Building and Construction Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.

Our Ref.: APPBCA-2014-16 Construction Productivity Centre

31 October 2014

See Distribution

Dear Sir/Madam

AMENDMENTS TO BUILDING CONTROL (BUILDABILITY) REGULATIONS TO FURTHER RAISE CONSTRUCTION PRODUCTIVITY

Objective

1 This circular is to inform the industry of the following new buildability requirements in the Building Control (Buildability and Productivity) Regulations 2014 ("Buildability Regulations") which will come into operation on **1 November 2014**:

(A) New higher minimum Buildable Design Scores (B-Scores) and Constructability Scores (C-Scores) for all types of project.

(B) Revised Buildable Design Appraisal System (BDAS) including the mandatory adoption of items such as drywall and industry standard components for specific types of projects.

(C) Mandatory adoption of specific productive technologies for new developments sold under the Government Land Sales (GLS) Programme.

Background

2 In September 2013, to accelerate the built environment sector's productivity improvement, the legislated minimum B-Score and C-Score requirements were raised by 3 points each. In addition, higher minimum B-Score and C-Score of additional 5 points and 3 points respectively were stipulated for all new public sector projects and private developments on land sold under the GLS programme. On top of this, a number of Government Procurement Entities (GPEs) such as HDB, JTC, MOH and MOE were required to take the lead to achieve even higher B-Scores and C-Scores.

3 With the tightening of manpower, there is a need for wider adoption of buildable designs and efficient construction technologies to further raise construction productivity. With this aim in mind, the Buildability Regulations have been amended to introduce 3 new requirements as described below.

A) Higher Minimum B-Scores and C-Scores for All Types of Project

4 The minimum B-Scores and C-Scores for **all new building projects** with GFA of 2,000m^2 or more which are **submitted for planning** permission on and after **1 November 2014** will be raised by 7 points and 4 points respectively. For projects on land sold under GLS/Industrial GLS Programme and all public sector projects, their B-Scores and C-Scores will be raised by 2 points above the higher B-Scores and C-Scores set in September 2013. Please refer to Annex A for the new minimum B-Scores and C-Scores for the different types of project from 1 November 2014.

5 The new minimum B-Scores and minimum C-Scores in this circular will supersede the minimum scores for all new projects (to be effective from 1 September 2014) and those built on land sold under the GLS Programme (to be effective from 15 October 2014) stated in our Circular Ref. BCA BC 15.0.3 dated 1 August 2013.

B) Revised Buildable Design Appraisal System (BDAS)

6 To move the industry towards higher buildability standards, the BDAS is revised with the following key changes:

(a) Mandatory items. To raise the adoption rate of key productivity components, the following components are made mandatory:

Applicable to Types of Development	Mandatory Items to Adopt
Residential (non-landed) and residential non-landed component of mixed-use developments	Dry partition wall for all internal dry areas (exclude party wall, toilet & kitchen)
	Typical storeys standardised to either 2.8m, 2.975m, 3.15m, 3.3m, 3.5m or 3.6m height
	Standard door structural openings (width) of either 900mm, 1000mm, 1100mm, 1200mm, 1500mm or 2000mm
	Standard precast refuse chutes (outer dimensions) of either • 0.8m x 0.8m (with 0.5m diameter internal dimensions)

	• 0.9m x 0.9m (with 0.7m diameter internal dimensions • 1.0m x 1.0m (with 0.8m x 0.8m internal dimensions)
Office developments	Typical storeys standardised to either 4.2m, 4.5m, 4.55m, 4.8m or 4.9m height
All developments except industrial developments	Standard prefabricated staircase of riser height of 150mm or 175mm & tread width of 275mm or 300mm
Industrial developments	Standard prefabricated staircase of riser height of 150mm or 175mm & tread width of 250mm, 275mm or 300mm

(b) Demerit Points for the use of Brickwall/Blockwall. To discourage non-productive method of construction, demerit points will be given for the use of brickwall/blockwall.

C) Mandatory Adoption of Specific Productive Technologies for New Developments sold under the Government Land Sales (GLS) Programme

7 As developers play a key role in driving productivity improvement, downstream construction will benefit if building designs include high impact productive technologies. The following specific technologies will be stipulated as land sales conditions for developments sold under the GLS Programme from 1 November 2014:

(a) Prefabricated Bathroom Units (PBUs). For all residential (non-landed) and residential non-landed component of mixed-use developments on GLS sites, the minimum number of PBUs to be adopted shall be 65% of the total number of bathroom units. The PBU systems adopted are required to meet all the performance requirements as shown in Annex B.

(b) Prefabrication Systems. For all industrial developments on Industrial GLS sites with GFA of 5,000m^2 or more, they are required to incorporate a minimum level of use of prefabrication for both the structural and wall systems. Please refer to Annex C for the requirements.

(c) Prefabricated Prefinished Volumetric Construction (PPVC). For selected land parcels under the GLS Programme, the developments will be required to adopt a minimum level of PPVC. Two (2) land parcels have been selected from the GLS Confirmed List for the second half of 2014. Please refer to Annex D for more details and the requirements.

Submission Requirements

8 As mentioned in the earlier circular issued on 1 August 2013, from 1 September 2013, Qualified Persons for Architectural and Structural Works (QPs) are required to submit a Buildability Detailed Design and Implementation Plan (BDIP) in addition to meeting the project's B-Score. The BDIP serves to substantiate the B-Score computation and is to be submitted for approval together with the building plan submission. For any departure or deviation to the approved BDIP or building plans which affects the B-Score, the QPs are also required to re-submit the revised BDIP for approval.

9 Similarly, builders are required to submit a Constructability Implementation Plan (CIP) which serves to substantiate the C-Score computation of their projects in addition to meeting the projects' C-Score when they apply for the permit to commence work.

10 The details of the new minimum B-Score and C-Score standards, the revised BDAS and the mandatory adoption of productive technologies for GLS sites can be found in the revised Code of Practice on Buildability 2014 which is available from BCA website starting 1 November 2014.

Clarification

11 If you or your members have any queries concerning this circular, please contact Mr James Lu at 6325 5091 (email: james_lu@bca.gov.sg) or Ms Jenny Tan at 6325 5073 (email: jenny_xy_tan@bca.gov.sg).

12 For queries on the performance requirements for PBUs, please contact Mr Justin Lim at 6325 1981 (email: Justin_lim@bca.gov.sg) or Ms Go Hui Jing at 6325 5039 (email: GO_Hui_Jing@bca.gov.sg).

13 For queries on the adoption of PPVC on selected land parcels under the GLS Programme, please contact Dr Eric Ong at 6325 5103 (email: eric_ong@bca.gov.sg)

Thank you.

Yours faithfully

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Annex A

A New Minimum Buildable Design Score (B-Scores)

A.1 For all new projects including projects built on land sold under the Government Land Sales (GLS) / Industrial GLS Programme and Public Sector Projects

Year	from 1 November 2014*		
Category of Building Work/Development	**2000m^2 ≤ GFA < 5,000m^2**	**5000m^2 ≤ GFA < 25,000m^2**	**GFA ≥ 25,000m^2**
Residential (landed)	70	75	78
Residential (non-landed)	77	82	85
Commercial	79	84	87
Industrial	79	84	87
Schools	74	79	82
Institutional & others	70	76	79

**based on date of planning submissions made to URA except for projects built on land sold under GLS Programme which are based on date of the GLS land sold*

A.2 For all new projects by key Government Procurement Entities (GPEs) which include HDB, JTC, MOH, MOE, MOT, LTA, PA, NEA, SPF and SPORTSSG

Year	from 1 November 2014*		
Category of Building Work/Development	**2000m^2 ≤ GFA < 5,000m^2**	**5000m^2 ≤ GFA < 25,000m^2**	**GFA ≥ 25,000m^2**
Residential (landed)	73	78	81
Residential (non-landed)	80	85	88
Commercial	82	87	90
Industrial	82	87	90
Schools	77	82	85
Institutional & others	73	79	82

**based on date of planning submissions made to URA*

B New Minimum Constructability Score (C-Scores)

B.1 For all new projects including projects built on land sold under the Government Land Sales (GLS) / Industrial GLS Programme and Public Sector Projects

Year	from 1 November 2014*	
Category of Building Work/Development	**GFA ≥ 5000m^2**	**GFA ≥ 25000m^2**
Residential (landed)	47 (min 32 points from Structural System)	57 (min 42 points from Structural System)
Residential (non-landed)		
Commercial		
Industrial		
Schools		
Institutional & others		

**based on date of planning submissions made to URA except for projects built on land sold under GLS Programme which are based on date of the GLS land sold*

B.2 For all new projects by key Government Procurement Entities (GPEs) which include HDB, JTC, MOH, MOE, MOT, LTA, PA, NEA, SPF and SPORTSSG

Year	from 1 November 2014*	
Category of Building Work/Development	**GFA ≥ 5000m^2**	**GFA ≥ 25000m^2**
Residential (landed)	50 (min 35 points from Structural System)	60 (min 45 points from Structural System)
Residential (non-landed)		
Commercial		
Industrial		
Schools		
Institutional & others		

**based on date of planning submissions made to URA except for projects built on land sold under GLS Programme which are based on date of the GLS land sold*

Annex B

PERFORMANCE REQUIREMENTS AND ACCEPTANCE FRAMEWORK FOR PREFABRICATED BATHROOM UNITS (PBU)

A. Performance Requirement for Prefabricated Bathroom Units (PBU)

A1. Prefabricated Bathroom Unit (PBU)

A prefabricated bathroom unit refers to a bathroom unit preassembled off-site complete with finishes, sanitary wares, concealed pipes, conduits, ceiling, bathroom cabinets, shower screen and fittings before installing in position.

A2. Strength and Robustness of Wall Panels

(a) For PBU with wall panels manufactured with non-concrete or lightweight concrete materials, the wall panels are to be tested in accordance with the Specification for performance requirements for strength and robustness (including methods of test) for partition walls – SS492:2001 to achieve a minimum grade of Medium Duty.

(b) The wall panels should not be susceptible to corrosion.

A3. Access to Utilities for Maintenance, Repair and Replacement

(a) The vertical soil stack shall be located such that it is readily accessible from outside the PBU and within the dwelling unit or from the common areas of the same floor.

(b) Access panels must be provided at the ceiling within the PBU to provide access for maintenance, repair and replacement of overhead services and utilities.

A4. Replacement of Tiles

The PBU must allow for tile replacement to be done via hacking with chisel and hammer, or their equivalent tools, without resulting in damage to the wall panels or backing board.

A5. Provision for Barrier-Free Accessibility design requirements

(a) For PBU with wall panels manufactured with non-concrete or lightweight concrete materials, provision shall be made on the wall panels for future installation of grab bars in the prefabricated bathroom unit.

(b) Information such as the location for future installation of grab bars and the installation method statement shall be included in the homeowner user manual (see item A7).

A6. Manufacturer's Label

A manufacturer's label measuring 6cm by 10cm of a waterproof and rustproof material is to be affixed within the interior of the PBU with the following information on it:

(a) Date of manufacture in the following format: Month/Year

(b) Name of manufacturer

(c) Company address of manufacturer

(d) Contact number of manufacturer

(e) Material of wall panel
(f) Material of floor pan

A7. Homeowner User Manual

A user manual containing the following list of information shall be provided to homeowners upon the handing over of the unit:

(a) General information about the PBU
  (i) Introduction to the PBU
  (ii) Safety notices
  (iii) Instructions for use

(b) Structure of the PBU
  (i) Floor
  (ii) Wall
  (iii) Ceiling
  (iv) Water piping
  (v) Sanitary discharge pipe/vertical soil stack
  (vi) Electrical conduits

(c) Layout of the PBU
  (i) General layout of the PBU
  (ii) Locations of concealed services
  (iii) Location of the manufacturer's label

(d) Cleaning and maintenance advice
  (i) Internal fittings, tiles and accessories
  (ii) Floor trap
  (iii) Ceiling access panels
  (iv) Access to vertical stack

(e) Alteration, repair and replacement works
  (i) Replacement of accessories/installation of additional fittings
  (ii) Availability and supply of spare parts
  (iii) Instructions for drilling and fixing
  (iv) Instructions for tile replacement
  (v) Instructions for grab bars installation

B. Acceptance Framework for Prefabricated Bathroom Units (PBU)

B1. The acceptance framework consists of two parts – the Building Innovation Panel (BIP) and the PBU Manufacturer Accreditation Scheme (PBU MAS).

B2. Under the new acceptance framework for PBU systems to be used at the mandated GLS sites, PBU suppliers and manufacturers are required to submit their applications and proposals to the Building Innovation Panel (BIP). There will be two separate evaluation stages under the BIP. Stage 1 consists of a PBU Screening Panel chaired by BCA and other industry representatives, who will be tasked to evaluate the design and materials used for each individual PBU system. Once the PBU system is accepted by the PBU Screening Panel (Stage 1), the BIP Secretariat will then coordinate

submissions to the remaining regulatory agencies under the BIP and facilitate early resolution of outstanding issues between the applicant and the respective regulatory agencies (Stage 2).

B3. A letter of In-Principle Acceptance (IPA) will be granted to the PBU supplier/manufacturer if acceptances are obtained from both the PBU Screening Panel (Stage 1) and the relevant participating regulatory agencies (Stage 2). The accepted PBU systems and their respective suppliers/manufacturers will be listed on the BCA website at http://www.bca.gov.sg/BuildableDesign/pbu.html.

B4. In addition, the production facilities producing PBU systems which have been accepted through the BIP will be required to be accredited under the PBU MAS, which is managed by the Singapore Concrete Institute (SCI) as part of the effort to promote greater self-regulation by the industry. The accreditation criteria were jointly developed by SCI and BCA. Further details on the accreditation scheme can be found at www.scinst.org.sg.

Annex C

Minimum Prefabrication Level Requirements for Industrial Developments Built on Land Sold under the Industrial Government Land Sales (GLS) Programme

The table below shows the different minimum prefabrication levels affecting industrial projects with GFA of at least 5,000m^2. Affected projects are required to comply with the minimum prefabrication levels for both the structural and wall systems.

Minimum Prefabrication Level	**GFA ≥ 5000m^2**	**GFA ≥ 25000m^2**
Structural System In respect of total structural floor area of the building works	20%	35%
Wall System In respect of total wall length of the building works	35%	50%

Annex D

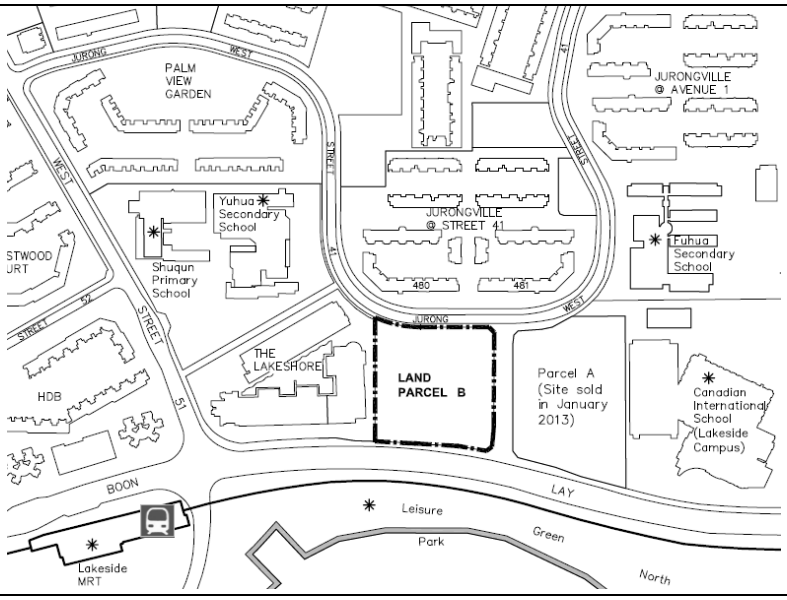
A. Specific Requirements on use of Prefabricated Prefinished Volumetric Construction

A1. For the selected land parcels sold under the Government Land Sales Programme on or after 1 November 2014, the building or the component of the building shall be built using prefabricated prefinished volumetric construction (PPVC).

A2. Prefabricated prefinished volumetric construction refers to the construction method whereby free-standing volumetric modules complete with finishes for walls, floors and ceilings are constructed and assembled outside the premises of the building works and installed at those premises for the purposes of those building works.

A3. The minimum level of use of prefabricated prefinished volumetric construction shall be 65% of the total super-structural floor area of the building or the component of the building that is to be used for residential or private dwelling purposes. Total super-structural floor area refers to the total constructed floor area of the building consisting of the ground floor and all floors above the ground floor, but excluding any floor area constructed for use as a roof or car park.

A4. The two (2) selected land parcels (as of 1 November 2014) are shown below:

LAND PARCEL (1)	
Location	Land Parcel at Jurong West Street 41(Parcel B) *{Pending Lot number from URA}*
Location Plan	

LAND PARCEL (2)	
Location	Land Parcel at Yishun Avenue 4 (Lot 3852N Mk 19)
Location Plan