

Our Ref: APPBCA-2022-08

Environmental Sustainability Group
Construction Productivity and Quality Group

30 June 2022

See Distribution List

Dear Sir/Madam

ENHANCED MINIMUM REQUIREMENTS FOR BUILDING WORKS RELATING TO ANY BUILDING ON LAND SOLD ON OR AFTER 30 JUNE 2022 UNDER THE GOVERNMENT LAND SALES PROGRAMME

Objectives

1. This circular is to inform the industry of the changes to the Building Control (Buildability and Productivity) Regulations 2011 (the “**Buildability Regulations**”) and the Building Control (Environmental Sustainability) Regulations 2008 (the “**ES Regulations**”) which will take effect on 30 June 2022. These changes apply to building developments on land sold on or after 30 June 2022 under the Government Land Sales (GLS) and Industrial Government Land Sales Programme (the “**GLS Programme**”). In summary, the changes are :
 - (A) amendments to the Buildability Regulations to require the building works to adopt Integrated Digital Delivery (IDD);
 - (B) amendments to the Buildability Regulations to require a higher minimum level of use of Design for Manufacturing and Assembly (DfMA) technologies and prefabrication;
 - (C) amendments to the ES Regulations to require a higher Green Mark Certification Standard of Green Mark Platinum Super Low Energy; and
 - (D) adoption of the BCA Green Mark certification requirements relating to building developments on land sold on or after 30 June 2022 under the GLS Programme.
2. In addition to the above, the circular also informs the industry on the requirement **to attain Quality Mark (QM) for Good Workmanship** for residential sites or the residential component in mixed developments on sites sold under the GLS Programme

Background

3. Launched in October 2017, the Construction Industry Transformation Map (ITM) envisions an advanced and integrated sector with widespread digital adoption, led by progressive and collaborative firms, and supported by a skilled and competent workforce. This roadmap focuses on three key areas namely IDD, DfMA and green buildings that will pave the way to transform the entire construction process, delivery and value chain of the Built Environment (“**BE**”) sector.

4. While there has been considerable adoption of IDD, DfMA and green buildings over the last few years, there is a need to accelerate the transformation efforts to bring about greater construction efficiency, productivity and sustainability in building developments to address the growing challenges faced by the sector today. The enhancement to these regulatory requirements will provide the necessary impetus to achieving the desired ITM outcomes which in turn, strengthen our local workforce and industry capacity, creating a more resilient BE Sector.

(A) Amendments to the Buildability Regulations to require adoption of IDD

5. Adoption of IDD will allow developers and building owners to leverage on technology to digitalise and integrate work processes in the building and construction lifecycle. The new digitalisation requirements will necessitate ***the adoption of a minimum of five (5) IDD essential use cases across the design, construction, fabrication and handover management stages of the building lifecycle with at least one use case per stage, and the use of digital platform(s) based on the Common Data Environment (CDE) Data Standard in respect of the building works.*** This will improve the accuracy of planning and design, such that productivity can be improved downstream in the construction and asset management stages. More details on the [IDD requirements](#) are set out in BCA's website.
6. The amended Buildability Regulations will apply to the building works relating to any building on any land that is sold under the GLS Programme **on or after 30 June 2022**. Under this requirement, the IDD implementation plan with the details on the minimum of five (5) integrated digital delivery essential use cases as in **Annex A** is to be adopted in relation to building works of a building and submitted for approval. The implementation of IDD essential use cases is to be in accordance with the requirements set out in the Code of Practice on Buildability.

(B) Amendments to the Buildability Regulations to require a higher minimum level of use of DfMA technologies and prefabrication.

7. Higher adoption of DfMA will shift more on-site construction work to off-site prefabrication in factories for ease of assembly at construction sites. Developers will benefit from the productivity gains through time (e.g. shorter construction period) and manpower savings. DfMA will also improve workmanship quality and reduce disamenities such as construction noise and dust to surrounding developments. To accelerate the adoption of DfMA across all work disciplines and reap the maximum productivity benefits, the minimum productivity requirements for developments will be enhanced.
8. The amended Buildability Regulations will apply to the building works relating to any building on land that is sold **on or after 30 June 2022** under the GLS Programme. The enhancements are :
 - i. for residential non-landed (RNL), commercial and hotel developments, ***the adoption of Prefabricated Mechanical, Electrical and Plumbing (Prefab MEP) systems and System Formwork (SF)*** in addition to the current provisions to reap the benefits of significant manpower savings at trade-level as compared to traditional methods;
 - ii. for other development types, ***the adoption of minimum prefabrication level across the three respective disciplines of building works (i.e. structural, architectural and MEP) together with the adoption of SF***; and
 - iii. for industrial developments, ***the adoption of Prefab MEP and SF, and a higher minimum prefabrication levels for structural and architectural works.***

The implementation of DfMA technologies is to be in accordance with the requirements set out in the Code of Practice on Buildability. More details of these enhanced requirements are provided in **Annex B**.

(C) Amendments to the ES Regulations to require higher Green Mark standard for building works relating to any building on land sold under the GLS Programme

9. Since 2010, building developments on GLS sites in the selected strategic areas are subject to mandatory higher Green Mark standards under the ES Regulations 2008, to maximise the potential for cost-effective energy-saving solutions in the built environment.
10. With the increasing need to scale up climate action, more ambitious targets to implement sustainable building development in the BE sector have been set to mitigate the effects of climate change under the latest Singapore Green Building Masterplan. These targets also serve to support the Construction ITM and Singapore Green Plan 2030. One of the key initiatives includes **extending the imposition of a higher Green Mark Certification Standard to building developments on all GLS sites** to ensure a minimum energy efficiency improvement of 60% over the 2005 baseline and to facilitate the transition to a low-carbon and climate resilient future.
11. The amended ES Regulations will require the Green Mark Certification Standard for building developments on land sold under the GLS Programme to be raised from the current Green Mark Gold^{Plus} or Platinum rating to the **Green Mark Platinum Super Low Energy rating**. This enhanced requirement will apply to any building on land on or after 30 June 2022 under the GLS Programme.

(D) Adoption of the BCA Green Mark Certification Requirements

12. The assessment of the environmental performance of building developments on land sold on or after 30 June 2022 under the GLS programme will be based on the [BCA Green Mark: 2021 Certification Standard](#). For these building developments, the attainment of the Maintainability Badge¹ will be a prerequisite to meeting the required Green Mark Certification Standard of Green Mark Platinum Super Low Energy. Please refer to the [certification requirements specific to these building developments](#) for more details.

(E) New requirement to attain Quality Mark (QM) for Good Workmanship

13. Greater adoption of prefabrication in a controlled factory environment off-site should improve the quality of building products. Today, BCA's Construction Quality Assessment System (CONQUAS) is already a requirement for all GLS developments. Moving forward, **RNL sites or the residential component in mixed developments on sites sold under the GLS Programme will also be required to attain Quality Mark (QM)** to ensure consistent high-quality standard on the internal finishes and water tightness of toilets/bathrooms within all dwelling units in the development as part of the requirements.

¹ GM:2021 Badges will be awarded to projects with exceptional performance in any of the environmental sustainability sections under the Green Mark: 2021 certification standard. It comprises Maintainability Badge, Whole Life Carbon Badge, Health & Wellbeing Badge, Intelligence Badge and Resilience Badge.

For Clarification

14. We would appreciate if you could convey the contents of this circular to members of your organisation. For clarification, please submit your enquiry through [BCA's Online Feedback Form](#) or call us at 1800 342 5222.

Thank you.

Yours faithfully



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Integrated Digital Delivery (IDD) Essential Use Cases	Applicable Stage
(a) <u>Digital Request for Information</u> To use digital technology to request information or facilitate communication, in relation to any issue arising from the building works	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(b) <u>Integrated Concurrent Engineering Meetings</u> To conduct an integrated concurrent engineering meeting in relation to the building works using digital technology and BIM	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(c) <u>Visualisation and Design Checks</u> To utilize a BIM model, a digital 3 dimensional model or immersive technology to visualise, seek feedback about and validate the design of the building.	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(d) <u>Digital Submission & Approval</u> To use digital technology to submit and obtain approval relating to the design of the building or any component involved in the building works	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(e) <u>BIM-based Documentation</u> To prepare documents relating to the building works based on information primarily generated from a BIM model	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(f) <u>BIM-based Cost Estimation</u> To estimate costs at various stages of the building works based on information generated from a BIM model	<ul style="list-style-type: none"> • Design • Fabrication • Construction
(g) <u>Digital Logistics</u> To use digital technology to plan the prefabrication production schedule of the building works, and digitally track and monitor the production, delivery, and installation of prefabricated components	<ul style="list-style-type: none"> • Fabrication • Construction
(h) <u>Digital Construction Scheduling and Sequencing</u> To use digital scheduling to plan and monitor the construction activities of the building works	<ul style="list-style-type: none"> • Fabrication • Construction
(i) <u>Digital Progress Monitoring</u> To use digital solutions or digital scanning to track and monitor the progress of the building works	<ul style="list-style-type: none"> • Fabrication • Construction
(j) <u>Digital Quality Assurance (QA)/ Quality Control (QC) Inspections</u> To use digital solutions to record the observations from site inspections of the building works and track the necessary follow-up actions taken	<ul style="list-style-type: none"> • Fabrication • Construction
(k) <u>Digital Defects Management</u> To use digital checklists or digital dashboards to manage and track the defects of the building works and the rectification of those defects	<ul style="list-style-type: none"> • Fabrication • Construction • Handover
(l) <u>Digital Handover</u> To use digital technology to generate and digitally handover — <ul style="list-style-type: none"> (i) a digital model of a physical asset that is built as part of the building works; and (ii) any other documents relating to the physical asset, including but not limited to the following: <ul style="list-style-type: none"> (A) the as-built records; (B) the manufacturer’s specifications and warranties; (C) the operation and maintenance manuals 	<ul style="list-style-type: none"> • Construction • Handover
(m) <u>Real-time monitoring of assets performance</u> To set up a digital platform to monitor the real-time performance and track the key operating parameters of a physical asset that is built as part of the building works	<ul style="list-style-type: none"> • Handover
(n) <u>Digital operations and maintenance</u> To set up a digital platform to integrate other technologies to perform the operations or maintenance of a physical asset that is built as part of the building works	<ul style="list-style-type: none"> • Handover

Annex B

Minimum Productivity Requirements for Sites sold under the GLS Programme																										
Site Type	Current Requirements	Revised Requirements from 30 June 2022																								
Residential	Minimum 65% coverage of Prefabricated Prefinished Volumetric Construction (PPVC)	<ul style="list-style-type: none"> Minimum 65% coverage of PPVC; Minimum 65% coverage of Prefab MEP; and Minimum 70% coverage of SF. 																								
Hotel	Minimum 65% coverage of PPVC	<ul style="list-style-type: none"> Minimum 65% coverage of PPVC; Minimum 65% coverage of Prefab MEP; and Minimum 70% coverage of SF. 																								
Commercial (Office)	Minimum 80% of Structural Steel Construction (SS) of total office area	<ul style="list-style-type: none"> Minimum 80% of SS of total office area; Minimum 65% coverage of Prefab MEP; and Minimum 70% coverage of SF. 																								
White, ¹ mixed, and smaller residential / hotel/office sites with constraints	Minimum productivity improvement requirement	<ul style="list-style-type: none"> Minimum productivity improvement requirement; and Minimum prefabrication levels to be adopted for the following systems: <table border="1" style="margin-left: 20px;"> <tr> <td>Structural*</td> <td>65%</td> </tr> <tr> <td>Architectural</td> <td>80%</td> </tr> <tr> <td>Prefab MEP</td> <td>65%</td> </tr> <tr> <td>SF</td> <td>70%</td> </tr> </table> <p style="text-align: center;"><i>* Minimally Advanced Precast Concrete System (APCS) to be adopted</i></p>	Structural*	65%	Architectural	80%	Prefab MEP	65%	SF	70%																
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SF	70%																									
Industrial	Minimum prefabrication levels to be adopted for the following systems: <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>For buildings with Gross Floor Area (GFA) that is equal to or more than 5,000m² but less than 25,000m²</td> <td>For buildings with GFA that is equal to or more than 25,000m²</td> </tr> <tr> <td>Structural</td> <td>25%</td> <td>40%</td> </tr> <tr> <td>Architectural</td> <td>45%</td> <td>60%</td> </tr> </table>		For buildings with Gross Floor Area (GFA) that is equal to or more than 5,000m ² but less than 25,000m ²	For buildings with GFA that is equal to or more than 25,000m ²	Structural	25%	40%	Architectural	45%	60%	Minimum prefabrication levels to be adopted for the following systems: <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>For buildings with GFA that is equal to or more than 5,000m² but less than 25,000m²</td> <td>For buildings with GFA that is equal to or more than 25,000m²</td> </tr> <tr> <td>Structural</td> <td>30%</td> <td>60%</td> </tr> <tr> <td>Architectural</td> <td>70%</td> <td>80%</td> </tr> <tr> <td>Prefab MEP</td> <td>40%</td> <td>50%</td> </tr> <tr> <td>SF</td> <td>70%</td> <td>70%</td> </tr> </table>		For buildings with GFA that is equal to or more than 5,000m ² but less than 25,000m ²	For buildings with GFA that is equal to or more than 25,000m ²	Structural	30%	60%	Architectural	70%	80%	Prefab MEP	40%	50%	SF	70%	70%
	For buildings with Gross Floor Area (GFA) that is equal to or more than 5,000m ² but less than 25,000m ²	For buildings with GFA that is equal to or more than 25,000m ²																								
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¹ These refer to sites where the land use (i.e. residential, hotel, office, mixed) has yet to be determined by URA.