APPENDIX A – Questionnaires

GENERAL INFORMATION

Please tick on any checkbox related to your opinion. You can choose one or more selections

A1. Main position
- ☐ Investor / Project Manager
- ☐ Supervisor
- ☐ Others
- ☐ Construction constructor
- ☐ Design consultant

A2. Specialization
- ☐ Project manager
- ☐ QS
- ☐ Others
- ☐ Commander / Deputy commander
- ☐ QA/QC
- ☐ BIM

A3. Experience in civil engineering field
- ☐ < 3 years
- ☐ 3-5 years
- ☐ 5-10 years
- ☐ > 10 years

A4. How many high-rise building projects have you been involved in?
- ☐ < 3 projects
- ☐ 3-5 projects
- ☐ 5-10 projects
- ☐ > 10 projects

A5. Scale of high-rise building projects
- ☐ <50 Billion VNĐ
- ☐ 50-100 Billion VNĐ
- ☐ 100-500 Billion VNĐ
- ☐ 500-1000 Billion >1000 Billion VNĐ

A6. Investment Fund
- ☐ State Investment
- ☐ Foreign Investment
- ☐ Private Investment
- ☐ Others

A7. Your level of knowledge related to project quantity management
- ☐ Not relevant
- ☐ Neophyte
- ☐ Expert

A8. The exported volume schedules in your management projects are used to
- ☐ Order materials for construction
- ☐ Pay for construction contractors
- ☐ Manage construction site
- ☐ Pay for owners
- ☐ Plan financial planning
- ☐ Others

A9. What is your quantity management subject area?
- ☐ Structure
- ☐ Architecture
- ☐ Others
- ☐ MEP
- ☐ Infrastructure / facility

A10. What applications do you use as your BIM tool for quantity management?
- ☐ Excel, CAD
- ☐ Revit
- ☐ Others
- ☐ Tekla
- ☐ Navisworks

A11. You think your quantity management method in-use is
- ☐ Not at all effective
- ☐ Slightly effective
- ☐ Moderately effective
- ☐ Very Effective
- ☐ Extremely effective

A12. Your level of knowledge related to BIM
- ☐ Not relevant
- ☐ Neophyte
- ☐ Expert

A13. Your level of knowledge related to 3D laser scanning
- ☐ Not relevant
- ☐ Neophyte
- ☐ Expert

A14. How do you personally evaluate the influence of the following factors of quantity management?

Please tick on 01 checkbox related to your opinion.

(1) = No influence;

(2) = Weak influence;

(3) = Moderate influence;

(4) = Strong influence;

(5) = Perfect influence;

The factors influence the quantity management in a construction project		Scale				
		1	2	3	4	5
1	The precision of the measuring instruments	☐	☐	☐	☐	☐
2	The fundamental mathematical calculation support of the software in volume monitoring	☐	☐	☐	☐	☐
3	The complexity of the structural design of buildings	☐	☐	☐	☐	☐
4	The indefinite form of an unfinished piece of work.	☐	☐	☐	☐	☐
5	The exacerbated number of activities must determine the volume at the same time.	☐	☐	☐	☐	☐
6	The urgent schedule of the project.	☐	☐	☐	☐	☐
7	The actual construction quality is compared to the design drawing.	☐	☐	☐	☐	☐
8	The management ability of parties: construction consultant, design consultant, supervisors, investor.	☐	☐	☐	☐	☐
9	The ability to calculate / breakdown the volume of the parties: construction consultant, design consultant, supervisors, investor.	☐	☐	☐	☐	☐
10	The lack of communication, cooperation, information exchange between investors and consultants.	☐	☐	☐	☐	☐

A15. How do you personally evaluate the influence of the implementation of BIM – 3D Laser Scanning for quantity management in a construction project?

Please tick on 01 checkbox related to your opinion.

(1) = No influence;

(2) = Weak influence;

(3) = Moderate influence;

(4) = Strong influence;

(5) = Perfect influence;

The factors influence the implementation of BIM – 3D Laser Scanning for quantity management in a construction project		Scale				
		1	2	3	4	5
1	The cost of the initial investment in Laser scanners and processing software	☐	☐	☐	☐	☐
2	The training fees for engineers who apply BIM and Laser Scanning	☐	☐	☐	☐	☐
3	The constraint in critical thinking when changing from the conventional method (working with 2D drawings)	☐	☐	☐	☐	☐

The factors influence the implementation of BIM – 3D Laser Scanning for quantity management in a construction project	Scale				
	1	**2**	**3**	**4**	**5**
to BIM – 3D Laser Scanning (working with 3D model, 3D drawings, point cloud)					
4 The complexity in the integration of actual data into the model for implementation quantity management.	☐	☐	☐	☐	☐
5 The ability of the new method not compatible with current metrology rules and regulations.	☐	☐	☐	☐	☐
6 The knowledge about the new technology between relevant parties.	☐	☐	☐	☐	☐
7 The complexity in the project structural design.	☐	☐	☐	☐	☐
8 The influence of uncontrol onsite condition to the collecting process of scanner	☐	☐	☐	☐	☐
9 The software packages are too complex to used	☐	☐	☐	☐	☐
10 The coordination, communication and cooperation process	☐	☐	☐	☐	☐

A16. How do you personally evaluate the effective of the implementation of BIM – 3D laser scanning for quantity management in a construction project?

Please tick on 01 checkbox related to your opinion.

(1) = Not at all effective;

(2) = Slightly effective;

(3) = Moderately effective;

(4) = Very effective;

(5) = Extremely effective;

The factors affect the implementation of BIM – 3D laser scanning for quantity management in a construction project	Scale				
	1	**2**	**3**	**4**	**5**
1 The processing time and precision of the 3D laser scanner	☐	☐	☐	☐	☐
2 The ability to automatically export volume schedule from the BIM model minimize the risks of errors	☐	☐	☐	☐	☐
3 The speed of exporting volume schedule from the BIM model	☐	☐	☐	☐	☐
4 The accuracy of the exported volume schedule from the BIM model	☐	☐	☐	☐	☐
5 The quality control ability of quality management	☐	☐	☐	☐	☐
6 The synchronous between parties	☐	☐	☐	☐	☐

APPENDIX B BIM – 3D laser scanning implementing evaluation

B1. How do you personally evaluate the effectiveness of the implementation of BIM – 3D Laser Scanning for quantity management in a construction project compared to the conventional methods?

- ☐ Not at all effective
- ☐ Slightly effective
- ☐ Moderately effective
- ☐ Very effective
- ☐ Extremely effective

B2. Do you think that the implementation of BIM and 3D laser scan could result in faster and more accurate than the conventional methods?

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

B3. How do you personally evaluate the feasibility of the implementation of BIM – 3D Laser Scanning for quantity management in a construction project?

- ☐ Totally impossible
- ☐ Impossible
- ☐ Neutral
- ☐ Moderate possible
- ☐ Totally possible

B4. Do you want to apply BIM – 3D laser Scanning to your project

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree