5D BIM QUANTITY TAKE-OFF (QTO) AND COSTING REQUIREMENTS

1.1 The Contractor shall propose and utilise 5D BIM Software to carry out QTO and cost evaluation to be accepted by the Engineer.

1.2 Notwithstanding **Clause 21.7 of the Particular Specification**, the Contractor shall ensure the 5D BIM Software can perform and carry out the following upon request by the Engineer:

(a) measurement and quantity take-off on BIM models, 2D Drawing Sheets as well as image files. The software must also minimally be able to support the following formats:-

(i) Image files (JPEG, BMP, PDF)

(ii) Vector PDF files

(iii) DWG, DGN, DWFx

(iv) IFC (2x3) or later

(b) identify scale of file or allow for calibration to determine drawing scale;

(c) merge / group multiple drawings / BIM models such that all measured quantities and information are saved under a single project;

(d) import / extract quantities from BIM models based on categories, elements or other user-defined parameters;

(e) extract information and quantities of a project based on defined zones;

(f) ability to have element tree for Civil & Structural, Architectural, civil and M&E Services / Systems;

(g) able to run elemental cost analysis;

(h) generate quantity report / schedules and export such reports / schedules to editable excel spreadsheets;

(i) track and record measured items;

(j) import and export measurement / costing files to be shared amongst multiple users;

(k) export information into Breakdown of Cost; and

(l) ability to compare and extract quantities from the revised BIM models and have the capability to identify these changes. The changes shall also be highlighted with updates made to the measurement and workbooks.

1.3 The Contractor shall develop and propose a set of cost codes with reference to the Agreed Schedule of Rate (ASR) that maps the description, rates and quantities to the approved BIM Elements identified for Civil and Structural, Architectural and M&E Services / Systems for the Engineer's acceptance. The accepted proposals shall be documented in the BEP.

1.4 The Contractor shall be responsible and accountable for developing, maintaining and updating these cost codes; and shall ensure the accuracy and consistency of these cost codes related data and information in accordance to the agreed BEP throughout the project lifecycle.

1.5 The Contractor shall develop a 5D BIM progress payment report and attach it as reference to verify the completed works on site upon submission of the Contractor's request for monthly payment. The actual completed quantities shown in the 5D BIM progress payment report shall correspond to the respective BIM Elements and these quantities shall be mapped to contract rates / price to derive the amount deemed payable. The Contractor shall also submit isolated model section of the completed works for that month upon request by the Engineer. For avoidance of doubt, the value of Works executed and deemed payable shall be in accordance with the methods set out in the Conditions of Contract and Appendix E4 - Cost Loading of the General Specification.

1.6 The Contractor shall utilise the 5D BIM Software to take-off quantities for items with price adjustments arising from fluctuations as stipulated in the Contract to the acceptance of the Engineer. The Contractor shall ensure that the quantities extracted are in-line with the approved method for price adjustments in his monthly payments.

1.7 The Contractor shall utilise the 5D BIM Software and BIM Models to provide QTO, and cost estimation proposals upon request by the Engineer**.**

1.8 The Contractor shall submit 5D BIM deliverables in formats compatible for use with iTWO costX software or equivalent.

1.9 The Contractor shall continuously maintain and ensure the accuracy of the submitted Construction Models and its consistency with actual site condition.