Detailed BIM Strategy

BIM Execution Plan

Detailed BIM Strategy Guidelines

15-03-2019

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***Use of this template***

*This template has been elaborated to be used as the basis for the BEP. The Supplier shall fulfill all the required information in order to show their intention to comply with all the standards and procedures described in the BIM Manual. The Supplier is free to add extra information.*

*Where standards deviate from the BIM Manual, this should be communicated to the wider design team and RB Rail.*

*This document is composed by the main document (describing the overall information of the BEP) and a list of annexes including the TIDP, the MIDP and the different BIM Authoring tools – specific procedures and workflows (there must be at least one annex by BIM Authoring tool and there could be various if the Supplier considers it necessary, for instance due to the existence of various disciplines developing the project with the same BIM Authoring tool).*

*All the text in italics in this document serves as description to fulfill each section and shall be removed before final delivery of the BEP.*

1. BIM Execution Plan (BEP)

The following provides the general information and the roles on the project (if applicable) together with details of key personnel who are likely to be involved in information exchange.

* 1. Preface

The BEP shall list the agreed targets for responsibility, timely delivery, exchange, reuse and final handover to the clients. It will also list all of agreed elements as outlined in the Employers Information Requirements.

1. Project Information

Key project information is defined below:

|  |  |
| --- | --- |
| Key Information | Description |
| Project Name |  |
| Project Address |  |
| Project Number |  |
| Project Description (as defined in EIR) |  |
| Project Stages (According to the BIM Manual) |  |
| Disciplines where this BEP is applicable |  |

1. Acronyms & abbreviations

|  |  |
| --- | --- |
| Abbreviation | Meaning |
| AD4 | Asset Data Dictionary Definition Document |
| AIM | Asset Information Model |
| AIR | Asset Information Requirements |
| AR | Asset Register |
| BCF | BIM Collaboration Format |
| BEP | BIM Execution Plan |
| BIM | Building Information Modelling |
| BOQ | Bill of Quantities |
| CDE | Common Data Environment |
| EIR/TS | Employer's Information Requirements and Technical Specifications |
| GIS | Geographic Information System |
| IFC | Industry Foundation Classes |
| IP | Intellectual Property |
| LOD | Level of Definition |
| LoG | Level of Geometric Detail |
| LoI | Level of Information |
| MEP | Mechanical Electrical Plumbing |
| MEPF | Mechanical Electrical Plumbing & Fire-Protection |
| MIDP | Master Information Delivery Plan |
| PI | Professional Indemnity |
| PIM | Project Information Model |
| QAQC | Quality Assurance & Quality Control |
| QC | Quality Control |
| QTO | Quantities Take-Off |
| RB | Rail Baltica |
| TIDP | Task Information Delivery Plan |
| VCR | Virtual Construction Review |
| VDC | Virtual Design Construction |
| VDR | Virtual Design Review |
| WBS | Work Breakdown Structure |
| WCS | World Coordinate System |
| WMS | Web Map Service |
|  |  |

1. References

* BIM Strategy Framework
* BIM Manual (RBR-DOC-BIM-BMA-0001)
* Specifications for Supporting Technologies (RBR-DOC-BIM-CDE-0001)
* CAD Standards (RBR-DOC-BIM-BMA-0002)
* Codification Tables (RBR-DAT-BIM-BMA-0004)
* Codification Standards (RBR-DOC-BIM-BMA-0003)
* BIM Objects Parameter Matrix (RBR-DAT-BIM-BMA-0005)
* Level of Definition (LOD) (RBR-DOC-BIM-BMA-0006)
* BIM Objects LoG Matrix (RBR-DAT-BIM-BMA-0007)
* BEP template (RBR-DOC-BIM-BMA-0020)
* TIDP template (RBR-DAT-BIM-BMA-0021)
* MIDP template (RBR-DAT-BIM-BMA-0022)
* BIM Delivery Report template (RBR-DAT-BIM-BMA-0030)
* QAQC CAD/BIM Checklist Report template (RBR-DOC-BIM-BMA-0031)
* Clash Check Report template (RBR-DOC-BIM-BMA-0032)
* QEX template (RBR-DAT-BIM-BMA-0033)
* QTO template (RBR-DAT-BIM-BMA-0034)
* Data Drop template (RBR-DAT-BIM-BMA-0035)

1. Standards, Codes & Regulations

* ISO/DIS 19650-1.2 Organisation of information about construction works -- Information management using building information modelling -- Part 1: Concepts and principles
* ISO/DIS 19650-2.2 Organisation of information about construction works -- Information management using building information modelling -- Part 2: Delivery phase of the assets
* PAS 1192-2:2013 Speciﬁcation for information management for the capital/delivery phase of construction projects using building information modelling.
* PAS 1192-3:2014 Specification for information management for the operational phase of assets using building information modelling.
* PAS 1192-4:2014 Collaborative production of information.
* PAS 1192-5:2015 Specification for security-minded building information modelling, digital built environments and smart asset management.

1. Project Contacts
   1. BIM Team Key Contacts

|  |  |  |
| --- | --- | --- |
| Role (Package) | Name | E-mail |
|  |  |  |
|  |  |  |
|  |  |  |

* 1. Engineering BIM Lead Key Contacts

|  |  |  |
| --- | --- | --- |
| Role (Package) | Name | E-mail |
|  |  |  |
|  |  |  |
|  |  |  |

1. Major Project Milestones and document updates in CDE.

The following table summarizes the proposed major project milestones relating to information delivery during the project.

*If separate design teams are planned, BEP shall include separate schedules.*

|  |  |
| --- | --- |
| Milestone | Date |
|  |  |
|  |  |

Only major milestones are listed. A more detailed and coordinated Project Plan must be developed with the stakeholders and agreed. This is included in the Master Information Delivery Plan.

Updates of BIM Models, data and documents for each discipline to client’s CDE shall be done according to the following table (and according to the technical specifications and contract documents).

|  |  |  |  |
| --- | --- | --- | --- |
| Discipline / Package / Sub-package | Documents / models | Owner | Date / Frequency / Milestone |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. Roles & Responsibilities

*At the start of a project it is important to identify the roles and responsibilities of the design teams. The Supplier shall describe the main roles and their responsibilities.*

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Owner | Description | Tasks / responsibilities |
|  |  |  |  |
|  |  |  |  |

1. BIM Use Cases

The major goals and objectives for the BIM implementation must be considered and stated as a project strategy, and are explained in the BIM Manual section “3.3. BIM Use Cases”.

The main BIM Use Cases that shall be implemented in this project for each stage are listed in the chart below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BIM use case | Value Engineering | Master design completion | Detail technical design completion | Design for administrative approvals | Construction | As built | Operation |
| Design Authoring (Collaboration) |  |  |  |  |  |  |  |
| Engineering Analysis |  |  |  |  |  |  |  |
| 2D Drawing & Schedule Generation |  |  |  |  |  |  |  |
| Interference Management (Clash Checks) |  |  |  |  |  |  |  |
| Interactive Design Reviews |  |  |  |  |  |  |  |
| Structural Detailing |  |  |  |  |  |  |  |
| Quality Control |  |  |  |  |  |  |  |
| Visualisations |  |  |  |  |  |  |  |
| Phasing and Construction Sequencing Simulations (4D) |  |  |  |  |  |  |  |
| Field Progress Tracking |  |  |  |  |  |  |  |
| Quantity Take-Off (5D) |  |  |  |  |  |  |  |
| Vendor Equipment Submittals |  |  |  |  |  |  |  |
| Augmented and Virtual Reality |  |  |  |  |  |  |  |
| Digital Fabrication |  |  |  |  |  |  |  |
| As-Built documentation |  |  |  |  |  |  |  |
| Operations & Maintenance Information |  |  |  |  |  |  |  |
| Other BIM use case |  |  |  |  |  |  |  |

Based on the BIM Use Cases adopted from the precedent table that will be implemented on the project, a brief description on how the BIM Use Case will be implemented on the project is described in the matrix below.

|  |
| --- |
| Design Authoring (Collaboration) |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Engineering Analysis |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| 2D Drawing & Schedule Generation |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Interference Management (Clash Checks) |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Interactive Design Reviews |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Structural Detailing |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Quality Control |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Visualisations |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Phasing and Construction Sequencing Simulations (4D) |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Field Progress Tracking |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Quantity Take-Off (5D) |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Vendor Equipment Submittals |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Augmented and Virtual Reality |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Digital Fabrication |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| As-Built documentation |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Operations & Maintenance Information |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |
| Other BIM use case |
| *(Describe how this use case will be utilized on the project if applicable, if not use n/a)* |

1. Software Versions

The CAD/BIM software, including Add-Ons, and versions that will be used by the design teams shall be agreed before starting the project.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Company Name | Discipline | CAD/BIM software | Version | Format | Comments |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

No party is authorized to alter the platform or the build/version without prior consent by the project BIM Manager/Design Manager and RB Rail / Employer.

Any requirements to upgrade the platform or build/version will be communicated to all parties with a minimum of one month’s notice. This is to allow for a period of discussion and testing before implementation.

1. Exchange Formats

The agreed exchange formats for documents, model and drawing file exchange are:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | DWG | DGN | IFC | RVT | NWC/NWD | I-MODEL | PDF | Other |
| Models |  |  |  |  |  |  |  |  |
| Aggregated Models |  |  |  |  |  |  |  |  |
| Drawings |  |  |  |  |  |  |  |  |
| Final drawing format |  |  |  |  |  |  |  |  |
| Schedules or spreadsheets |  |  |  |  |  |  |  |  |
| Documents |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

1. Levels of Definition

It is important to define who models what (the BIM Author) and to what Level of Definition (LOD).

The LOD should be defined at a regional level by phases and disciplines and shall align with the BIM Manual and the project EIR.

*To be described by the Supplier for all project stages.*

*The BIM Objects Attributes Matrix shall be completed by the Supplier and annexed to this document. The Supplier shall use as template the file RBR-DAT-BIM-BMA-0005\_BIM\_Objects\_Attributes\_Matrix.*

1. Project Collaboration Systems, Common Data Environments & Electronic Data Management

*The Supplier will develop the Work In Progress (WIP) design within the next platforms. The Delivery will follow the BIM Manual workflow and no deliverable will be considered if not released within the Employer CDE (also called Rail Baltica CDE within the BIM Manual, 20-Rail Baltica Common Data Environment (CDE))*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Company Name | Solution | Network | Database | Field based | Comments |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

TBD :To be defined.

1. Security & Extranet Access, Distribution Authority

|  |  |  |
| --- | --- | --- |
| Company Name | Authorised Manager | Authority (upload, download, change, access/distribution) |
|  |  |  |

*The Supplier shall demonstrate in this section how he will securely archive information within their WIP / Shared CDE environments and or destroy any sensitive information during the whole lifecycle of the project.*

1. File Naming Convention

Naming conventions of all models, drawing sheets and clash renditions will comply with the BIM Manual & Codification & Data Management.

1. Dimensional Consistency

The project team should agree common units of measurement. These should include distance (e.g. meters and millimeters) and angles (e.g. degrees/radians measured clockwise or counter clockwise).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Type of information | Millimeters | Meters | Degrees | Radians | Clockwise | Counter |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1. Survey Strategy

*The Supplier shall demonstrate in this section how he will manage the survey data and models.*

|  |  |  |  |
| --- | --- | --- | --- |
| Survey method | Delivery format | Survey origin | Comments |
| Point cloud |  |  |  |
| Light detecting & Randing (lidar) |  |  |  |

1. Geo-location & Coordinates System

*The Supplier shall demonstrate in this section how he will manage the geo-location and coordinate system of the models.*

*Refer to point 11-BIM Models’ Geo-reference of the BIM Manual for more details.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model name | Coordinates system | Easting (m) | Northing (m) | Elevation (z) | Azimuth |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1. Quantity Extraction and Tracking Strategy

*The Supplier shall describe in this section how they are going to proceed with the Quantity Extraction and its tracking, based on the standards and procedures defined in the BIM Manual (**15.5-5D: quantity extraction and tracking)*

1. Data management strategy

*The Supplier shall describe in this section how they are going to proceed with data management, based on the standards and procedures defined in the BIM Manual (14.3-BIM Objects’ information (Data Management), 15.7-Information exchange: Data Drops).*

1. Interdisciplinary Coordination

*The Supplier shall describe in this section how they are going to proceed with Interdisciplinary coordination, based on the standards and procedures defined in the BIM Manual.(18-Interface Coordination)*

1. External Model Integration

*The Supplier shall describe in this section how they are going to proceed with external model integration, based on the standards and procedures defined in the BIM Manual.*

1. Interference check

*The Supplier shall describe in this section how they are going to proceed with interference check, based on the standards and procedures defined in the BIM Manual (18.2-Clash Detection (Coordination Review)).*

1. 2D Drawing strategy

*The Supplier shall describe in this section how they are going to proceed with 2Ddrawingd, based on the standards and procedures defined in the BIM Manual (3.3.3 2D Drawing & Schedule Generation, 15.2-2D: Drawing production and CAD Manual).*

1. Interdisciplinary Design Review

*The Supplier shall describe in this section how they are going to proceed with Interdisciplinary design review, based on the standards and procedures defined in the BIM Manual. (18-Interface Coordination, 15.3.3-Collaboration)*

1. Field progress tracking strategy

*The Supplier shall describe in this section how they are going to proceed with field progress tracking, based on the standards and procedures defined in the BIM Manual. (8.3.6-Construction and As-Built)*

*(This section is only valid if the project includes the Construction and / or the As-Built stages),*

1. Handover

*The Supplier shall describe in this section how they are going to proceed with handover, based on the standards and procedures defined in the BIM Manual. (This section is only valid if the project includes the Construction and / or the As-Built stages, 10-Operation & Maintenance, Asset information Model (AIM))*

1. Quality Assurance

*The Supplier shall describe in this section how they are going to proceed with the Quality Assurance for verification, both of geometry / data and validation against the EIR, based on the standards and procedures defined in the BIM Manual.(19-Quality Control)*

*The Supplier shall describe the periodicity for the BIM model and data checks that will be defined, discussed and agreed with the Rail Baltica / Employer Information Manager (BIM Manager).*

1. Annexes



























30. 1. Task Information Delivery Plan (TIDP)

A Task Information Delivery Plan (TIDP) for each task within the project is appended to this document.

*The TIDP shall be prepared using the template “TIDP-template-RB”. When completed by all team members the TIDPs should be published in this document appendix and on the project extranet.*

* 1. Model Information Delivery Plan (MIDP)

The Master Information Delivery Plan (MIDP) is developed from the separate TIDPs produced for each task within the project and appended to this document.

*This more detailed, coordinated MIDP, prepared using the template “MIDP-template-RB”, must be developed and agreed with the stakeholders. When completed the MIDP should be published in this document appendix and on the project extranet as a project plan.*

* 1. BIM Objects Attributes Matrix

*Completed by the supply chain, prepared using the template “RBR-DAT-BIM-BMA-0005\_BIM\_Objects\_Attributes\_Matrix”.*

*Note: the BIM Objects Attribute Matrix is provided by the Rail Baltica / Employer Information Managers, but that list is open to be completed by the Supplier with any extra attributes that could be useful for the Suppliers’ tasks. The naming shall follow BIM Manual’s guidelines.*

* 1. Authoring tool XXX procedures & workflows

*Refer to BIM Manual section “7.2.1 BIM Authoring tool-specific procedures and workflows” for further clarifications.*

*Each different BIM Authoring tools will have a specific annex with procedures and workflows to be used by the Supplier teams. (There must be at least one annex by BIM Authoring tool and there could be various if the Supplier considers necessary, for instance in the event there are various disciplines developing the project with the same BIM Authoring tool).*

*If the Supplier considers necessary, there could be specific annexes for special workflows or BIM use case-related subjects, such as the Design Review, Design Coordination, … It is important to mention that if specific procedures are not created to define the BIM Use Cases approach, they will have to be defined in the BEP main document or in the Authoring tool procedures.*

*This annex shall include a small mock-up model (or link to it in the CDE) with the stated in the BIM Manual requirements.*

* 1. Authoring tool YYY procedures & workflows

*Refer to BIM Manual section “7.2.1 BIM Authoring tool-specific procedures and workflows” for further clarifications.*

*Each different BIM Authoring tools will have a specific annex with procedures and workflows to be used by the Supplier teams. (There must be at least one annex by BIM Authoring tool and there could be various if the Supplier considers necessary, for instance in the event there are various disciplines developing the project with the same BIM Authoring tool).*

*If the Supplier considers necessary, there could be specific annexes for special workflows or BIM use case-related subjects, such as the Design Review, Design Coordination, … It is important to mention that if specific procedures are not created to define the BIM Use Cases approach, they will have to be defined in the BEP main document or in the Authoring tool procedures.*

*This annex shall include a small mock-up model (or link to it in the CDE) with the stated in the BIM Manual requirements.*