Annex 1: Competition Guidelines

Category A: Architectural Design

I. Design requirements

1. You shall choose a town or village near a railway, and design a railway station building.

2. Your design shall be based on a real-life site and its current conditions.

3. The design shall include the following spaces to fulfill the respective functions: passenger service, tickets counter, waiting area, entrance and exit and supporting services (station affairs offices, bathrooms, etc.). The combination or integration mode of the functional spaces is at your discretion, but make sure it complies with the logic and rules of railway station operation.

4. Besides the passenger transportation function, you shall also fully consider the local social, economic, and cultural needs. You shall propose strategies to improve the passenger station building and its surrounding city, town or village, and make a corresponding design.
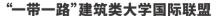
5. The railway station building shall be designed as Class-4 (see *China Railway Station Classification Method* in the notes below). The area of the building shall be in the range of 3,000 to 4,000 m^2, which can be properly adjusted to meet your needs and shall be explained accordingly.

6. You will only need to consider the station building's location in relation to the railway, adjacent or passing through. Factors related to the traffic plan and railway running shall not to be evaluated in the competition.

II. Entry requirements

1. Submit the following drawings: a floor plan, elevations, plans & sections, perspectives drawn to scale, and additional drawings that you find necessary to demonstrate the design philosophy and strategy; a 200-word project concept description in Chinese or English.

2. The above drawings and design instructions shall be presented in 2 drawings with A1 size (841mm x 594mm) and in vertical composition. There is no limit to the representation method of the drawings.

*Notes: As *China Railway Station Classification Method* states, comprehensive railway stations that involve passenger transport, goods transport or goods train break-up and formation operations and meet at least two of the following three requirements are perceived as Class-3 station:
- Daily passengers who board, get off the trains and transfer at the station being 2000 or above, and luggage and packages that are delivered or transferred being 100 pieces or above;
- Daily loading and unloading 50 trains or above;
- Daily engaged in shunting operation for 500 trains or above.

Category B: Structural Design

I. Design Requirements

1. General requirements: This is an open-ended design exercise to encourage

well considered, innovative and creative solutions. Firstly，please describe the reasons for selecting the geographic location and the actual construction site of the railway bridge, and its role in the local political, economic and cultural landscape. Briefly describe the design philosophy or principles applied to this bridge. Up to 500 words for this section please. All design parameters including load and site conditions are to be determined by the participants. These should include the bridge's design capacity, topography of the site, its groundwater, geological, geotechnical conditions as well as any potential long-term impact that the local climate change or earthquake history would have on the bridge's structural performance. The technical design standards to be used, the design load and all other relevant site conditions, are to be specified by the participants and should be clearly presented in the design scheme with narratives. Please use tabular form or sketches to illustrate where necessary. Participants are encouraged to propose novel and reasonable bridge structure types.

2. Bridge type: Railway bridge. According to the demands of the countries or districts where the participants are located, the design work can be carried out on a single bridge or bridge group in the selected railway line. According to the specific conditions of the selected railway line, there is no limit to the type of the bridge crossing barriers, including rivers, roads, and valleys, etc.

3. Scale of the Bridge: the bridge length and span combination shall be determined by the designers to ensure it is fit for purpose and meets the design

requirements for the selected railway line. The bridge width shall be designed according to the standard of double track railway.

4. Requirements for bridge types and design contents are as follows:

(1) Bridge types: Suspension, Cable-stayed, Arch bridge, Beam bridge, Truss bridge or combined, mixed, new conceptual, futuristic designs etc.;

(2) Structural design: When the bridge type is decided, participants shall design the primary load-bearing components and major ancillary facilities. Additionally, the strength, stiffness and stability of the bridge structures shall be ensured through reasonable load combination and internal force calculations;

(3) Materials: steel, concrete, combination and mixed, FRP composites; new materials, etc.;

(4) Construction schemes: advanced, innovative and applicable construction schemes;

(5) Design concepts: safety, applicability, durability, innovation, atheistic features, environmental sustainability, low carbon consideration, energy conservation, economy, constructability, easy maintenance, etc. Each work shall follow at least three of the above design concepts.

II. Entry requirements

1. It is recommended that the participants prepare a design appraisal with (preferably hand) sketches in preparation for the selection of the type of bridge. The

appraisal should include two distinct and viable options for the proposed bridge structure, and how loading transfers from the main functioning frame to the substructure. Due consideration should be given to the bridge's serviceability and stability aspects. Review and critically appraise the two schemes (such as sustainability, functionality, buildability, carbon reduction and whole life costing) and identify the final chosen solution. Please specify the reasons for the choice before carrying out the final design.

2. The electronic version of the work description shall be submitted in Word format. If it's in Chinese, use Song font with 4-size characters, 28-point line spacing, no more than 20 pages and 15,000 words; For English submissions, use Times New Roman font with size 11, single line spacing, no more than 35 pages and 10,000 words;

3. The number of design drawings (design schemes, main structural drawings, construction schemes, etc.) shall not be more than 10 pages of A3;

4. Renderings: color images with no more than 5 pages of A3. The electronic version should be submitted in JPG format.

Category C: Scene Modelling and Visualization

I. Modelling and Visualization Requirements

1. You shall choose a landscape based on the history, culture, customs, and

geography of your chosen region. The landscape shall be typical of railways and stations along the Belt and Road, and reflect the characteristics and economic and cultural development of your chosen region.

2. You shall choose your data source, modelling tools, and visualization platforms according to the features of your chosen landscape and the application scenarios of the 3D model. We encourage participants to set their creativity and innovation capacity free and complete the modelling and visualization with your self-developed plug-ins. One principle is to be followed during the process of data collection, 3D modelling, and visualization: You shall pay attention to the unity between fidelity and artistry, and between the model's functionality and application scenarios.

3. Coverage and accuracy of the model: The parameters vary according to each participant's application scenarios. However, the following requirements must be met: The coverage area should be no less than $100m^2$, with the length of one side no less than 5m. There should be no obviou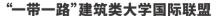s omissions in the main artificial surface features of the model. The geometric accuracy should be no less than 5cm. The texture of the model should be able to represent the real-world landscape without obvious omissions.

4. Requirements for the submitted landscape models of railway stations are as follows:

(1) Landscape features: mainly cultural landscapes such as railway stations, platforms, and typical scenarios characterized by railway features along the Belt and Road, supported by natural landscapes such as vegetation and waters;

(2) Modelling data: including but not limited to point cloud and image data collected by drones and ground platforms;

(3) Model formats: osgb, obj, ifc, dae, dxf, kml, 3ds, etc.;

(4) Implementation plan: It should be scientific, innovative and applicable;

(5) Modelling concepts: The 3D modelling, display, and visualization should embody design concepts such as creativity, artistry, practicability, science, etc.

II. Entry Requirements

1. Your submission shall include a modelling and visualization proposal, a 3D model, and renderings.

2. Your modelling and visualization proposal shall be illustrated by text and graphics, and submitted in .docx format. If it's in Chinese, use Song font with 14-point characters and 28-point line spacing, no more than 20 pages and 15,000 words; For English submissions, use 14-point Times New Roman font with 28-point line spacing, no more than 35 pages and 10,000 words.

3. Your 3D model shall be submitted in the electronic format, where you shall also attach a version to be visualized on given platforms, and indicate the theme of the digital town landscape you have constructed. If you have developed your own

visualization platform, a configuration file should also be submitted.

4. Your renderings should be color images with no more than 5 pages of A3. Electronic versions should be submitted in common formats such as jpg, png, and pdf.

*Notes: The software used in the entries is not limited. The Organizing Committee recommends software of Daspatial Technology Co., Ltd., including DasEarth (https://earth.daspatial.com/), GET3D Cluster, ModelFun, ModelPainter, DasViewer, etc. Download link: https://www.daspatial.com/cn/download. For limited-time free use and training, please contact LIU Lei (Cell: 0086-17692202215). Daspatial Technology Co., Ltd. reserves all rights for final interpretation.