MMC Foundations - Product Selector Matrix

Client - Process | MMC - Process

Digital Tools

Physical Products	3.1 Parts			3.2 Panels					3.3 Volumes			3.4 Complete	
	3.1.1 Commodity Parts	3.1.2 Pre-Manufactured Parts	3.1.3 Structural Parts	3.2.1 Internal Wall Panel	3.2.2 External Wall Panel	3.2.3 Floor Cassette	3.2.4 Roof Cassette	3.2.5 Services Assembly	3.3.1 Pods	3.3.2 Structural Volume	3.3.2 Volumetric Section	3.4.1 Transportable	3.4.2 Stackable
Off-Site Manufacturing Portion	10%	30%	40%	50%	50%	50%	50%	60%	70%	40%	60%	90%	80%
Limited Build Window Short time for construction & access	●	●	●	○	○	○	○	○	○	○	●	●	●
Constrained Site Tight urban sites & logistics	●	●	●	○	○	○	○	○	●	●	●	○	●
Repeatable Typology Kit of Parts for at-scale rollout	●	●	●	●	●	●	●	●	●	○	○	○	●
Temporary Use On-demand occupancy e.g. site office	●	●	●	○	○	○	○	○	○	○	○	●	●
Remote Site Difficult/remote access, labour shortage	●	●	●	○	○	○	○	○	●	●	●	●	●
Accomodation Units Hotel, motel & student accomodation	●	●	●	○	○	○	○	○	●	○	●	○	●
Special-use Space Medical room, data room, plant room etc.	●	●	●	○	○	○	○	●	●	●	●	●	●
Mid-rise Housing 3-6 level apartments	●	●	●	●	●	●	●	●	●	○	●	○	●
Terrace Housing 2-3 level attached homes	●	●	●	●	●	●	●	○	●	○	●	●	●
Granny Flat Fixed size, constrained site	●	●	●	●	●	●	●	●	●	○	●	●	○
Multi Level Commercial Office, Institutional, Educational	●	●	●	●	●	●	●	●	●	●	●	○	●
Low-carbon Construction To meet ESG, Green Finance etc.	●	●	●	●	●	●	●	●	●	●	●	●	●

MMC FOUNDATIONS PROJECT

Language Framework 2024 (draft)

Modern Methods of Construction

Client - Process

Internal - Organisation	External - Market	Business Model
Planning Process development & improvement for org alignment, repetition, standardisation & integration of systems across design, delivery, procurement, investment planning & monitoring, asset management, digital **People** Skills, experience, capability & gaps, organisational goals **Technology and Systems** Technology databases, SLA's, common data environments, LEAN, Level of Standardisation **Governance & Decision-Making** DLA's, responsibilities, budgets, stage gates, committees **Procurement** Contract type and stage-gates, scope & sequence of lifecycle works **Finance** Drivers & ROI expectations, budget, time-frames, portfolio vs. project, debt, equity, instruments, bank, bonds, PPP	**Market Scoping** Understanding capability & capacity of options, trade-offs, options, alignment with goals. Following assessment, explore options for delivery solutions - local and international. **Early Market Engagement** Identifying aligned delivery partners and options **Delivery Options** Workflow, warranties, responsibility of delivery i.e. full turn-key, installation, supply, manufacture **Skills** level of experience, competence & maturity of supply chain.	**Problem Definition** What are the challenges, constraints & opportunities? Why MMC? **Contracting Approach** ECI, Design-Build, Alliance, PPP, Super-subs **Risk** Macro, labour, supply chain & environmental risk, program **Budget** Timing, Size, Scope, net present Value metrics, decisions, feasibility modelling & assessment, pricing in benefits (shorter build time etc.) **Measuring Success** Whole of Life Costings, broader outcomes, Programme Certainty

MMC Delivery - Process

Internal - Organisation	External - Market	Business Model
Planning Process development & improvement for org alignment, repetition, standardisation & integration of systems across design, delivery, procurement, investment planning & monitoring, asset management, digital **People & Resources** Skills, experience, capability & gaps, facilities & equipment **Technology and Innovation** Automation, machinery, tools, DfMA, Intellectual Property, Methods, design & management software **Quality Assurance** Accreditation, operations, process, insurance, compliance, monitoring, LEAN, ESD **Finance** Drivers & ROI expectations, budget, time-frames, funding, investment, debt.	**Target Client** Identification, engagement & understanding of pain points. clearly state with evidence benefits to the Client & planned outcomes. **Competition** Identification, evaluation of businesses offering similar products or services. **Policy & Compliance** Laws, regulations, and government policies that affect or support business operations. **Supply Chain** Identification of collaborators & providers of materials, process, activities and assurance. **Future Impacts & Risks** Labour, automation, carbon, resources	**Product-Market Fit** The unique solutions a company offers to its target customers with evidence of benefits **Product Set** What the company provides & generates its income from - mixture of offerings & services to diversify income streams. **Delivery Model** Revenue model, Internal & external contracting of activities, methods & physical products to deliver solution, contract, innovation **Marketing & Demonstration -** Create opportunities for pilot/proof of products to demonstrate solutions & use to market.

Digital Tools - Lifecycle View, Comprehensive

Interfaces between tools crucial to efficiency and priority for automation and flow.

Programme — Multiple projects for an asset owner organisation, city etc.

Project — An individual or one-off project in one location.

Briefing	Design	Construction/Manufacturing	Asset Management
Digital Kit of Parts Catalogue - a set of products drawn from the MMC Product spectrum in digital format, reusable across projects & sourced from widely available, robust & reliable supply chain and/or within MMC provider capability.		**Fab Automation & Analytics** Optimise production process.	**Maintenance Analytics** Predictive maint. & ops monitoring
Configurators Tools for Kit of Parts to be used.	**Digital Construction Model** Sharing data through digital formats (e.g. BIM, CAD, IFC etc.) & developed in CDE.	**Digital Manufacturing Model** Link fabrication to manuf. workflow.	**Asset Information Database** Linked CapEx and OpEx databases.

Product Lifecycle Management (PLM)
Strategic approach to managing the entire lifecycle of kit of parts components from inception to decommissioning. This process enables more stringent change management & decision-making processes.

Logistics Database Optimise flow of physical parts.	**Carbon Lifecycle Calculations** Embedded parameters in the digital components for accurate projections.	**Digital Assembly Manual** Interactive detailed assembly instr.	**Digital Twin** Optimised 3D analytics to demonstrate asset performance.
Process Automation Improvement processes (e.g. procurement, design, construction, operational) at a programme level.	**Generative Masterplan Tools** Algorithms to rapidly explore a variety of design options.	**4D Programming (Sequencing)** Timeline Simulations to demonstrate logistics and construction/assembly methodologies and sequencing.	
Supply Chain Database Inventory of suppliers for each MMC Physical product category.	**Geospatial (GIS)** Database of geospatial and locational information to inform design.	**5D Cost Information/BIl of Materials** Embedded cost parameters in the digital components for accurate projections and real-time cost analysis.	
	LiDAR & Survey Advance photogrammetry techniques to attain 3D measurement of asset or site to be altered.	**Simulation/ AI** Analysis of structural, environ- mental and other aspects.	**Fabrication Software** Transfer of models to manufacturing standards

Physical Products

3.1 Parts	3.2 Panels	3.3 Volumes	3.4 Complete
3.1.1 Commodity Parts	3.2.1 Internal Wall Panel	3.3.1 Pod	3.4.1 Transportable
3.1.2 Pre-Manufactured Parts	3.2.2 External Wall Panel	3.3.2 Structural Volume	3.4.2 Stackable
3.1.3 Structural Parts	3.2.3 Floor Cassette	3.3.3 Volumetric Section	
	3.2.4 Roof Cassette		
	3.2.5 Services Assembly		

MMC FOUNDATIONS PROJECT

Language Framework 2024 (draft) - Physical Products

Modern Methods of Construction

Physical

3.1 Parts

3.1.1 Commodity Parts — OSM ~10%

Parts that anyone can buy from a merchant.

Claddings, linings, insulation, membranes, panels, wraps, tapes, surfaces, cabling, lighting, fixings, paints, sealers, fixtures & fittings etc.

3.1.2 Pre-manufactured Parts — OSM ~30%

Parts that are supplied by 3rd party specialists.

3.1.2.1 Pre-manufactured Products -
Truss, windows, doors, stairs, balustrades, connectors, custom steel work, custom kitchen/bathroom joinery, custom flashings

Complex Parts supplied by 3rd party specialists needing commissioning & maintenance.

3.1.2.2 Proprietary Systems -
Lifts, access, safety systems, HVAC systems, switchboards, appliances, balconies, bike racks, acoustic products, shower & drainage systems, ducting, passive/active fire products, extracts etc.

3.1.3 Structural Parts — OSM ~40%

Parts that are needed to meet NZBC Bs.

Mass Timber -
beams, columns, slabs (CLT, LVL, GLT, Other)

Timber -
Frames, trusses, plywood, strandboard, MDF, studs, plates, beams, piles joists, etc.

Masonry -
bricks, blocks, stone etc.

Steel -
beams, columns, braces, secondary steel, plates, reinforcing, piles etc.

Light Gauge Steel -
studs, plates, beams, joists, etc.

Concrete -
beams, columns, slabs, piles, precast panels

Note: these categories have a high amount of Pre-Manufactured
Value that contribute significantly to MMC - On-site & Off-site

3.2 Panels

3.2.1 Wall Panel — OSM ~50%

Vertical panels combining structure with value-add parts like linings, cladding, insulation & services i.e. Closed panels

3.2.1.1 Internal Wall Panel -
Structural Part systems with commodity & pre-manufactured parts to meet functional & regulatory requirements, including: insulation, linings, acoustic & fire layers, openings, connections, outlets, channels etc.
Examples include: partitions, intertenancy walls, corridor walls

3.2.1.2 External Wall Panel -
Structural Part systems with commodity & pre-manufactured parts to meet functional & regulatory requirements, including: insulation, linings, acoustic & fire layers, windows, balustrading, flashings, connections, outlets, etc.

3.2.2 Cassettes — OSM ~50%

Horizontal panels combining structure with value-add parts like sheeting, insulation & services. Open & Closed panels.

3.2.2.1 Floor Cassette -
Structural Part systems with commodity & pre-manufactured parts to meet functional & regulatory requirements, including: insulation, sheeting, acoustic & fire layers, connections, outlets, etc. Examples include: LTF floor cassettes, composite floors

3.2.2.2 Roof Cassette -
Similar to Floor cassette but with different loading, weathertightness & geometry requirements.
Examples include: SIPS, insulation panels, LTF, CLT, Box beams

3.2.3 Specialist Assemblies — OSM ~60%

Horizontal and vertical panels, cassettes & assemblies typically with a single function.

3.2.3.1 Services Assembly -
Panel or assemblies with commodity, pre-manufactured, proprietary & structural products with a services function.

Examples include: pre-plumbed wall, wet-area floor panel, services shaft box, horizontal ducting assembly, electrical switchboard & distribution assembly, HVAC cassette etc.

3.3 Volumes

3.3.1 Pod — OSM ~70%

Volumetric units comprising panels & assemblies to make an occupiable, functional space.

3.3.1.1 Bathroom Pod -
A complete volumetric unit with all of the aesthetic, functional & regulatory requirements of a bathroom i.e. plumbing, drainage, extracts, ducting, regulatory surfaces, geometry, fixtures & fittings, doors. Can be structural for the purposes of transportation, or part of a larger structural system

3.3.1.2 Specialist Pod -
Similar to Bathroom Pod but for a different purpose/s:
Examples include: Kitchen/Bathroom/Laundry Pod, Specialised Pod i.e. large scale HVAC units, plumbing, power supply or other.

3.3.2 Structural Volume — OSM ~40%

A structural volume that is then used as the basis for more construction.

3.3.2.1 Structural Frame -
A volume created from a frame that will be the basis for further construction.

Examples include: heavy steel or metal box frames for occupation, vertical circulation, bracing, and CLT volumes or other structural systems that are then the basis for more complete buildings.

3.3.3 Volumetric Section — OSM ~60%

A strategy where larger buildings are split into smaller off-site pieces, then combined on-site.

3.3.3.1 Volumetric Section -
Various, with various levels of physical products and levels of completion. Typically stems from the need for more efficient building practices, production space or opening limitations, logistics, transportation, lifting or installation. This also includes approached to create multi-level buildings i.e. stacking volumes.

These volumetric solutions are then combined onsite to make a complete building. The term **'hybrid'** references where the combination of off-site and on-site construction meet to complete the volumetric section.

3.4 Complete

3.4 Complete — OSM ~85%

A complete building typically built to maximum production space and/or transportable (trucking) dimensions, with minimal onsite construction & commissioning works.

3.4.1 Transportable -
Transportable's are typically governed by transportation limitations, but small & large buildings can be manufactured and delivered this way. Common examples include homes, tiny homes, classrooms and others.

OSM ~90%

3.4.2 Stackable -
These are complete units designed to be stacked together to make complete buildings. Can be based on other products like shipping containers or bespoke. Used for hotels, student accomodation, apartments or other uses.

OSM ~80%