

Housing & Land Delivery Board

Date	15 January 2020
Report title	Modern Methods of Construction: Strategy Update and Proposed Principles
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Report has been considered by	Housing & Land Delivery Steering Group

Recommendation(s) for action or decision:

The Housing & Land Delivery Board is asked to:

- 1) Note the progress to date on delivering WMCA's vision, route map and strategy for a Modern Methods of Construction Programme (MMC), to be implemented across the region, including key milestones and decision points;
- 2) Note the proposed incremental approach to developing the MMC Strategy, to be prepared using a process of wide-ranging engagement with industry experts and practitioners so that the final strategy benefits from this input;
- 3) Agree to the adoption of '*Advanced Manufacturing in Construction*' (AMC) as the term used to describe WMCA's MMC strategy and desired products;
- 4) Consider and agree the proposed principles set out in this report, which are intended to form the basis of WMCA's future AMC Strategy.



1.0 Purpose

1.1 The purpose of this paper is to update the Housing & Land Delivery Board on progress in implementing the decisions made by the Board, on 30 September 2019, to secure additional expert MMC resource and move towards mainstreaming MMC on sites coming through the Single Commissioning Framework. Additionally, this paper proposes a series of principles intended to guide the development of a future MMC strategy.

2.0 Background

2.1 WMCA committed to increasing the uptake of advanced construction technologies in WMCA's 2019/2020 Annual Plan, in response to the findings of the Land Commission and Farmer Review which highlighted the role that advanced construction technologies could play in accelerating housing delivery.

2.2 Past reports on this subject have set out a rationale for the strategic use of advanced construction techniques, often referred to as Modern Methods of Construction (MMC), by WMCA and its partners. Further information on the rationale behind WMCA's MMC Programme and work to date is included in Appendix 1 and Table 1.

2.3 At the 30 September meeting, the Housing & Land Delivery Board agreed that WMCA should identify MMC as a pre-qualification requirement in the Single Commissioning Framework. It was further agreed, however, that this should be progressed on a phased basis so that the impact of any requirements could be tested against real schemes. The Board agreed that this pre-qualification requirement would be applied only on sites of 200 homes or more where funding was being requested through the Single Commissioning Framework. Developers would be required to provide at least 20 per cent of homes using MMC techniques. In addition, to provide further clarity, 'MMC' would be defined as either:

- Category One (volumetric modular), or
- Category Two (panelised) forms.

(Both of these are defined in MHCLG's MMC Definition Framework (attached Annex 1) which is widely recognised in industry).

2.4 The Board further agreed that implementation of the strategy in this way was to be supported by:

- the appointment of industry-specialist resources,
- the co-ordination of a wider package of work including the convening of an MMC Expert Advisory Panel, and
- the development of an MMC Strategy.



- 2.5 At a national level, there continues to be growing support for the use of MMC to drive quality, scale and sustainable product design in housing development. By way of example, in the period since the last Board, the Housing Minister has announced plans for a national “*centre of excellence*” for MMC to be located in the north of England. Mark Farmer, CEO of Cast Consultancy, has also been appointed as ‘*Champion for MMC in housebuilding*’. While detailed announcements about the nature of the Centre of Excellence have not yet been made, it is understood that the concept is that of an “*advanced construction corridor*” in housebuilding across a range of locations with industry applications ranging from R&D and product development to manufacture.
- 2.6 With such growing national support for MMC, there is, therefore, a clear opportunity for WMCA to continue to develop its own ambitious strategy for advanced manufacture in the construction industry in the West Midlands. By linking this ambition to our landmark Local Industrial Strategy, we can also seek to develop the necessary skills in the region. In this way, there is clear scope for differentiating the region’s focus from the emerging national policy agenda. We would still maintain links with, and collaborating with, other regions but, by prioritising advanced manufacturing and drawing on our own rich heritage and future plans for manufacturing in the region, we could significantly develop the national agenda. This approach has the potential to benefit both residents (by providing high-quality new homes in the region) and local manufacturers and supply chain members (by increasing the quality, range and demand for their products).

3.0 Current Work

- 3.1 Following decisions at the previous Board, officers have appointed Cast Consultancy to support the development and delivery of WMCA’s workplan, programme and activities to drive MMC use and growth across the region and ensure key milestones are met. Cast is engaged across the UK to drive up the use of MMC in housing delivery, working with manufacturers, R&D and skills specialists and the commissioners of new homes at local and regional levels. In this way, they bring the necessary expertise to specific projects, facilitate collaboration and bridge the gap between commissioners and manufacturers of MMC homes. Additionally, as noted above, the CEO of Cast has recently been appointed as the Government’s MMC Champion in housebuilding. The expertise which the company can offer, therefore, is highly relevant to WMCA’s ambitions.
- 3.3 This paper sets out for the Board the recommended approach to developing an MMC strategy and route map. The guiding principles for this work are that:
- it should balance the imperative to proceed quickly and operationalise the commitment to using advanced manufacturing in construction with
 - the need to ensure that this commitment achieves the maximum possible strategic benefit for WMCA and the regional economy.



3.4 With this in mind, a number of steps will be taken in the coming months to support the phased development of a strategic approach to drive MMC in the region. The first step is to create a clear and concise strategy for MMC. This will guide the development of all other steps and support WMCA in its aspirations to assume a leadership position in an emerging growth market. To shape this strategy, the Housing & Land Delivery Board is asked to consider and agree the principles set out below. Subject to the Board's approval, these principles will form the basis of a concise MMC strategy to be considered at the next Board meeting.

4.0 Terminology

4.1 The intention of the proposed strategy is two-fold:

- a) to develop further the focus on advanced manufacturing established in the WMCA Local Industrial Strategy, and
- b) to enable a wider programme of activity in support of modern construction, including skills, training, links to local R&D specialisms and local supply chain growth, all within a single concept of modern construction.

4.2 'Modern Methods of Construction' or MMC is an umbrella term used to describe a number of different modern construction methods and techniques in off-site locations. Already, a number of MMC technologies and techniques are frequently used by traditional housebuilders but the extent to which these deliver cost, quality and consistency control varies. To date, WMCA has used the term 'MMC' to describe its ambitions for future construction activity in the West Midlands but this does not necessarily reflect its aspirations for local residents or the supply chain.

4.3 The West Midlands has a rich heritage of manufacturing and innovation and WMCA's work to support MMC should be placed in this context. There is clear opportunity to connect WMCA's focus on advanced manufacture as a driver for regional specialisation and growth with its investment in high quality new homes. For this reason, it is proposed that the term "*Advanced Manufacture in Construction*", or AMC, is adopted by the WMCA as the term used to define the programme and its products. Additionally, this term more precisely defines the type of off-site manufacturing WMCA wishes to promote.

5.0 Proposed AMC Principles

5.1 The following principles are proposed as a basis for WMCA's AMC strategy:

Principle/Theme	Principle	Supporting Information
Leadership	It is proposed that WMCA adopts a leadership position, in prioritising the development of genuinely advanced manufacture, and seeking opportunities for the regional supply chain to benefit from that.	Currently the UK manufacturing market for homes is in its infancy, with a wide variation in the extent to which new homes genuinely utilise advanced manufacturing, with some manufacturers deploying broadly traditional approaches, albeit in factory settings.
Consumer Choice	It is proposed that the WMCA actively prioritises AMC models that maximise consumer choice and customisation.	One clear potential benefit of AMC is the opportunity for a product-led mindset to deliver high-quality, design flexibility and opportunities for mass customisation in new homes in a manner that is beyond what is possible in traditional construction.
Design Quality	It is proposed that WMCA actively prioritises AMC models that achieve a high standard of design and enable a varied response to the local context.	New AMC homes should balance the efficiencies of standardised manufacturing processes with good quality architectural design, opportunities for variation in form and to respond to the local context.
Achieving Zero Carbon	It is proposed that WMCA prioritises AMC models that offer the zero-carbon homes now, or the potential to achieve that in the future.	Advanced manufacture in construction, in controlled conditions, offers great potential to move towards carbon neutral homes. AMC processes minimise construction waste, achieve very high standards of in-use



		energy performance, and can minimise construction vehicle movements, with follow-on air quality benefits.
Skills and Employment	It is proposed that the AMC strategy has a specific and detailed focus on construction work and skills opportunities.	AMC has the potential to support fundamentally different roles compared to traditional construction. The AMC workforce will have specialisms in, for instance, complex logistics, digital product design and manufacture and robotics. Equally, as current MMC providers move towards AMC models, they can offer a different work experience for construction workers, and opportunities to transition and upskill for some of the current workforce
Modernisation	It is recommended that the AMC strategy should also consider how modernisation might be achieved on all homes on all sites, and opportunities for the WM supply chain and workforce to benefit from this.	The MMC definition framework includes seven categories (the latter of which are effectively process and technology improvements that can be deployed on traditional sites). It is important to recognise that there will be a transition from traditional to AMC that will incorporate the entire spectrum of the framework, over a number of years and in various ways; and that this process is likely to provide additional opportunities to improve quality, process and outcomes for residents and the supply chain.

6.0 Embedding AMC requirements in the Single Commissioning Framework

- 6.1 As agreed at September's Housing & Land Delivery Board WMCA is now applying pre-qualification criteria for AMC on large sites (>200 units). This reflects the approach which has been adopted when applying pre-qualification requirements on other policy matters e.g. on design quality and affordable housing.
- 6.2 In applying pre-qualification criteria for MMC, however, we acknowledge that the use of manufacture in housing in the UK, whilst growing, is still in its infancy. Currently, there is an estimated annual delivery rate of approximately only 10,000 homes per year at most. As a natural consequence, there is a range of approaches to manufacture at present, from a small number of companies moving towards advanced digital manufacturing techniques, to a larger number using more analogue approaches. Both approaches nevertheless offer greater control and consistency than traditional site-based construction but any pre-qualification requirement must allow for this wide variation in capability at present.
- 6.3 On this basis, and as recognised in previous reports, the WMCA strategy for AMC should develop through a series of progressive short- and medium-term steps which recognise current circumstances and capabilities whilst still aiming for a true, digitally-led advanced manufacturing capability in the future. For instance, a sensible initial step towards advanced manufacture would be to assess in more detail which providers are able to achieve a high standard of advanced manufacturing capability now, and those which are planning to do so in the future. A progressive approach such as that proposed avoids the risk of unintended consequences e.g. eliminating some manufacturers from being able to supply sites, if the strategy moves too far too soon
- 6.4 For these reasons, it is proposed that the approach to implementing the SCF requirement for AMC on large sites should include:
- Beta-testing and refining the SCF approach by testing the criteria on a select number of sites in the first instance, rather than launching on all sites of more than 200 dwellings immediately because:
 - o A beta-testing stage manages risk to delivery, by not exposing all sites to a new process immediately;
 - o It enables the MMC market to develop locally over time, and to meet the WMCA requirements for design and quality as they develop.
 - Testing and developing the pre-qualification standard in partnership with the manufacturing market to:
 - o Balance the advantages of working with the most advanced MMC manufacturers today, with actively encouraging the growth of new entrants and products;



- o Keep open opportunities for Category 4 MMC (additive manufacturing) models to emerge. Additive manufacturing processes are similar to those used in the current automotive industry, whereby several smaller component manufacturers develop in a wider supply chain that feeds a centralised assembly plant.
- o Enabling an on-going development of WMCA’s objectives for AMC and signalling at an early stage where the pre-qualification specification is expected to develop over time – in relation to zero-carbon for instance.
- Developing an AMC toolkit to support negotiations with developers as part of the SCF process, reflecting WMCA’s wider strategy for AMC and ensuring that any additional benefits secured from developers achieve maximum effect in line with that strategy.

7.0 Establishing an AMC Expert Advisory Panel

7.1 A WMCA AMC Expert Advisory Panel will be established in January 2020 to ensure industry-wide input into all stages of this project. It will be chaired by Mark Farmer, ensuring a direct link into the emerging national agenda for AMC growth. It will also provide a useful reference group for engaging with the manufacturing market, locally and nationally, and based on that, for advising the WMCA on the appropriate speed at which to drive towards true digital-led AMC. At an officer level, the AMC Strategy and toolkit will be developed in collaboration with West Midlands local authorities, the invitation to join a working group being open to all. This process replicates that used successfully to create the Regional Design Charter.

8.0 Next Steps and Programme

8.1 It is proposed that these objectives are delivered in line with the timeframe set out below:

Month	Milestone
December 2019	First meeting of officer-level working group
January 2020	Board considers principles for AMC strategy First meeting of AMC Expert Advisory Panel Draft AMC toolkit to support first SCF negotiations Beta-testing of SCF process commences.
February 2020	Board receives update on SCF beta testing Board approves AMC strategy and vision for WMCA
March 2020	Further assessment of projects with AMC component agreed through SCF

	Review of SCF process and supporting toolkit, and next steps agreed as necessary
Year End 2020	Development of full AMC strategy Pre-qualification requirement in SCF applies to all 200+home sites Collaboration with MHCLG on “AMC corridor” on-going

9.0 Conclusions

9.1 WMCA recognises the existing barriers to driving an uplift in the quantity and quality of AMC and will work with its local authority and industry partners to address these. This is an ambitious programme for a significant strand of work, which WMCA will undertake in a measured way to ensure it delivers the time and financial efficiencies, quality, new skills and employment as well as overall inclusive growth benefits that AMC has the potential to provide.

10.0 Financial Implications

10.1 There are no direct financial implications for any work arising as a result of approving the recommendations within this report. Incorporating enhanced standards into proposals which WMCA are developing through the Single Commissioning Framework may result in a higher level of subsidy being required by the Combined Authority where the initial proposal refers to a lower standard. Investment decisions will, however, continue to be evaluated on a case by case basis to ensure the adequacy of outputs and verify affordability.

11.0 Legal Implications

11.1 Section 113A(1)(a) of the Local Democracy, Economic Development and Construction Act 2009 gives the CA a power of competence appropriate for the purposes of carrying-out any of its functions. Part 4 of The West Midlands Combined Authority Order 2016 (2016 No 653) confers that the functions relating to any Economic development and regeneration in the constituent councils are exercisable by the CA. Part 3 of The West Midlands Combined Authority (Functions and Amendment) Order 2017 confers functions corresponding to the functions of the Homes and Communities Agency has in relation to the combined area. Paragraph 10 (2) (a) of the 2017 Order confers the function of improving the supply and quality of housing to the Combined Authority, 10 (2) (b) to secure the regeneration or development of land or infrastructure in the combined area 10 (2)(c) to support in other ways the creation, regeneration or development of communities in the combined area or their continued well-being and 10 (2)(d) confers the function of contributing to the achievement of sustainable development and good design.

11.2 The principles for the provision of Modern Methods of Construction will be incorporated and reflected into the relevant grant funding agreements and Legal will advise further when instructed on specific funding agreements.

12.0 Equalities Implications

12.1 There are no direct equalities implications as a result of this report.

13.0 Inclusive Growth Implications

13.1 The proposed AMC principles and strategy are intended to increase the availability of good quality housing for West Midland's residents and provide new employment and upskilling opportunities in the construction sector. As this is a relatively new area of innovation, implementing the strategy in a phased way will give WMCA time to sufficiently understand its inclusive growth impacts and who benefits from these.

14.0 Geographical Area of Report's Implications

14.1 The proposed MMC target, vision, route map and strategy would be used to guide WMCA investment decisions across the whole geography of the WMCA area, including the 3 LEPs and non-constituent Member authorities.

15.0 Other Implications

15.1 There are no other implications.

16.0 Schedule of Background Papers

16.1 There are no background papers.

Appendix 1

1.0 Rationale

1.1 WMCA recognises that its ambitious housing targets and Local Industrial Strategy goals cannot be met through traditional construction methods alone, and that MMC could support the delivery of high-quality housing at pace and scale and, in particular, expedite build out on development sites. The potential advantages of adopting MMC include:

- Accelerated delivery, achieved through faster build out
- Predictability of the build out programme and reduced weather-related delays
- Improved quality, delivered through a factory-controlled environment with consistent processes
- Certainty of cost, quality and timescale at programme start due to consistent processes
- ‘Cleaner’ construction careers, providing opportunities in multi-skilled disciplines with improved health and safety conditions.
- Improved whole life efficiency, user comfort and costs, enabling housing to make a sizeable contribution to wider energy and environment ambitions

1.2 Despite these advantages, a number of challenges to widespread adoption of MMC remain, including:

- Lack of discernible pipeline, limiting continuity of supply and adding risk to upfront investment in MMC technologies
- Lack of volume, continuity of demand and standardisation, across products and amongst buyers, make it difficult to achieve and benefit from economies of scale
- Lack of standardisation and limited supply leading to increased development risk
- Limited guidance applying directly to MMC and MMC qualifications
- Potential loss of demand for traditional construction skills and, simultaneously, the need to resource a new construction sector.

1.3 Addressing these barriers will be key to achieving WMCA’s target of 215,000 new homes by 2031 and the strategic goals of the Construction Sector Action Plan. However, MMC and advanced construction technologies should not be seen as a distinct approach to or replacement for traditional methods of construction. Rather, they provide an opportunity to bridge the gap between what the construction industry currently delivers and the output the West Midlands needs alongside maximising the benefits of the 5G construction cluster and cross-cutting digital agenda of the Local Industrial Strategy.

2.0 Understanding MMC in the region

2.1 WMCA have already taken steps to understand MMC uptake and the private sector position in the West Midlands. An Advanced Methods of Construction Advisory Panel was established in September 2018 to support a mapping of current and emerging capability in the West Midlands, to advise WMCA on emerging strategy and to provide



expert private sector input into the development of an agreed definition of current market-led terminology.

- 2.2 Additionally, work was undertaken to understand the unique opportunity presented in the West Midlands to embrace new construction technologies and skills, including the Skills Agreement and Construction Gateway, National Brownfield Institute and Springfield Campus, Dudley College and existing suppliers. Additionally, the Industrial Strategy identifies a number of areas to use construction as a key lever for economic growth, including encouraging diversity and new entrants into the market and accelerating the use of innovative processes.

3.0 Reviewing work undertaken elsewhere

- 3.1 MMC is not a new term but has existed in various forms for a number of years. Already, a significant amount of research has been undertaken by government and industry bodies. WMCA can learn from others' research and practice when designing a vision, plan and delivery programme. A number of key documents are summarised in Table 1 (Research Review).

Table 1

Document	Publisher	Identified Benefits	Identified Drawbacks	Barriers to uptake	Recommendations
Modern Methods of Construction (2006)	HBF	<ul style="list-style-type: none"> – Greater business efficiency – Enhanced design and quality – Improved customer satisfaction – Enhanced building performance – Increased housing supply – Enhanced environmental performance 	<ul style="list-style-type: none"> – Difficult to achieve economies of scale due to uncertainties including changing planning policy, approval process and land supply – Inadequate certification process that limits innovation 	<ul style="list-style-type: none"> – Inflexibility – on site, in demand patterns, design requirements – Regulatory complexity and change not suited to MMC – Different training and certification needs – Building regulations prescriptive, not performance-based 	<ul style="list-style-type: none"> – Guidance and training to increase awareness of benefits, advantages and necessary skills across industry – Develop testing methods for MMC and promote as best practice – Develop an objective, industry-wide approach for assessing business cases – Develop a mechanism for whole project costing that provides cost basis and performance benchmarking – Develop a mechanism to assess and quantify risk with accompanying accredited standard
Farmer Review: 'Modernise or Die' (2016)	CLC	<ul style="list-style-type: none"> – Faster build programme – Time predictability – Improved quality – Reduced long-term cost – Easier operation and maintenance (build to rent) 	<ul style="list-style-type: none"> – Appetite for new approaches may wane if labour market improves and build costs reduce 	<ul style="list-style-type: none"> – Funders continue to see MMC has carrying added risk – Non-collaborative culture in industry (focus on lowering immediate cost rather than long term innovation and cost-reduction) – Lack of scale and capacity in current market 	<ul style="list-style-type: none"> – Implement a strategic level direct investment/building programme for MMC homes – Work with Registered Providers to deliver/co-invest in an Affordable Housing programme more specifically linked to influencing innovation – Investment in the private rented sector linked to influencing innovation
Modern Methods of Construction – Views from the Industry (2016)	NHBC	<ul style="list-style-type: none"> – Faster build programme – Improved build quality – Improved health and safety – Improved site efficiencies – Reduced cost – Reduced site waste – Addresses construction skills shortage 	<ul style="list-style-type: none"> – Reduced costs, improved cashflow and faster sales revenues only identified in strong sales markets – Less flexibility for on-site design changes (early freeze) – Supply chain capacity and choice of suppliers – Need for more comprehensive procurement planning 	<ul style="list-style-type: none"> – Unfamiliar methods – Increased capital cost – Lack of suppliers – Buyer reactions – Lack of sub-contractor skills – Supplier's inability to meet delivery programme 	<ul style="list-style-type: none"> – Share best practice case studies and cost/benefit models – Encourage suppliers to enter market and improve their knowledge of house-building sector – Grant or subsidy-funded development
Modern Methods of Construction – Who's doing what (2018)	NHBC	<ul style="list-style-type: none"> – Better quality – Improved efficiency – Accelerated delivery – Increased productivity – Addresses labour/skills shortage – Sustainability 	<ul style="list-style-type: none"> – Supply-side constraints, particularly concerns about procurement and continuity of supply 	<ul style="list-style-type: none"> – Procurement challenges – Manufacturing capacity – Unsuitable for planning system – Lack of funders/lenders – Mortgageability – Skills shortage 	<ul style="list-style-type: none"> – Note number of firms looking to make investment or co-investment in a factory (24%) – Note impact of Brexit on labour supply as a likely driver of uptake.



West Midlands
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