray)	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Trunking (Cable Tray) Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Conduit	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Conduit Fittings	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Circuit						HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Electrical Equipment: Switchboards, Panelboards, Generators etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Electrical Device: Power Socket, Sensor, Lighting Switch etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Lighting Fixture: Lighting	No.	HAA / HAB	100	HAA / HAB	200	HAA / HAB	300	HAB	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.9 Specialist System Models

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION MODEL		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Undergound/ Outside Footprint															
Elevator system (by lift supplier)	m	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Escalator	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Moving walkway	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500
Communications & Security															
Electrical Equipmenet/ Device: Telecommunication equipment, Audio/visual advisory system, Data communication, Security system etc.	No.	HAB	100	HAB	200	HAB	300	HAB	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.10 Underground Utilities

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION MODEL		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Undergound/ Outside Footprint															
Pipework	m	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Pipe Fittings	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Pipe Accessories: Valve, Pressure vessel, Water meter etc.	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Cable Tray	m	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Cable Tray Fittings	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500
Site: Inspection Pit, Manhole, Sand Trap, Box Culvert, Nullah etc	No.	HAC	100	HAC	200	HAC	300	HAC	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*

D.LOD-2.11 Bridges

Model Element List	QTO	DESIGN MODEL								CONSTRUCTION MODEL		AS-BUILT MODEL		OPERATION MODEL	
		Concept, Feasibility, Planning		Preliminary, Scheme		Detailed design		Submission to approval authority		Construction		As-Built		Operation	
		AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD	AUT	LOD
Bridge column / pier	m^3	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500
Bridge abutment	m^3	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500
Precast bridge segment	m^3	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500
Steel bridge segment	Ton	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500
Bridge deck	m^3	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500
Bearing	No.	HAS / HAC	100	HAS	200	HAS	300	HAS / HAC	300	CTR	400	CTR	500	FM	500

Note	
QTO	*Typical data which can be extracted from BIM for quantity measurement.* *The quantity surveyor may request the BIM Manager to include other quantity take off requirements in the BIM PXP.*
AUT	*Model Author* *For List of Codes refer to Section2.5 Quick Start - List of Codes and Abbreviations*
LOD	*Level of Development required*