



International BIM Competition 2017

Computational Design, Analysis and Optimisation
for 'Design for Manufacturing and Assembly' (DfMA)

Competition Brief

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General Brief

The International BIM Competition 2017 is organised by Singapore Building Construction and Authority (BCA), as the “Organiser”, located at 200 Braddell Road, Singapore 579700.

The competition is in conjunction with the Singapore Construction Productivity Week (SCPW) in 2017.

This document contains the design brief, submission requirements and the various parameters defined for the competition.

All the information is meant for the use of this particular competition only and shall not be used for any form of reference in actual design or construction project in future, if any, for the particular site.

The organiser, BCA, shall not be held liable for any consequences, loss or damage which may arise or result from any misuse by any parties or reliance made on its information for any purposes in the future.

Competition Details and Requirements

The competition is to develop a concept design of an academic building as a redevelopment project to replace the Block D & E Canteen Block to support the expanding educational activities in BCA Academy. The new building block should be able to host a minimum 3,000 students' capacity with a maximum 23,500sqm Gross Floor Area (GFA) including usable space, public circulation and service area.

The key aspect for the competition this year is to generate **design options** through **computational approach for analysis and optimisation that captures the design challenges and requirements** mentioned above for the final optimized option.

The conceptual design should capture the design challenges below:

2. **Sustainability**
 - Resource Efficiency
 - Environmental Impact
 - Social Impact
3. **Constructability**
 - Modularity
 - Prefabrication
 - Rapid Assembly
4. **Productivity**
 - Maximizing Value
 - Minimizing Waste

The spatial and technical requirements:

1. Total Gross Floor Area (max. 23,500sqm)

Percentage	S/N	Rooms and Facilities	Qty	Approx. Area (Sqm)	Total
Educational Space (50%-60%)	1	Centres	8	400	3,200
	2	Big Laboratories (B-Lab)	16	180	2,880
	3	Small Laboratories	25	120	3,000
	4	Big Lecture Theatre	2	360	720
	5	Small Lecture Theatre	3	200	600
	6	Multi-Purpose Hall (MPH)	2	600	1,200
Administration Office (10%-15%)	7	Office Space	1	2,200	2,200
	8	Board Room	1	120	120
	9	Meeting Room (30pax)	3	120	360
	10	Meeting Room (15pax)	5	60	300
	11	Meeting Room (9pax)	4	30	120
Others (10%-15%)	12	Food court	1	1,500	1,500
	13	Student Learning Area	1	700	700
Public & Services (20% -25%)	14	Circulation & ancillary		4,600	4,600
Total Area (Sqm)					21,500

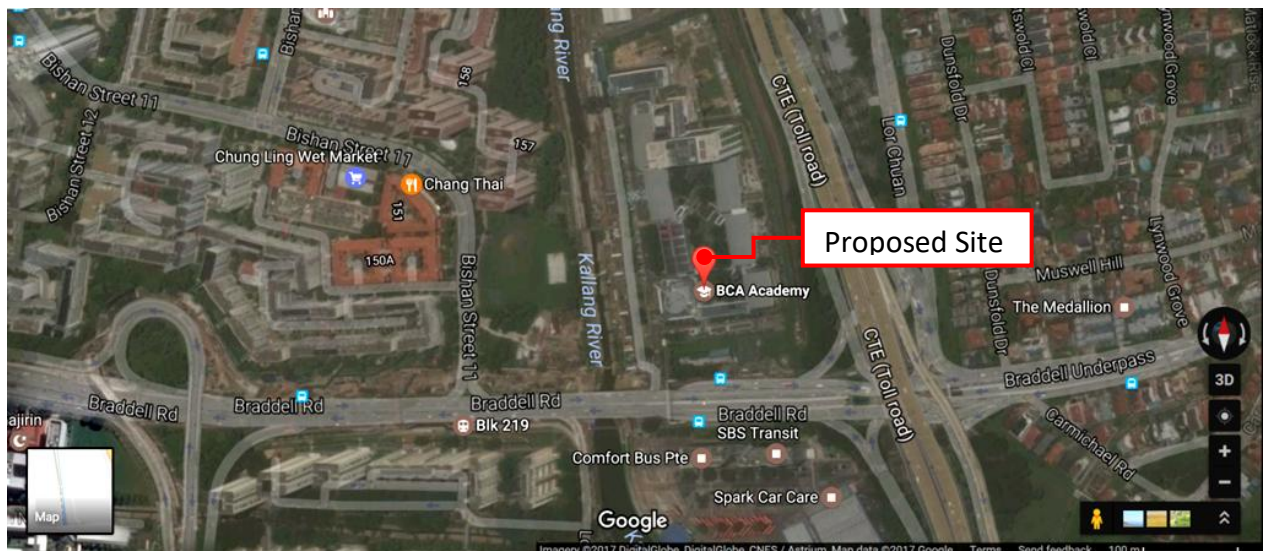
2. **Minimum 100 car parking lots** (non-GFA)
3. **Maximum building height** : 100m AMSL
4. **Building Storeys** : maximum 20 storeys
5. **Minimum Platform Level** : 104.5m RL
6. **Building Layout:** Minimise shading effect on existing block A Zero Energy Building (ZEB)

Competition Site

The site chosen for International BIM Competition 2017 is at BCA Academy, Block C and Block D, 200 Braddell Road, Singapore 579700.



Key Plan (Google Map)

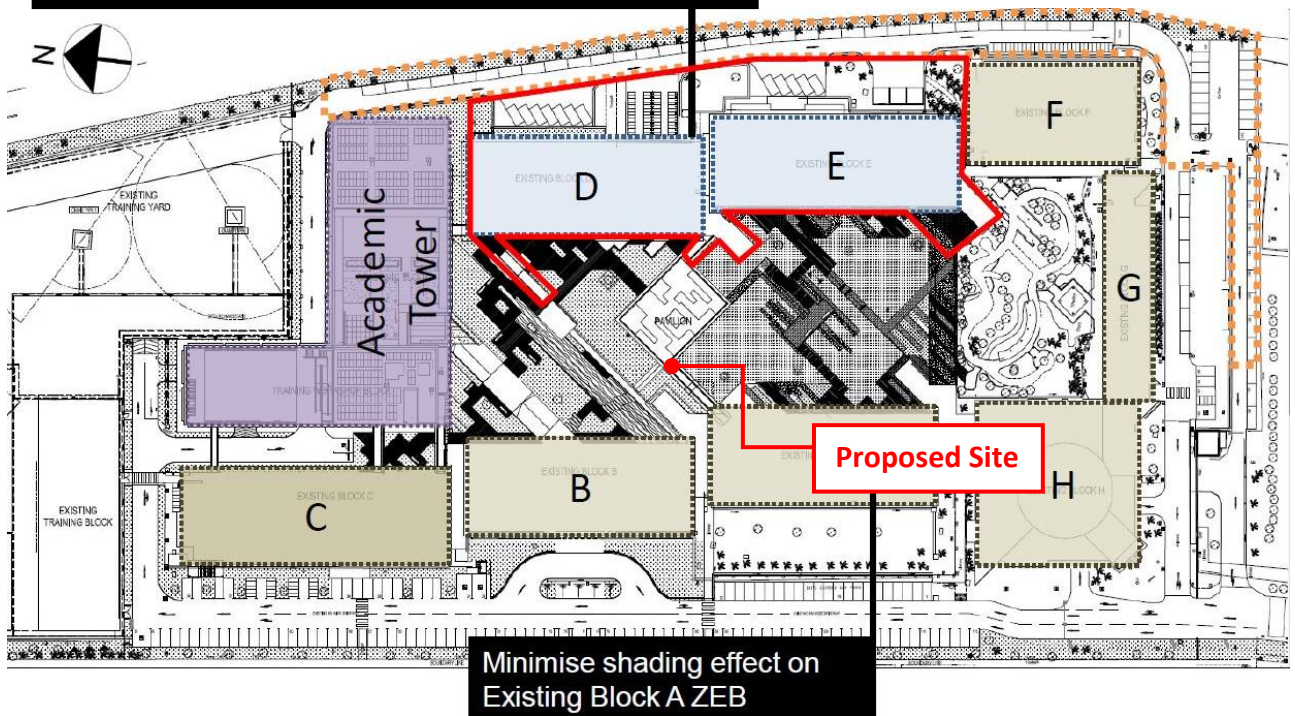


Site Plan (Google Map)

Reference google link for BCA Academy, Singapore

<https://www.google.com.sg/maps/place/BCA+Academy/@1.3449515,103.8595607,16.92z/data=!4m12!1m6!3m5!1s0x31da1772c644183b:0x7cbc9b5d75cc0b3a!2sBCA+Academy!8m2!3d1.34439!4d103.858527!3m4!1s0x31da1772c644183b:0x7cbc9b5d75cc0b3a!8m2!3d1.34439!4d103.858527>

Proposed Site with block D and block E to be replaced with a max. 20 storey building



Site Plan (Not to Scale)

Note:

- An IFC file will be sent upon registration.
- Please refer to the IFC file as design reference.

Design for Manufacturing and Assembly (DfMA)

The Academy building can be designed and constructed virtually first in Building Information Modelling (BIM) using strategized computational approach for DfMA (Design for Manufacture and Assembly). Although it is not necessary for all of the building components to be prefabricated, it is mandatory for at least one of the repeatable components, in this case, the façade penalisation, to be designed and assembled through DfMA approach. The DfMA approach is to generate through the factory and have all components delivered and assembled on site, to save time, effort, resources and also avoiding risks for unnecessary reworks.

The following considerations are for your cost and time schedule programming:

1. Equipment for hoisting (Type, Number of crane, Loading capacity)
2. Production rate of factory (modules per day / hoisting time per module)
3. Site storage capacity and time
4. Project Construction timeline
5. Building Components (modular panels, facade panel joints, structural components, partitions, etc)

Deliverables

DATE	DELIVERABLES
10 July 2017 (Dateline)	<ol style="list-style-type: none">1. 4nos of refined A1 Presentation Panels in jpeg format (200 dpi)*<ul style="list-style-type: none">▪ Panel 1: Design Quality: Analysis, Proposal, Collaboration, Concept, etc▪ Panel 2: Computational Design, Analysis and Optimisation▪ Panel 3: Design Development, Construction Details, Integration & Collaboration▪ Panel 4: Creativity and Innovation in Construction for productivity, Site planning & Software and Technologies applied2. Max. 20 PPT Slides for Presentation3. 1 Video AVI format (max. 2.5mins for Part 1 and Part 2)**4. Max. 10 Pages consolidated A4 Report***5. The Script applied for the computational design, analysis and optimisation for verification and validation

Notes:

*Please take reference to the A1 ppt Presentation, A4 ppt presentation and A4 report format sent or download the presentation template from bimsg.org

*PPT Slides (Structured according to Judging Criteria), please take reference to the ppt Presentation Guide sent. Students may have own presentation layout in Portrait format.

** Multimedia to showcase

Part 1 Documentation of overall competition process (max, 1min)

Part 2 Documentation of computational approach (max. 1.5min)

(Computational Design, Analysis, Optimisation, Collaboration Documentation)

***A4 Report

- Font: Calibri, min. size 10

- Exclude content page

- Any additional information can be attached as appendix (max. 5 pages)

Deliverables Format

The team shall deliver the project in the following formats:

- A max. 10 pages A4 reports in **doc** format;
- A max. 20 pages Powerpoint slides in **ppt** or **pptx** format;
- 4nos of A1 Posters with at least 200dpi in **jpg** or **png**, layout in portrait format reference to the Template received
- A max. 2.5mins multimedia in **avi** or **mpeg** format
- A **verifiable script** in Dynamo, Grasshopper, Generative Component, Houdini or any other common used computer language scripting applied in the competition to showcase computational design, analysis and optimisation

Online Submissions

Please **self-created a google account** and **store the requested deliverables in the google drive**, and send **shared the google drive link** by the stipulated time to

- **bca_clvc@bca.gov.sg**

Notes:

- *For countries that cannot access google platform, please create alternative link and send to the above email address*
- *Each participating team shall have tested the self-created folders and links for the accessibility before sending to the organizer*

Please ensure that you have tested the links before sending it.

Submission Dates and Timing

- **10-July-2017 12pm** for ALL participants / teams
- **Singapore time zone, UTC+08:00**

Common shared Items*

- a. 20170331 IBC BCAA.ifc
- b. 20170331 IBC Template and Presentation Guide - A1 size.ppt
- c. 20170331 IBC Template and Presentation Guide - A4 size 20 ppt slides.ppt
- d. 20170331 IBC Template and Presentation Guide - A4 10 pages report guide.docx
- e. 20170331 IBC Briefing.pdf
- f. Registration Form.doc
- g. Competition EDM.jpeg

*** Item 'a' above will be sent to registered participants directly with others items from 'b' to 'g' downloadable from bimsq.org**

Assessment Criteria

Below is the general scoring criteria for all participating teams:

Scoring Criteria	Percentage (%)
Design Quality <ul style="list-style-type: none">• Overall planning, background research, context analysis, schematic design proposal, presentation and communication and team effort.	30
Computational Design, Analysis and Optimisation <ul style="list-style-type: none">• The ability to develop multiple design options through computational analysis to arrive at an optimum solution that meets sustainability, constructability, productivity, building performance and considerations for DfMA (Design for Manufacturing and Assembly).	40
Creativity, Innovation & Technologies <ul style="list-style-type: none">• The level of creativity, innovation and "out of the box" approach for construction productivity• Adoption of new or existing simulation, optimisation, computational approach and technologies	30
Total	100
Building Information Modeling to be incorporated throughout and demonstrated in the presentation panel	

Final Presentation

From all participating teams who have successfully shortlisted will be notified soonest by 14-July-2017 and latest by 18-July-2017, through email, for the **28-July-2017 on-stage presentation @ BCA Academy, H2-1, 200 Braddell Road, Singapore 579700.**

All presentation materials are to be submitted online. Any update and change of venue and time will be notified by email. The presentation is also open to the public, who could join in as sit-in audiences.

Presentation and final judging for all teams:

- Each team is given **ONLY 15 minutes for presentation;**
- **Following with 10 minutes for Q&A** (open to judges ONLY) for each team; and
- Assign your own presenter(s) among your team members ONLY.

NOTE:

- *The organiser is very strict on the timing of presentation by each team.*
- *All presenters would be given a timer. Thus please rehearse and prepare for your presentation. The presenter(s) could present from any materials submitted online during the (28 July 2017) competition ONLY.*
- *NO further uploading of files on stage.*
- *All submitted items shall be pre-loaded by the organiser for all teams on stage @ BCA Academy.*
- *For overseas participating teams, a max. 15mins video recorded presentation would be requested on the 14-July-2017 and submitted latest by 21-July-2017 for International BIM Competition 2017.*
- *We shall keep the shortlisted teams posted on the details.*

Awards and Prizes

Awards	Prizes
1 st Prize	Plaque + Certificate + S\$5,000
2 nd Prize	Plaque + Certificate + S\$3,000
3 rd Prize	Plaque + Certificate + S\$2,000
Max. 6 Merits	Plaque + Certificate + S\$800
Others	E-Certificate of Participation

Terms and Conditions

The International BIM Competition 2017, refer as the “Competition”, is organised by Building and Construction Authority (BCA), refer as “Organizer”, located at BCA Academy, Academic Tower, level 10, 200 Braddell Road, Singapore 579700. By participating in the Competition, each team shall make an application to participate in the Competition, refer as the “Participating Team”, and each Team Member unconditionally accepts and agrees to comply with and abide by these Terms and Conditions and the decisions of BCA, which shall be final and binding in all respects.

Registration

1.1 All Participating Teams can register on 1-March-2017 and latest by 30 June 2017, unless waiver granted by the Organizer. Successful registration will be notified via email by the Organizer. Only the registered team members who completed the full submissions to the International BIM Competition 2017 are qualified to receive the electronic certificates of participation.

1.2 The participating schools must be a registered tertiary institution in their respective countries.

1.3 Each school may send more than 1 team.

1.4 Each Participating Team shall not have more than 7 members (including the team leader).

1.5 Each Participating Team is encouraged to find a mentor to learn the industry BIM good practices from before the competition begins.

1.6 Students below 18 years old shall obtain consent from their respective institutes and parents to participate in the competition.

1.7 The Participants are required update the Organizer for replacement or update on candidates and to submit the new name list latest by 7 July 2017.

1.8 The Organizer reserves the right to reject any Participant who does not meet the eligibility criteria.

1.9 The Organizer reserves the right to cancel and/or modify the terms and conditions, at any time, during the competition.

International BIM Competition 2017

Pre-Competition

21. The Participating Teams shall complete the competition at their own premises. Teams are advised to take all necessary precautions to ensure that the competition areas, equipment and machines are safe for use by the team members. The Organizer shall not be held responsible for any mishap that may befall the Participants during the competition.

2.2 Participants may use any BIM (Building Information Modelling) software or tools that are IFC (Industry Foundation Class) compliant and other supporting analysis/simulation software or graphic and presentation tools during the competition. The submission formats and deliverables are stated under.

2.3 Participants will be notified through email with any changes incurred on submission or presentation time and venue.

During Competition

3.1 All Participants must comply strictly with all rules & regulations of the competition. The Judges and Organizer reserve the rights to disqualify any Participant if he/she suspects, in its sole discretion, that the Participant did not follow these official rules.

3.2 Failure by the Participant to comply with instructions given by the Judges or Organizer, or Participants caught in cheating and not producing genuine works, may also incur loss of marks. Continuous violation of rules may result in suspension from the competition.

3.3 All grievances must be reported to the organizers/Judges by either the Participant, or, his/her Team Leader, before, or, on the actual days of the competition. Appeals after the competition will not be entertained. The Judges' decision shall be final.

3.4 All entries and deliverables must be submitted electronically online, within the timeframe given, through the server/web portal with a self-created, self-verified, downloadable link and send to by the Organizer.

3.5 The Participants must inform the Organizer if he/she falls sick or becomes unwell during the competition. An official medical letter shall be submitted to the Organizer. The Judges shall decide if a replacement is deemed necessary or if the Participant has to withdraw from the competition.

Assessment and Judging

- 4.1 The submissions are assessed based on the assessment criteria as laid down in the scoring criteria in the marking sheet given to the Judges.
- 4.2 The panel of Judges shall abstain from evaluating a team where there may be conflict of interest issues. In such a case, the chief marshal or reserve judge shall take over.
- 4.3 In the event of a tie, the Judges shall re-evaluate the submissions based on the judging criteria given and recommend accordingly to the Organizer.
- 4.4 Standard marking scheme shall be used and marks must be entered into the forms to record the marks accordingly. Assessment shall not be done in the presence of the Participants.
- 4.5 Marks will be awarded at different stages of the online submittal.
- 4.6 If any stated prizes are unavailable, the Sponsor reserves the right to substitute one or more items of equal or greater value, in its sole and absolute discretion. No prize is exchangeable, transferable, or redeemable for cash.

Post-Competition

- 5.1 All materials submitted during the International BIM Competition 2017 shall not be returned.
- 5.2 The Organizer shall retain and hold exclusive rights, including media rights, over all deliverables, including the models, materials and projects created and submitted during the International BIM Competition 2017.
- 5.3 All results shall be released soonest by 4 August 2017 to the participants.
- 5.4 All decisions made by the Organizer and Judges are final. No correspondence or appeals shall be entertained.
- 5.5 Only the top three prize winners will be invited for the awards' presentation in the SCPW's Opening Ceremony at Singapore Expo.

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