Request for Proposal (RFP)

Design, Development and Maintenance of Integrated Project Management System (IPMS) for BMRCL

RFP Release Date: 18th September 2026

Updated version: 30th September

Table of Contents

1 Introduction 5
2 RFP Process & Guidelines 6
2.1 Milestones & Timelines 6
2.1.1 Timeline for the Selection 6
2.1.2 Contract duration 6
2.1.3 Phased Contract Arrangement 7
2.2 Submission Process & Proposal Formats 7
2.2.1 Eligibility Documents 7
2.2.2 Technical Proposal 8
2.2.3 Commercial Proposal 10
2.2.4 Declaration 10
2.2.5 Presentation Deck 10
3 Evaluation Process and Criterion 11
3.1 Evaluation Process—Introduction 11
3.2 Stage 1—Bidder eligibility criteria 11
3.3 Stage 2—Technical bid evaluation 12
3.3.1 Technical evaluation criteria and scoring guidelines: 13
3.4 Stage 3—Commercial bid evaluation 29
3.5 Stage 4—Final scoring and selection 30
4 Scope of work 31
4.1 Proposed IPMS platform Stack setup 31
4.1.1 Tech Stack (Indicative) 32
4.2 Components of the Proposed solution: 35
4.2.1 Source Systems & Integration layer 35
4.2.2 Security Layer 36
4.2.3 Infrastructure & hosting layer 38
4.2.4 Data Layer 39
4.2.5 Application and Core IPMS Layer 42
4.2.6 Presentation Layer 49
4.2.7 Internal and External Integrations 52
4.3 Other Functional requirements: 55
4.3.1 Performance & scalability 55
4.3.2 Reuse of Existing Components and interoperability 56
4.4 Non-functional Requirements 57
4.4.1 Screen size and resolution. 57

4.4.2 Coding practice 58
5 Implementation Timeline 60
6 Deliverables 63
7 Payment milestones 64
8 Hypercare and Support Requirements 66
8.1 Hypercare support 66
8.2 Support Requirements 66
8.2.1 Infrastructure, Cloud Operations, DevOps, and IPMS support 66
8.2.2 Support timings 66
8.2.3 Proactive Monitoring support 66
8.3 Backup Management 67
8.4 Change Request Effort Thresholds 68
9 Liquidated damages 68
10 Appendix 1: Submission Checklist 68
10.1 RFP Annexure Template–Form 1 70
10.2 RFP Annexure Template – Form 2 71
10.2.1 Company information 71
10.2.2 Contact information 71
10.2.3 Financials (Pls provide all figures in USD) 71
10.2.4 Employees & Resources 72
10.2.5 Technical capability and experience with proposed technology stack 72
10.2.6 Taxation Details 72
10.2.7 Supporting Documents 72
10.3 RFP Annexure Template – Form 3 73
10.3.1 Project References 73
10.3.2 Supporting Documents 74
10.4 RFP Annexure Template – Form 4 74
10.4.1 Solution Architecture 74
10.4.2 Supporting Documents 75
10.5 RFP Annexure Template – Form 5 75
10.5.1 Functional coverage 75
10.5.2 Integration Across Modules 76
10.5.3 New Age Technology & Analytics 76
10.5.4 Utilization & Methodology of Licenses 76
10.5.5 Quality of IPMS Solutioning 77
10.6 RFP Annexure Template – Form 6 78
10.6.1 Project Plan & Delivery 78

10.6.2 Capacity Build & Training 78
10.6.3 Maintenance & Support 78
10.6.4 Documentation 78
10.6.5 Supporting Documents 79
10.7 RFP Annexure Template – Form 7 80
10.7.1 Proposed Team Structure 80
10.7.2 Proposed Team Members 80
10.8 RFP Annexure Template – Form 8 81
10.8.1 Total Costs for 5 months (Contract Period) 81
10.8.2 Total Costs post contract period 81
10.8.3 Commercial Bid – NPV of 3 year TCO 81
10.9 RFP Annexure Template – Form 9 81
10.9.1 Implementation/ Build Cost 81
10.10 RFP Annexure Template – Form 10 82
10.10.1 License Cost during Period of implementation 82
10.10.2 License Cost post Period of implementation 83
10.11 RFP Annexure Template – Form 11 83
10.11.1 Support & Maintenance Rate Card as per Role 83
10.11.2 Breakdown of Support & Maintenance Services 83
10.11.3 Maintenance of Software, Tools & Licensing Co st 84
10.12 RFP Annexure Template – Form 12 84
10.12.1 Rate Card 84
10.13 RFP Annexure Template – RFP Query Format 85
11 Appendix 2: Declaration by Digital Partner 85

1 Introduction

Japan International Cooperation Agency ("JICA") is a governmental agency that coordinates official development assistance ("ODA") for the Government of Japan to promote socio-economic growth in partner countries. JICA supports sustainable development in partner countries including JICA through finance, technical cooperation, and grant. In India, JICA has been a long-standing development partner for metro network development including for the city of Bengaluru.

JICA DXLab is a mechanism within JICA that spearheads the digital transformation initiative based on its portfolio projects and programs to achieve greater socioeconomic impact. JICA DXLab particularly focuses on the development and deployment of enterprise-wide digital transformation initiatives for metros across the world. They promote adoption of innovative technologies and artificial intelligence (AI), aiming to leverage data for implementing digital solutions.

JICA DXLab now envisions to develop and drive first of its kind **Integrated Project Management System (IPMS) for BMRCL** with key stakeholders in Bengaluru, and an aspirational digital partner that will be selected through this RFP.

2 RFP Process & Guidelines

2.1 Milestones & Timelines

2.1.1 Timeline for the Selection

Milestones	Timeline	Remarks
RFP release on JICA website	18th September 2026	
Submission of queries	23rd September 2026	By 11:59 PM Indian Standard Time on the date
Pre-bid query meeting of JICA, BCG & BMRCL with prospective bidders	25th September 2026	Will be conducted Online. Confirmation of participation via email on JICADxLabIPMS@bcg.com, is mandatory to receive the online link for the session.
Submission of technical & commercial proposals	6th October 2026	By 11:59 PM Indian Standard Time on the date
Qualified (eligible) potential bidders' technical presentations	13th / 14th October 2026	Will be conducted through online mode
Contract award – issuance of letter of award	15th October 2026	
Partner onboarding	19th October 2026	

2.1.2 Contract duration

- The total duration of the contract will be till ***15th February 2027.*** Project must be initiated within 7 days from the date of award.
- The contract between JICA and the selected bidder ("Digital Partner") will include provision for the development of IPMS Platform, implementation of IPMS platform as described in the "Section 4" & post deployment hypercare support (for 30 days) for IPMS platform.
- Upon the conclusion of the JICA contract period, all project assets, documentation, licenses/ rights, source code and other deliverables to be required to be transferred to Bangalore Metro Rail Corporation Limited ("BMRCL").
- BMRCL may, at its discretion and subject to applicable procurement requirements engage the digital partner for maintenance, support, further development or other services. For such purpose, **the commercial quotes provided by the bidder under this RFP shall remain valid as ceiling rates for a period of 3 years from the date of project initiation, unless otherwise agreed through an applicable procurement process.** Payment for any further development shall be subject to effort estimation of the finished product/ service by an independent technical expert at the rates that are mutually agreed subject to a ceiling of what is adopted by the NIC or CSG, GoK.
- Nothing in this provision shall oblige BMRCL to continue with the selected Digital Partner. The solution shall therefore be designed and documented so that BMRCL or another service provider

appointed by BMRCL can operate, maintain and extend the system without unreasonable technical, contractual or commercial dependence on the original Digital Partner.

Note:

- The contract completion date is 15 February 2027 as specified in the RFP. No extension of the contract period will be allowed under any circumstances. While the completion date may be advanced if the work is completed earlier than planned, it cannot be extended.
- In the event of delays attributable to the Digital Partner, any additional costs or time extensions incurred shall be borne by the Digital Partner.

2.1.3 Phased Contract Arrangement

- JICA will require the Digital Partner to enter the contract with its appointed consultant.
- In case JICA chooses to appoint a new consultant mid-way during the contract duration, there will be a need for a fresh new contract between the Digital Partner and the newly appointed JICA consultant.
- The Digital Partner will cooperate in any such transition from one appointed consultant to another. Any failure on part of Digital Partner (including but not limited to failure to enter a new contract) will be a material breach.

2.2 Submission Process & Proposal Formats

- Electronic submission must be received at JICADxLabIPMS@bcg.com by the latest 11:59 PM Indian Standard Time on or before by 6th October 2026. The email subject needs to be changed to "JICA-BMRCL-IPMS," followed by your organization name.
- Bidder may make inquiries/information requests by email to JICADxLabIPMS@bcg.com. For any inquiry, the email subject must be changed to "**JICA-Bengaluru-IPMS-Query**," followed by your organization name. Bidder can refer ***"RFP Annexure Template: 13. RFP Query format"*** for the format of query submission.

The bidder is expected to submit the following for eligible participation:

Note that all submission materials need to be prepared in English. The size of all files should be less than 50 pages each (including annexures, ensuring minimum 12 font size).

2.2.1 Eligibility Documents

The following documents must be submitted by the Bidders to prove that they will meet the eligibility criteria as outlined in ***"Section 3.2":***

- Copy of certificate of incorporation/partnership/ any other government recognized certificate.
- Self-certification from CEO/Authorized signatory to declare that the bidder:
  - Does not have any Conflict of interest.
  - Has proposed a team with no history of corruption/arrest records/involvement with criminal organizations.

- Has not debarred/blacklisted by JICA in past.

2.2.2 Technical Proposal

Submission format: ***"RFP Annexure Template: 1. Executive Summary to 7.*** Team Composition"

All technical submissions must be compliant with ISO 19650 standards. Bidder's description and business/technical qualifications should be presented concisely by filling out the specified forms with the following information:

(1) Executive Summary *"RFP Annexure Template: 1. Executive Summary"*

- The executive summary covers a brief note of the bidder's response for an executive-level audience. It provides a summary of their technical proposal across all sections with clear articulation of how the bidder is uniquely positioned to deploy IPMS at BMRCL

(2) Company profile *"RFP Annexure Template: 2. Company Profile"*

- This includes the following sub-requirements: Financial Stability, Partnership Model, Headcount
- This section should include but is not limited to the company's history, financials, structure and management, number of employees, location, and management policy.

(3) Relevant project experience & credentials *"RFP Annexure Template: 3. Project Experience"*

- A Bidder to submit 6 (six) project execution reports exclusive in nature showcasing credentials/experience with respect to implementation of project management solutions or digital tool implementation in companies that manage large scale construction in Civil and infrastructure industries, Metro and Rail industries along with public sector experience. The bidder must also attach project completion certificates with each execution report.
- If any Bidder has undergone corporate restructuring (including merger, demerger, hive off, slump sale, etc.) in the last three financial years (FY 2022-23, 2023-24, 2024-25), it must showcase the credentials of its former or current entity, provided sufficient documentary proof is submitted with an undertaking to evidence that such credentials have been transferred to the bidding entity and that the bidding entity is authorized to use these credentials. Notwithstanding the foregoing, the credentials of the parent entity, holding entity, subsidiaries, or affiliates cannot be used (and will not be considered) unless such parent entity, holding entity, subsidiaries, or affiliates are themselves bidding in this RFP.

(4) Quality of the solution build & proposed architecture *"RFP Annexure Template: 4. Solution Architecture"*

- Detailed system architecture (i.e., Technical Architecture, infrastructure Architecture, and Integration Architecture) along with proposed tech stack, Engineering techniques, and references of the case studies/ project executed by Bidder in past.
- A Bidder to submit detailed explanation on technical solution that covers the explanation of various building blocks, components and services, best-in-class design patterns, tech stack (front-end and back-end), Integration methodologies, infrastructure requirements etc.
- The Bidder must clearly specify all data and information requirements from BMRCL, contractors, or any third-party entities necessary to implement each building block of the proposed solution.

(5) Coverage & Quality of IPMS solutioning capability *"RFP Annexure Template: 5. Functional Coverage"*

- The Bidder must clearly provide details about coverage of scope (which solutions will be developed in-house/outsourced, which will be built Versus how many solutions will be deployed using out-of-the-box solutions)
- The bidder must also provide information on the proposed software/tools and licenses to be used for delivery of IPMS solution as detailed out in **"Section 4.2.5"**
- The Bidder should demonstrate that the proposed solution supports the full spectrum of Integrated Project Management capabilities – covering the entire project lifecycle from planning, execution, monitoring, to commissioning and final payments.

(6) Implementation approach & methodology *"RFP Annexure Template: 6. Implementation methodology"*

- Outline the project approach and methodology for the development of the IPMS platform and integration across existing and planned tech. system and support post launch i.e., detailed implementation plan, including the milestones, timeline, and the resources deployment strategy. Also, this includes an execution strategy for capability building & training and documentation. The bidder must clearly call out for any dependencies and support needed to deliver the proposed scope.

(7) Team profiles – Quality & relevance for RFP scope execution *"RFP Annexure Template: 7. Team Composition"*

- A detailed description of team size & structure with breakdown of roles and responsibilities of the project team to be deployed. This deployed team should consist of 6 named members as described in **"Section 3.3.1".** This team shall remain constant throughout the contract period and should be available to work on BMRCL premises. This team should include project manager, cloud & solution architect, integration architect, delivery manager, Metro/Infra mgmt. expert, UI/UX designer, software developer, security specialist, QA engineer, business analyst, cloud architect, and any other relevant personnel.
- The proposal should also describe the qualifications, certifications, and experience of each team member, highlighting their relevant experience and expertise in developing and implementing technology-based solutions in LCPM, with Application Management System ("AMS") & Run Operations ("RunOps"), User/Customer facing applications development, APIs building & system integration, Information Technology and Operational Technology ("IT-OT"), and others.

2.2.3 Commercial Proposal

Submission format: ***"RFP Annexure Template: 8. Commercial Bid to 12. Rate Card."***

A Bidder shall provide a total expected cost (after including all payable duties and taxes) and a detailed breakdown of the costs associated with the Contract, including personnel and implementation of resources by filling the required format. They should provide breakdown of the following:

- Implementation/development fee – release wise costs
- License fee, number of licenses and duration for use of licenses
- Maintenance costs
- It should also include the rate card for distinct roles/levels proposed for estimation of additional scope that may need to be included in the future.

2.2.4 Declaration

Submission format: ***"Section 11 - Appendix 2: Declaration by Digital Partner"***

Declaration by the bidder – that they have understood the terms and conditions associated with this RFP Document and they accept and agree to comply with the same.

2.2.5 Presentation Deck

Supporting presentation deck to summarize the key information from all forms and highlight the unique value addition from the bidder's proposal. This deck will be used during the technical presentation round.

3 Evaluation Process and Criterion

3.1 Evaluation Process—Introduction

- Bid submission:
  - Bidder to submit proposals to this RFP along with the requisite documentation in the prescribed formats.
- Eligibility check:
  - Eligibility of all the Bidders will be evaluated based on the criteria laid down in ***"Section 3.2"***
  - The Bidders failing to meet the eligibility criteria will stand disqualified, and their technical/financial bids will not be opened.
- Presentation:
  - The eligible Bidders basis eligibility criteria to give an oral presentation/Q&A in English based on the submitted documents/ pitch deck with key team members to be present in person/ online
- Bid evaluation:
  - The eligible Bidders will be evaluated as per the technical evaluation criteria prescribed in ***"Section 3.3"*** below to be shortlisted. Commercial bids of the shortlisted Bidders will be opened thereafter and evaluated as per the commercial evaluation criteria prescribed in ***"Section 3.4"*** below.
  - Evaluation criteria proposed to be adopted will be Quality and Cost Based Selection (QCBS) where Technical Bid Score will get a weightage of 70% and Commercial Bid Score a weightage of 30%.
- Award of Contract:
  - The Bidder whose bid secures the highest total score as per above evaluation will be considered as the best evaluated Bid for selection as the Digital Partner.
  - In case of a tie where two or more Bidders achieve the same highest overall score, the Bidder with the higher technical score will be selected as the Digital Partner.

3.2 Stage 1—Bidder eligibility criteria

- Eligibility criteria
  - Eligibility criteria mentioned below are necessary requirements that a Bidder must meet to be eligible to submit a proposal.
  - This is a screening mechanism to ensure that only capable and qualified Bidders who can deliver the services or products required are considered. They include criteria related to Legal Entity in India, years of operations, conflict of interest, legal history, and debarment. Failure to meet any of these requirements will lead to an automatic disqualification from the bidding process.
  - For consortium bids, the Contract will be executed with the Lead Member.

Sl. No.	Metrics segment	Criteria	Documentation requirements
1	**Legal entity in India**	Legal entity in India (firm/company/ partnership/ proprietorship firm registered under the Companies Act, 2013)	Copy of certificate of incorporation/partnership/ any other government recognized certificate.
2	**Years of operations**	Minimum of 5 years' operating in technology development (LCPM/Project management in Infrastructure Industry/Custom App/ Software development)	Copy of certificate of incorporation/partnership/ any other government recognized certificate
3	**Conflict of interest**	Bidder must only participate in one bid. None of the Bidder's subsidiaries, or associate or holding company or companies having common director/s or companies in the same group of promoters/management shall participate in the bid process.	Self-certification from CEO/Authorized signatory.
4	**Legal history**	Bidder's management and proposed team members do not include members who have a history of corruption, arrest records, or involvement with criminal organizations	Self-certification from CEO/Authorized signatory.
5	**Debarment**	Bidder not debarred/blacklisted by JICA in past are only allowed to bid.	Self-certification from CEO/Authorized signatory.

- Continued Eligibility
  - The eligible Bidders must continue to meet the eligibility criteria prescribed in the RFP document (based inter-alia on which they were shortlisted) and should continue to meet these until the award of the Contract. Bidders must provide evidence of their continued eligibility, if requested.
  - Furthermore, it is Bidder's responsibility to ensure that its experts, service providers, Bidders, and/or their employees similarly continue to meet such eligibility criteria.

3.3 Stage 2—Technical bid evaluation

Technical evaluation score will contribute to 70% of total bid score.

- The proposals submitted by the eligible Bidders will be evaluated on the following 6 broad parameters, based on the submitted technical proposals and the presentation:

SL. No.	Parameters	Max. Marks
1	Company Profile	**5**
2	Relevant project experience & credentials	**15**
3	Quality of the Solution build & proposed Architecture	**20**

SL. No.	Parameters	Max. Marks
4	Coverage & Quality of IPMS solutioning capability	**30**
5	Implementation approach	**20**
6	Team profiles - Quality & relevance for RFP scope execution	**10**

- JICA reserves the right to check/validate the authenticity of the information provided against the parameters in the evaluation criteria, and the requisite support must be provided by the Bidders. Component wise details and methodology on how the Bidders will be evaluated on each of the technical evaluation criteria are provided in Table 1 below.
- Particularly, for a contract of such a scale and complexity, it is imperative that the Bidders should deploy best in class professionals to ensure successful execution.
    - All the named resources/Experts who are subject to technical evaluation - are recommended to be present in the presentation and may be interviewed/assessed during the presentation.
    - Constraints on the availability of named resources/Experts proposed must be made. If necessary, a backup resource profile shall be attached.
    - A Bidder must commit 100 (Hundred) percent time availability of the named resources/Experts from Day 1 of the Contract & should remain available throughout the period of the Contract.
    - The named Experts cannot be replaced without prior approval by JICA. If replaced, the newly appointed Experts shall be of equal or higher competence.
- The Bidders with an aggregate technical score of 70 or more will be shortlisted for commercial bid evaluation. Failing to secure a minimum of 70% marks will lead to technical rejection of the Bid.

3.3.1 Technical evaluation criteria and scoring guidelines:

Dimension	Criteria	Max. Marks	Scoring Guidelines
Partner Profile (5)	**Annual turnover** In case of Consortium, the total turnover of the Lead Member only will be considered	**3**	Scoring basis of average annual revenues in the last 2 years Score 0 - X < $100,000. Score 1 - $100,000 < X < 200,000 Score 2 - $ 200,000 < X > $ 1 Million. Revenue criteria not applicable for “Not for Profit” platforms established in the transport sector.

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Technical capability and experience with proposed technology stack	**1**	Demonstrated capability supported by substantial relevant implementation experience and/ or suitably qualified/ certified resources (Score 1) Limited demonstrated capability (Score 0.5) No demonstrated capability (Score 0)
	Headcount: Resource capability and capacity In case of Consortium, the total headcount of the Lead Member will only be considered.	**1**	Scoring basis of average headcount in the last 12 months > 1000+ headcount (Score 1) > 500 & <1000 headcount (Score 0.5) < 500 headcount (Score 0)
Relevant project credentials (15)	A Bidder must submit 6 unique/exclusive project execution cases along with their completion certificates. Each case can simultaneously fulfill one or more of the following categories. However, a Bidder must ensure that at least 2 cases satisfy each criterion: **- 6*2.5 marks.**	**15**	Each project to be rated from 0 to 2.5. Projects will be evaluated on basis of relevance to this RFP. Score: 0 – Minimal or No Relevance - The project has little to no relevance to current scope; there is a significant gap between the scope requirements and the skills, technologies, and resources demonstrated in the project.

Dimension	Criteria	Max. Marks	Scoring Guidelines
	LCPM projects in India: At least 2 in India or 1 in India and 1 in an international market of comparable scale and complexity with relevant tech. experience in project management or digital tool implementation in large scale construction or infrastructure industries Metro and Rail Sector Projects: At least 2 in Metro or railway sector (Metro projects will be preferred) Public Sector Projects: At least 2 full stack implementation projects undertaken with Central/State Government departments or their agencies/ undertakings for operational transformation/large scale development/growth /turnaround & transformation/ implementation. Projects will be evaluated on basis of relevance to RFP scope, future compliance, relative in size & scale of implementation in BMRCL. Each project must have a minimum size of USD 100k (~INR 95L) and must have completed the project in the last 5 financial years (between April 2021 to March 2026).		Score: 1 to 2 – Moderate Relevance with Identified Gaps The project is somewhat relevant to the current scope, but significant gaps are identified; Some aspects of the project align with scope requirement of skills and resources, but major areas require capability enhancement or external support. Relevant to a single category. Score: 2 to 2.5 – High Relevance and Well-aligned The project is highly relevant to the current scope, displaying a strong alignment in skills, technologies, and resources. It displays the required capabilities to implement the RFP. Relevant to multiple categories

Dimension	Criteria	Max. Marks	Scoring Guidelines
Quality of the solution build & proposed architecture (20)	Front-end – Channels (References from past projects with rationale on choice of tech stack will be preferred) The Bidder shall describe the proposed front-end approach for the IPMS platform, covering the Web Portal, role-based dashboards and Field Mobile App. The response should demonstrate how the proposed user channels will support BMRCL leadership, project teams, planning/scheduling teams, design reviewers, site engineers, QA/HSE teams, finance/commercial teams, contractors and consultants. The proposed solution should cover unified access to IPMS modules, role-based dashboards, configurable forms and workflows, field data capture, geo-tagged and time-stamped updates, offline mobile usage, document/photo/video uploads, alerts and exception reporting. It should also support single sign-on, role-based access, responsive design across desktop/tablet/mobile, and auditability of user actions. The Bidder should provide relevant references from past implementations involving web portals, dashboards, workflow systems, field mobile applications or project management platforms in large infrastructure, construction, metro/rail or public sector environments.	**5**	Score: 0-1: Basic description of components in the front-end channels are described but not detailed to show robustness of implementation approach. Score: 1-3: Reasonable description of the web portal, dashboards and mobile app, including role-based views and field workflows, but only partially contextualized to BMRCL/IPMS/ sector requirements. Score: 3- 5 - Comprehensive and IPMS-contextualized approach covering web portal, dashboards, mobile app, role-based user journeys, offline field usage, integration, auditability and scalability, supported by relevant past implementation experience.

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Backend - Common Data Environment (CDE) setup, Integration & API (References from past projects with rationale on choice of tech stack will be preferred) Detailed explanation of tech stack used to build Central Data Platform (CDE), various data services, real-time data collection and usage, scalable data platform, rules engine and handling various datasets etc. Standards Compliance and Metadata Support: The solution must support industry standards and allow metadata tagging for efficient search, classification, and lifecycle tracking of documents and models using various reusable components. Detailed approach for various integrations within and outside IPMS eco system, Plug-and-Play Integration Capability, facilitation for real-time and bi-directional data flow between IPMS modules and third-party systems, Contractor data sources, BMRCL data sources, provisioning for SDKs, sandbox environments, and developer support for building custom integrations or extensions etc. Detailed explanation of tech stack supporting the integration meeting the requirements stated in NFRs.	**5**	Score: 0-1 - Business Domain services, CDE, tech stack and integration components have been described but are not detailed out to show robustness of implementation approach Score: 1-3 - Business Domain services, CDE, tech stack and integration components have been detailed and contextualized to show robustness of implementation approach but are not backed by relevant experience of executing similar work irrespective of sector. Score: 3- 5 - Business Domain services, CDE, tech stack and integration components have been detailed, contextualized to show robustness of implementation approach, and are backed by relevant experience of executing similar work irrespective of sector. Ex: Comprehensive approach that encompasses real-time data processing integration with third-party services, scalability, security, data analytics, incident monitoring, and maintenance. Integration patterns, list of guiding principles and best practices, detailed list of outbound and inbound interfaces including detailed integration design for selected interfaces, rationale for technology choices made, mechanisms to manage performance, scalability, security, and monitoring

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Infrastructure, Networking, Cloud and Security (References from past projects with rationale on choice of tech stack will be preferred) Detailed infrastructure architecture to support the IPMS ecosystem,-with rationale, limitations and support model for the preferred model-In case the Bidder proposes on-premises or hybrid deployment, the Bidder shall provide rationale, limitations, cost implications and support model. The approach to support multi-tenancy, cross connection between on-premises and Cloud, to follow infra as a code with scalability, security features and is agnostic to any infrastructure provider.	**5**	Score: 0-1 - Infrastructure components in the proposed solution are described but not detailed to show robustness of implementation approach Score: 1-3 - Infrastructure components in the proposed solution are described and detailed to show robustness of implementation approach, but the proposed solutions are not backed by relevant experience of executing similar work irrespective of sector Score: 3-5 - Infrastructure components are described in detail, are contextualized to show robustness of implementation approach, and backed by relevant experience and proof of executing similar work irrespective of sector. Ex: Best practices for infrastructure management, including configuration management, automated deployment processes, monitoring tools and practices, incident response strategies, ensuring high availability, redundancy measures, and disaster recovery plans. Usage of infrastructure-as-code (IaC) tools such as Terraform, Ansible, or CloudFormation. Ensuring data security, implementing regular security audits, and compliance with industry standards.
	Data analytics (References from past projects with rationale on choice of tech stack will be preferred)	**5**	Score: 0-1 - Analytics components in the proposed solution (ground-up build) are described but not detailed to show robustness of implementation approach

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Approach for data ingestion, transformation, and preparation for analytics workloads. Implementation of data models, warehouses, and data lakes supporting analytics and reporting use cases. Description of analytical tools and frameworks used for analysis, visualization, and business intelligence. Use of advanced analytics, including machine learning, predictive modeling, or AI-assisted decision support.		Score: 1-3 - Analytics components in the proposed solution (ground-up build) are described and detailed to show robustness of implementation approach but proposed solutions are not backed by relevant experience of executing similar work irrespective of sector Score: 3- 5 - Analytics components (for a —ground-up build solution) are described in detail, are contextualized to show robustness of implementation approach and backed by relevant experience of executing similar work irrespective of sector
Coverage & Quality of IPMS solutioning capability (30)	Functional and solution coverage: (References from past projects will be preferred) Detailed explanation of how each of the IPMS solutions needed will be implemented at BMRCL (list of solutions available in Annexure template), demonstrate comprehensive functional coverage across all modules specified in the scope, ensuring end-to-end process enablement and their past references in implementing these tools and such methodologies. All recommended licenses should qualify the pre-requisites defined in the scope of work – section 4.1.1	**9**	Of the 9 solutions in total, confirmation of implementation of that solution will grant a maximum score of 1. Scoring will be dependent on whether the recommended solution will be built, or OOTB license will be purchased. The scoring will be as follows: Score: 0-0.5 - Technology components in the proposed solution (ground-up build/OOTB implementation) are described and detailed, comply with specified standards but are not backed by relevant experience of executing similar work irrespective of sector; complies with specified standards
	All Proposed modules and license should be interoperable with both BMRCL and its DDC's existing licenses.		0.5-1 - Technology components in the proposed solution (ground-up build/OOTB implementation) are described and detailed, comply with specified standards but are backed by relevant experience of executing similar work irrespective of sector; complies with specified standards

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Integration between various IPMS components: The Bidder shall explain how the proposed IPMS components will integrate with each other, including data flows, interoperability standards, APIs, interface management mechanisms, salability, security, maintainability and ease of replacement or addition of individual components. The evaluation shall place particular emphasis on: a. Use of documented and open APIs/ interfaces; b. Adherence to recognized open data and interoperability standards; c. Ability to exchange and export data without proprietary restrictions; d. ability to replace or upgrade individual modules without requiring replacement or substantial redesign of the entire IPMS; e. Minimisation of proprietary dependencies and vendor lock-in; f. Relevant experience in comparable integrations	**5**	Score: 0-1 – Limited integration approach; material proprietary dependencies; inadequate API/ data portability Score: 1–2.5 – Reasonable integration approach but with identified interoperability, portability or maintainability limitations Score: 2.5-4 – Strong standards-based integration with documented APIs, data portability and modular architecture, supported by relevant implementation experience Score: 4-5 – Comprehensive, modular and standards-based integration architecture demonstrating open interfaces, portability of data and configurations, ease of substitution/ addition of components and minimal vendor/ OEM dependency, supported by relevant implementation experience

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Analytics, dashboarding and future-ready architecture Detailed explanation of fulfilling the functional requirements of an IPMS platform in the solution using advanced analytics, AI-driven solution, ML-based solutions for various forecasting in future etc. Real-time Collaboration methodology for users (Chat, Tasks, Comments), support to implement capabilities for Digital Twin and other similar AI and digital exp in future.	**3**	Details that cover various AI enabled solutions, OOTB tool-based Vs custom build to be evaluated on basis of relevance of implementation. Score: 0-0.5 - Analytics based Technology components and its implementation in the proposed solution (either built or OTTB solution) are described but not detailed. Score: 0.5-1.5 - Analytics based Technology components and its implementation in the proposed solution (either built or OTTB solution) are described and detailed to show robustness in implementation approach but proposed solutions are not backed by relevant experience of executing similar work irrespective of sector Score: 1.5-3 - Analytics based Technology components and its implementation in the proposed solution (either built or OTTB solution) are described in detail, are contextualized to show robustness in implementation approach and backed by relevant experience of executing similar work irrespective of sector

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Utilization and methodology of various Licenses: All recommended licenses should qualify the pre-requisites defined in the scope of work, List of licenses and tools recommended for purchase, optimized way of using tools and licenses thus minimizing any recurring costs of licenses The Bidder may propose SaaS, cloud-hosted, on-premises or hybrid licensing/ deployment models, or an appropriate combination thereof, based on the functional and non-functional requirements of IPMS. The Bidder shall clearly set out: • Licensing model and quantities • Three-year and indicative longer-term lifecycle cost • License optimization and reallocation arrangements • Data residency and security arrangements • Scalability • Restrictions, if any, on integration, export, migration or continued use • Exit/ migration requirements and • Recurring OEM/ Subscription dependencies	**5**	Licensing strategy and utilization efficiency License purchase Score 0-2.5 – Licensing model inadequately explained, poor optimization, significant recurring/ proprietary or inadequate exit arrangements;

Dimension	Criteria	Max. Marks	Scoring Guidelines
	For all SaaS/ cloud deployments, data residency requirements shall be complied with and BMRCL shall retain full ownership and control of its data.		Score 2.5 – 3.5 – Suitable licensing/ deployment model with reasonable cost and utilization planning but some limitations in portability, flexibility or licensing cost Score 3.5 - 5 –Optimized licensing/ deployment strategy demonstrating competitive lifecycle cost, scalability, portability, effective license utilization, clear exit arrangements and minimal proprietary dependency.
	Quality of IPMS solution The proposed IPMS architecture shall demonstrate: (1) Coherent and manageable architecture with minimum necessary fragmentation. (2) Comprehensive functional coverage of the stated requirements, through suitable OOTB and/ or custom components (3) Scalability and performance appropriate to BMRCL requirements (4) Robust, documented and preferably open APIs/ interfaces (5) Interoperability and support for recognized industry standards (6) Advanced analytics and configurable KPI visualization (7) Portability of BMRCL data, metadata, configurations and project-specific components (8) Demonstrated maturity through successful deployments of comparable scale, complexity or criticality	**8**	Score 0-3: Bidder solution lacks native integration, depends on multiple SaaS platforms, requires extensive customization, or has gaps in scalability, analytics, or offline functionality; recommended licenses are adopted by <100 companies. Score 3-5: Bidder meets most core requirements but relies on limited third-party tools or moderate customization; integration and analytics capabilities are available but not fully native, recommended licenses are adopted by 100-250 companies. Score 5-8: Bidder demonstrates a unified, scalable, and mature IPMS platform with OOTB solutions for native 3D BIM, open APIs, built-in analytics, and proven adoption by >250 companies— requiring minimal customization and offering full SaaS alignment.

Dimension	Criteria	Max. Marks	Scoring Guidelines
	(9) Availability of technical documentation, Knowledge base and implementation/ support capability Please refer to **"Section 4.2.5"** for more details on the requirements for each module in IPMS.		
Implementation approach (20)	Project plan & agile delivery Detailed release plan for contract period (till 15th February 2027) split into 2 interim releases incorporated. In-depth description of the methodology to implement planning, sizing, and capabilities of teams with maximum level, snapshot of Microsoft Project file describing the complete project, critical path, resources assigned to each task, alternative paths, critical deliverables clearly explained. Agile methodologies, proposed pod structure, ceremonies, and tools e.g., Product Backlog, Backlog grooming, Pod structure, Sprint planning and estimation, Release planning, Scaled Agile, Sprint demo etc.	**8**	Score: 0-1 - Proposed solution demonstrates a basic explanation of the project plan & understanding of agile methodology Score: 2-3 - High level of details have been provided in the project plan (including metrics, experience, resource plan, critical path etc.) & agile methodology is contextualized. However, concrete examples/references not provided. Score: 4-6 - Project plan (including metrics, experience, resource plan, critical path. milestones etc.) & agile methodology detailed out, and concrete examples/references are provided. Sparse details of accelerating deployment provided Score: 7-8 - Project plan (including metrics, experience, resource plan, critical path. milestones etc.) & agile methodology detailed out, and concrete examples/references are provided. Detailed accelerated deployment plan with realistic plan to deploy within timeline provided

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Capability building & training. Understanding the context, Understanding of SaaS/ on-prem requirements, Risk & QA Approach, Methodology Depth Detailed plans of strategically developing and enhancing team skills, knowledge, and abilities to achieve long-term success and adapt to changing circumstances by means of comprehensive training, usage of automated frameworks with testing defined metrics and quality dashboards that provide a real time view for continuous improvements. Creation of User manual & Knowledge transfer plans for internal capability build. The proposed solution provides E2E automation using best-in-class DevOps tool chain from Plan to Monitor, testing methodologies and frameworks	**7**	Score: 0-1 - The proposal has notable deficiencies in outlining capacity building strategies. It mentions training but fails to provide detailed plans or specifics. Score: 2-3 - Demonstrates a basic grasp of the requirements, some details on training and schedules; but falls short in offering thorough materials for impactful capacity development Score: 4-5 - Presents robust and detailed strategies for capacity development, falls short on comprehensive training agendas, content summaries, and examples. Score: 6-7 - Presents robust and detailed strategies for capacity development, including comprehensive training agendas, content summaries with examples, and concrete adoption plan.
	Maintenance & support and Documentation Detailed Maintenance and Run Operations Plan outlining how the proposed solution will be supported post-implementation. It should include maintenance approach, including Operational Processes description of daily, weekly, and monthly operational tasks, including system monitoring, performance tuning, log management, and preventive maintenance.	**5**	Summation of scores from Maintenance and documentation – <u>Maintenance & Support</u> Score: 0-1 - Proposed solution demonstrates a basic explanation of maintenance and running operations processes, with limited detail.

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Resource Allocation: Details of the team structure, roles and responsibilities, staffing model (L1/L2/L3), and availability, Incident & Problem Management, Security & Compliance**:** Measures for patch management, vulnerability remediation, access management, and compliance with relevant standards, High Availability & Disaster Recovery, Tools & Automation by using monitoring tools, alerting systems, A Documentation Plan outlining the full set of documents that will be created, maintained, and delivered throughout the duration of the contract, structure, and clarity and approach with Versioning & Change Control. It should include (but not limited to) Admin Training Manuals, End-User Training Guides, Operations Runbook/SOP, Technical & Architecture documents, System Configuration & Deployment Docs, Application-Level Documentation, Migration & Cutover Documentation etc.		Score: 1-1.5 – Provides a high level of detail in the maintenance and operations plan, covering aspects like detailed processes, resource allocation, incident management strategies & security measures. Concrete examples/references not provided. Score: 1.5-2.5 - Offers a comprehensive maintenance and operations plan, detailing processes, resource allocation, incident management strategies, security measures, and includes concrete examples/references from past projects. References to best practices for maintaining high availability and disaster recovery. <u>Documentation</u> Score: 0-1 - Proposed documentation plan provides list of documents to be generated during course of Contract & limited detail on content. Score: 1-1.5– Specific details are provided in the documentation plan w.r.t critical documents i.e., technical documentation, design studies, progress reports, and training guides. Content summaries are provided but structure, templates & concrete references are not provided. Score: 1.5-2.5 – Comprehensive documentation plan is offering content summaries, structure, templates, references & timelines of release for all documents to be generated during course of Contract.

Dimension	Criteria	Max. Marks	Scoring Guidelines
Team profiles – Quality & relevance for RFP scope execution (10) (CV review and 1:1 Interview, if necessary) This deployed team should consist of 6 named members which shall remain constant throughout the contract period and should be available to work on BMRCL premises.	Project Lead/Manager • Education qualification- master's degree • Minimum total years of experience- 12-15 years The Project Manager is responsible for planning, executing, and closing projects, ensuring it is completed on time, within scope, and within budget using Agile methodologies and tools like JIRA and Trello. Possess certification like PMP, PRINCE2, Certified Agile Project Manager or equivalent.	**2**	Total score for each will be the sum of scores for (Years of experience, relevant experience, and certifications) <u>Years of experience:</u> Score: 0 - Less than 12 years Score: 0.5 - more than 12 years <u>Experience in the large-scale Project management projects</u> Score: 0 - No relevant project Score: 1 – one to two relevant projects Score: 1.5 - More than 2 relevant projects
	Solution / Infrastructure Architect • Education qualification- Degree or master's degree • Minimum total years of experience- 12-15 years Design the overall architecture of the application, Cloud applications, DevOps Strategy, ensure system scalability and integration, and provide technical guidance. Possess certifications like TOGAF or equivalent, Certified Cloud Solutions Architect from various CSPs or equivalent.	**3**	Total score for each will be the sum of scores for (Years of experience, relevant experience, and certifications) <u>Years of experience:</u> Score: 0 - Less than 12 years Score: 0.75 – more than 12 years <u>Experience in the large-scale Project management projects</u> Score: 0 - No relevant project Score: 0.5 – one to two relevant projects Score: 1.5 - More than 2 relevant projects <u>Certifications</u>: Score: 0 - No relevant certificate Score: 0.75 - Relevant certificates

Dimension	Criteria	Max. Marks	Scoring Guidelines
	Integration Architect • Education qualification- Degree or master's degree • Minimum total years of experience- 12-15 years Design the overall integration roadmap of the application, API Strategy, ensure system modularity scalability and integration, and provide technical guidance. Possess certifications like TOGAF, Certified API Integration Specialist, ISO/IEC 12207, Integration Specialist certification from various CSPs. like Azure, Oracle Cloud Platform	**2**	Total score for each will be the sum of scores for (Years of experience, relevant experience, and certifications) Years of experience: Score: 0 - Less than 12 years Score: 0.5 - more than 12 years Experience in the large-scale Project management projects Score: 0 – One or less relevant project Score: 1 - More than 1 relevant projects Certifications: Score: 0 - No relevant certificate Score: 0.5 - Relevant certificates
	Metro/ infrastructure management expert • Education qualification- Degree or master's degree • Minimum total years of experience- 12-15 years Serves as a key knowledge resource, providing insights and guidance to ensure the IPMS is designed in alignment with best of industry standards and operational realities. Their role involves sharing expertise on planning, operations, regulatory compliance, route and schedule optimization, safety and security considerations, and data-driven decision-making.	**3**	Total score for each will be the sum of scores for (Years of experience, relevant experience, and certifications) Years of experience: Score: 0 - Less than 12 years Score: 0.5 – 12-15 years Score: 0.75 - more than 15 years Experience in the large-scale Project management projects Score: 0 - No relevant project Score: 1 – one to two relevant projects Score: 1.5 - More than 2 relevant projects Certifications: Score: 0 - No relevant certificate Score: 0.75 - Relevant certificates

Dimension	Criteria	Max. Marks	Scoring Guidelines
	While not solely responsible for implementation or management, the domain expert contributes by informing design decisions, offering best practices, and validating that the platform addresses real-world needs. They help bridge the gap between technical teams and operational requirements, ensuring the solution is practical, efficient, and aligned with user expectations. Possesses the certification w.r.t railways or metro domain e.g., Government/National-Level Certifications from Indian Railways Training Institutes like IREEM/IRICEN/IRIEEN/IRIMEE or equivalent. 2 other profiles to be added as relevant (App developer, Business Analyst, UI/ UX engineer, advanced analytics expert etc.)		
	Total Score	**100**	

3.4 Stage 3—Commercial bid evaluation

Dimension	Sub Criteria
Financial Offers	***Set up, run and Implementation costs:*** Bidder to share detailed commercial breakups on: 1. Overall configuration cost Customization cost 2. Development cost for any additional modules/logic 3. Cost for integration with typical peripheral on-premises systems 4. Deployment cost of cloud/ on-prem etc. 5. Additional implementation costs
	License fees: Bidder to share detailed commercial breakups on: 1. License fee required for implementation based on the # of licenses. 2. Number of licenses required and duration.

Dimension	Sub Criteria
	3. Discount structure on each license based on the number. 4. Additional fees for any new release of the solution (if any)
	Maintenance cost (incl. service and support costs) – *applicable post development period only:* Bidder to share detailed commercial breakups on: 1. Maintenance Team structure and cost 2. Change requests cost after implementation. 3. Associated upgrade costs
	Other fees: Bidder to share detailed commercial breakups on: Costs related to additional data push, pull as per requirements (if any), or any other cost not covered in the above sections

Commercial bid evaluation will contribute 30% of total bid score.

- Evaluation of the commercial proposal will be done based on their bid/quoted value for 3-year total cost of ownership. This will be calculated as Net Present Value of [Implementation cost + License cost (for year 1 to 3) + Maintenance cost (for year 2 to 3)] considering an IRR of 10%
- The commercial bid scores of each shortlisted Bidder will be evaluated as ***(Minimum Bid quoted among all bidders/Value quoted by the Bidder of the Bid) * 100***. The commercial bids to be calculated in USD.
- A Bidder to ensure that commercial bid submitted in USD, including all taxes, levies, duties, etc.
- Arithmetical errors will be rectified on the following basis:
    - If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected.
    - If there is a discrepancy between words and figures, the amount in words will prevail.

3.5 Stage 4—Final scoring and selection

Final Scores for each shortlisted Bidder will be calculated as follows:

Final Score = 70% * Technical Score + 30% * Commercial Score

1. The Bidder achieving the highest Final Score, reflecting a balanced mix of technical proficiency, organizational capability, strategic approach, and financial competitiveness, will be selected for the issuance of the Letter of Intent and subsequent initiation of Contract for engagement on the work outlined in the RFP.
2. Should the contracting process fail, JICA reserves the right to proceed to the next highest scoring Bidder and so on.

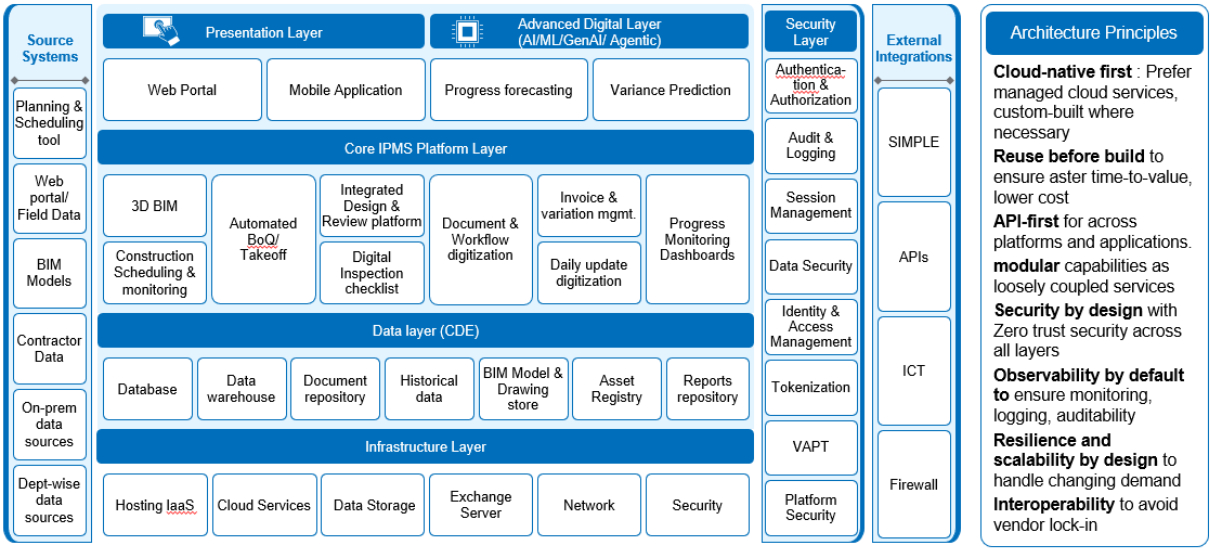
4 Scope of work

The scope of work is focused on implementing the IPMS Stack – which will consist of 8 major layers ranging from source systems to presentation layer.

4.1 Proposed IPMS platform Stack setup

The reference architecture for the proposed solution is provided below and shall be used by SI partners as a baseline when detailing their proposed solution approach. The platform is expected to incorporate all layers and building blocks defined within this architecture.

IPMS Architecture Blueprint for Advanced Digital Integrations for phase 3



The Proposed IPMS platform solution architecture would exhibit the following tenets:

1. **User centricity:** The solution would be centered around business requirements and work backwards to design and deliver specific solutions.
2. **Reusability:** The use cases, data models, data marts/data lakes, and related APIs, etc. should be designed in a way that can be extensible and reusable across different business groups and personas
3. **Automated:** The solution should automate the data pipelines end-to-end starting from data ingestion from the source systems, data transformation to the data consumption from various BMRCL data sources, and other peripheral platforms. In addition, it should identify and document the meta-data, perform data quality and leakage checks, and detect data anomalies, and trigger corresponding alerts and notifications.
4. **Governed:** The solution must support fine-grained access control and usage framework for each data object. Supports configuration of users and groups, classification of data according to sensitivity, protecting data in transit and in rest, etc. The solution should provide data catalog to document data available on the data platform along with metadata, data owners, data stewards, data quality guarantees, data salience and so on.
5. **Secure and Resilient:** The cloud data platform solution should support resiliency, high availability, data loss prevention, disaster recovery, and backup/restore capabilities.

6. **Interoperability** – Seamless integration with various tools and software used (e.g., BIM, ERP, workflow tools, Project management and scheduling tools, GIS, SCADA, etc.)
7. **Scalability** – Support for increasing projects, users, and data volumes without performance degradation.
8. **Configurability** – Ability to adapt forms, fields, and workflows without heavy coding.
9. **Analytics & Insights** – Real-time dashboards, predictive analytics, and KPI monitoring.
10. **Mobile Enablement** – Native mobile apps and offline sync for field updates.
11. **Standards Compliance** – ISO 19650 (BIM), PMBOK, PRINCE2, and local statutory requirements

4.1.1 Tech Stack (Indicative)

The Target technology stack choices for the IPMS platform are envisaged as below. The stack is indicative only at this stage and likely to evolve, based partly on Partner's recommendations and deliberations with BMRCL Team. Partners are expected to recommend alternative tech stack choices and expected benefits with detailed explanations (Pros and Cons). The Tech stack has been defined with required components and SIs are given an opportunity to use appropriate tech options that can fulfill the architectural requirements.

Technology neutrality: References in this RFP to any OEM, brand, software product, platform or technology are intended only to indicate the required functionality, interoperability requirement or an illustrative technology choice and shall be deemed to include "or equivalent", unless expressly stated otherwise for reasons of compatibility with an existing BMRCL system.

Bidders are free to propose equivalent or superior technologies meeting the functional, performance, security and interoperability requirements. No bidder shall receive additional marks merely for proposing a product, OEM or technology specifically named in this RFP.

The following represents the technology stack proposed for custom build and integration capabilities.

Sl. No.	Platform	Description	Technology stack (Indicative only)
1	Data	API Layer	APIGEE, API Gateway, Cloud Endpoints or equivalent
2	Data	Authentication & Authorization	Azure Cloud Identity, Enterprise ID providers like Microsoft AD Methods: Token-based OAuth 2.0, SAML 2.0, OIDC protocols
3	Data	Batch processing	Azure Data Factory (ADF), Dataflow, Jobs, Pipelines, P6 scheduling, Unifier Scheduler, AutoCAD Time liner
4	Data	Data Orchestration	ADF, Apache Airflow, or Synapse Pipelines or equivalent
5	Data	Data base	PostgreSQL, Azure SQL DB or equivalent
6	Data	AI/ML	Azure ML or equivalent, Open-source tools
7	Data	Caching System(s)	Redis, Memcached & others
8	Data	Business Intelligence Layer/Dashboards	Power BI, QlikView, Tableau or UI/UX provided by ERPs Open-source tools or equivalent.

The following represents the technology stack proposed for Core IPMS capabilities.

Sl. No.	Platform	Description	Technology stack (Indicative only)
1	IPMS	3D BIM	Revit, Tekla, Trimble or equivalent
2	IPMS	Automated BoQ/ Takeoff	Automated Takeoff, Trimble Accubid, CostX or equivalent
3	IPMS	Integrated design & review platform	Collaborate Pro, Unifier, Trimble Connect or equivalent
4	IPMS	Document & workflow digitization	Unifier, Autodesk Docs, Aconex or equivalent
5	IPMS	Daily update digitization	Custom built, Unifier, Autodesk Docs, BIM 360 Field or equivalent
6	IPMS	Tool-based scheduling & Monitoring	Primavera P6, MS Projects, Synchro or equivalent
7	IPMS	Digital Inspection Checklist	Unifier, Autodesk Docs or equivalent
8	IPMS	Invoice & Variation digitization	Unifier, Autodesk Docs or equivalent

The indicative BoM below outlines the proposed solution. The digital partner is expected to provide a clear plan to optimize licensing costs, supported by an updated BoM reflecting the proposed cost-reduction levers.

Sl. No.	Solution	User count/license sizing assumptions (indicative)
1	3D BIM	One representative from Civil, Projects and central design team
2	Automated BoQ/Takeoff	To be used by two representatives for the tendering - to use it for civil and system tenders, another one for the design & engg. team to validate the quantities
3	Integrated design & review platform	To be used by the representatives for each package (2 users per package for 6 packages)
4	Document & workflow digitization	To be used by a list of 4-5 users comprising of initial and final approvers
5	Daily update digitization	Upto 100 users for submitting the request and data (read only users); To be used for pushing the data from custom mobile app to proposed platform
6	Tool-based scheduling & monitoring	To be used by Civil and Projects CoE representatives for managing schedules, representatives for monitoring purpose, one license for leadership
7	Digital Inspection Checklist	Used by inspection team per package; (2 users per package for 6 packages) Used to push the data from custom mobile app to the proposed platform
8	Invoice & Variation digitization	Used by ERP and Finance team representatives for approvals.
9	Progress monitoring dashboards	Custom dashboard to be used by key stakeholders and platform users Individual users need read-only access for the local dashboards provided

4.2 Components of the Proposed solution:

4.2.1 Source Systems & Integration layer.

The Digital Partner to build and set up the integration layer for integration with different data sources as listed in following Table.

Category	Source Systems (Illustrative List)
On-premises Data sources	Document management systems, contract databases, financial systems, asset registers, scheduling/project mgmt. databases.
Department wise Data	Procurement and contract systems, finance systems, O&M systems, quality, and safety databases (both Civil and System data)
Data from field	Site inspection data, daily progress logs, equipment and labor usage data, geotagged site photos, test, and commissioning data
Contractor Data	Contractor-submitted schedules, progress reports, invoices, material delivery data, QA/QC reports, risk, and issue registers
Data uploaded on web portal	Uploaded documents, drawings, RFIs, approval records, reports, photographs, safety, and quality checklists
Planning Data	Project schedules, baseline and revised plans, resource allocation data, cost and progress data, forecast and variance data.
WhatsApp Data	Field updates, site photos, issue notifications, coordination messages, short video clips, and quick status confirmations

- The scope and tech specifications to be referred to set up the integration layer, unless otherwise agreed differently by the parties during the service delivery.
- If any system is not available and the data is prepared in digital files (excel, CSV or any suitable format), appropriate provisions are to be made for the periodic transfer of such data to maintain in the platform.
- The Integration Layer shall support industry-standard protocols and formats, including but not limited to REST/JSON, SOAP, Odata, Open API, XML, and CSV, ensuring compatibility with BMRCL's existing systems and third-party platforms.
- Bidder shall ensure seamless bi-directional integration with the applications including Primavera P6, ERP, BIM platforms, Document Management Systems, and other tools identified by BMRCL.
- The Integration Layer shall support both real-time event-driven integration (if applicable) and scheduled batch data exchange, with configurable frequency and retry mechanisms.
- The Bidder shall document all integration endpoints, data models, workflows, and dependencies, and follow BMRCL's change management process for any modifications to the Integration Layer

(1) Integration architecture

- Integration Framework & Architecture – Integration services from a choice cloud service provides interservice communication, load balancing, and service discovery.
- Ingestion of data using cloud connectors and data pipelines from the source applications

(2) API & gateway features

- Enables secure publishing, versioning, & monitoring of all REST/SOAP APIs across applications.
- Use of API first approach for setting up various integrations within the source systems and different layers
- API management service on chosen Cloud Service Providers can be used to build Web APIs if applicable.
- The Integration Layer shall support API versioning and ensure backward compatibility for integrated systems during upgrades, minimizing disruption to ongoing operations.

4.2.2 Security Layer

The Digital Partner should make the necessary provisions for security of the IPMS Platform Cloud Platform and data in line with recognized standards and govt. guidelines as applicable for several types of data processed or managed on the platform. Following scope and tech specifications are to be referred, unless otherwise agreed differently by the parties during the service delivery.

(1) Identity & access management

- Role based access control (RBAC) implementation for authorizing access to specific services.
- User Identity Lifecycle Management for Provisioning, Updating, and de-provisioning user accounts.
- Integration with enterprise Identity and Access Management (IAM) or SSO solutions using Oauth 2.0/OpenID Connect. If required, digital partner should set up a new SSO and necessary configuration at an additional scope. In this case, setup and configuration of SSO, including integration, testing, and user validation, shall be provided as an additional scope and may be quoted separately.
- Support for Requesting Party Token (RPT) issuance and validation for Real-time token-based access control to be enforced at the resource server layer (e.g., document repositories, BIM viewer, dashboards)
- IAM system should support RESTful APIs or equivalent for integration with Control Tower, Construction Management platforms, Document Management Systems, Third-party subcontractor portals, and others.

(2) Authentication and Authorization

- The solution must support SSO using SAML 2.0 and OpenID Connect protocols to integrate with the existing identity provider (IdP), such as Azure AD, Okta, or any LDAP-compliant service.
- Mandatory support for MFA using OTP, mobile push notification, biometric, or hardware token, configure at user and role levels.
- Digital certificate-based authentications for issuing tokens.
- Support future integration with IAM governance tools, privileged access management (PAM)
- API gateway used for authenticating, controlling & analyzing API traffic.

(3) Tokenization

- Usage of JWT tokens (or equivalent) for secure exchange of data across the web

(4) Platform Security

- Data encryption at all levels and integration layers and industry standards to be followed.
- Static IP based secure integration for specific servers and services.
- Security logs correspond to sessions to be maintained.
- Web access firewalls to be used appropriately as applicable.
- Rate limiting provisions for preventing DDOS attacks for open resources.

(5) Data Security

- Strong Data model allowing for isolation of sensitive user data.
- Data at rest – Admin only access on the cloud platform
- Data on the move – Encryption
- Data masking in case of specific data extracts pertaining to users.
- Data security protocols and requirements to ensure the protection of sensitive and confidential data (e.g., secure APIs).

(6) VAPT (Vulnerability Assessment and Penetration Testing)

- Penetration test before major production release to identify existing or potential issues/flaws for the following components (but not exhaustive):
  - Custom build components
  - Various integrations
  - Central Web Portal and mobile app
  - Common landing page
- Analyze security vulnerabilities and implement preventive actions.
- The Digital Partner shall support annual VAPT exercises, including remediation and compliance closure for solution-related findings.

(7) Audit and logging.

- The Bidder should implement logging and auditing mechanisms to track changes, accesses, and data movements.
- All login/logout attempts must be logged and auditable.
- Maintain logs for failed logins, MFA attempts, password resets, and account status changes.
- The Digital Partner (DP) shall integrate the solution with BMRCL's proposed Security Operations Center (SOC) and centralized logging and auditing framework.

(8) Session Management:

- Configurable session timeout and idle logout policies.
- Display last login timestamp and notify users of concurrent login attempts.

4.2.3 Infrastructure & hosting layer

The proposed IPMS solution shall follow a SaaS or cloud-hosted deployment approach, wherever technically and commercially feasible, to enable faster deployment, lower infrastructure management burden, easier scalability, vendor-managed upgrades and maintenance, and quicker rollout across BMRCL users and external stakeholders. However, the final deployment model shall remain platform-neutral and cloud-agnostic, subject to BMRCL's security, data residency, integration, interoperability and operational requirements.

The Digital Partner to provision, set up and manage the infrastructure for the Central Data Environment platform (preferably on a cloud infrastructure), including but not limited to the following, to enable the implementation of different solutions.

- The selected Digital Partner shall set up the cloud infrastructure for hosting, deployment, operation, and integration of the IPMS solution, without establishing any parallel or redundant hosting environment unless explicitly approved by BMRCL.
- The Digital Partner shall perform an initial capacity and performance assessment of the infrastructure and propose required scaling, optimization, or configuration to support integration of IPMS workloads.
- The Digital Partner shall maximize reuse of cloud services, subscriptions, and resources to optimize cost, and shall provide a cost-benefit analysis of proposed cloud resources.
- All infrastructure components required for the platform shall be provisioned, configured, and maintained by the Digital Partner within the BMRCL cloud tenancy, following BMRCL's governance and change management processes.
- The Digital Partner shall ensure that the solution is architected to utilize the existing high availability, backup, and disaster recovery features of the BMRCL cloud infrastructure.
- The Digital Partner shall define and adhere to performance benchmarks for application responsiveness, data processing, and concurrent user load, based on the capabilities of the existing infrastructure.
- All extensions and configurations must comply with BMRCL's existing cloud security policies, including ISO 27001, and relevant data privacy laws, ensuring no compromise to existing security posture.
- For each proposed cloud service, the Digital Partner shall provide the selected service tier (e.g., Standard, Premium), CPU/memory allocation, storage capacity, IOPS requirements, and scalability considerations.
- Provision to use data storage resources on cloud on Block storage, File storage, Object storage stores as applicable.
- Cloud powered networking, switches, and API gateways to perform load balancing and data packet sequencing.
- The Digital Partner shall provide comprehensive documentation of all infrastructure extensions, configurations, and integrations carried out within the BMRCL cloud environment, to enable smooth knowledge transfer to BMRCL's ICT team.
- The Digital Partner shall evaluate and present multiple cost optimization strategies for the proposed cloud platform, including but not limited to reserved instances, auto-scaling policies, storage tiering, serverless architecture adoption, and right sizing of computing resources, with a comparative analysis of cost savings for each option.
- The Bidder shall indicate the cost structure (CAPEX/OPEX), subscription type (pay-as-you-go, reserved instances, etc.), and anticipated recurring costs for each additional cloud resource included in the BOM.

- The Digital Partner shall provide a comprehensive Bill of Materials (BOM) listing all additional cloud services, resources, storage, networking components, software licenses, and related subscriptions required for the deployment.
- The BOM shall clearly specify the database types, version, licensing model, and expected workload sizing, along with justification for selection based on the functional requirements.
- The proposed IPMS, including its architecture, infrastructure, cloud services, databases, applications, SaaS/ OEM products, integrations, APIs, data models and Bill of Materials, shall be designed to minimize proprietary dependencies and avoid vendor lock-in.
- Wherever proprietary technology is proposed, the Bidder shall identify the dependency specifically and disclose its technical necessity, licensing implications, recurring cost, migration/ exit implications and availability of reasonable alternatives. Any material proprietary dependency shall require prior written approval of BMRCL.
- The architecture shall, to the extent technically feasible, permit BMRCL, or another service provider appointed by BMRCL to operate, maintain, integrate, modify, migrate and extend IPMS without dependence on the original Digital Partner.
- All Proposed modules and license should be interoperable with both BMRCL and its DDC's existing licenses. If BMRCL needs any additional licenses beyond the recommended BOM or Scope of Work, the vendor shall procure these additional licenses and invoice it to BMRCL on a direct payment basis.
- The Vendor shall provision, bear the Cloud Infra costs associated with the development and System Integration Testing (SIT) of the proposed solution. Infrastructure costs related to development, quality assurance and User Acceptance Testing (UAT) to be borne by the digital partner. The Vendor shall ensure that the solution is fully functional and compliant with the agreed specifications during SIT at no additional cost to BMRCL.
- BMRCL reserves the right, at its sole discretion, to migrate the build and custom components in development environment from the Vendor's environment to BMRCL's own cloud infrastructure at any point during the engagement. The Vendor shall provide all necessary assistance, including knowledge transfer, configuration details, and support, to ensure a smooth transition without additional cost to BMRCL.
- The preference for cloud resellers, if any, shall be communicated by BMRCL during or upon the completion of the implementation period. The Vendor should not assume or rely on any specific cloud re-seller selection prior to this communication and shall ensure that the solution remains compatible and portable across standard cloud platforms.

4.2.4 Data Layer

- The Digital Partner shall set up (or leverage the existing BMRCL enterprise data lake if available) and extend the data layer for all IPMS-related data ingestion, storage, processing, and analytics, ensuring no duplication of core data storage systems unless explicitly approved by BMRCL.
- The Digital Partner shall extend the current data models to accommodate IPMS-specific datasets, maintaining consistency with BMRCL's existing data taxonomy, metadata standards, and master data management policies.
- All data ingestion for IPMS shall utilize or extend existing ETL/ELT pipelines, ensuring uniform transformation logic, data quality checks, and minimal operational disruption.
- All new IPMS datasets shall be registered in BMRCL's existing data catalog, with complete metadata documentation including lineage, quality scores, and classification levels.

- The Digital Partner shall adhere to BMRCL's established data governance framework, including policies for data ownership, stewardship, retention, archival, and disposal.
- The Digital Partner shall enforce role-based access control (RBAC) for IPMS data, aligning with BMRCL's identity and access management framework, and ensuring compliance.
- The Digital Partner shall implement automated data quality checks for completeness, accuracy, timeliness, and consistency of IPMS data ingested into the data lake.
- The data lake shall be architected for horizontal scalability, with performance benchmarks defined for ingestion speed, query response time, and concurrency levels under peak load.
- The Digital Partner shall ensure that extended datasets are accessible to BMRCL's existing BI, reporting, and analytics tools, supporting both operational dashboards and advanced analytics use cases.
- The Digital Partner shall deliver detailed technical documentation covering data schemas, ETL/ELT workflows, integration points, data governance measures, and provide training to BMRCL's data engineering team.

(1) Data Types

Data ingestion should support various scenarios as the mode of data ingestion may be different for each data source and type. The frequency of data ingestion can vary across current and new sources of data in future. The partner is expected to implement and support the various scenarios on an on-going basis. A few scenarios are mentioned below.

- **Near Real time data** – Real-time ingestion of structured, semi-structured and unstructured data. This also includes data coming from mobile apps (field app), WhatsApp channels etc.
- **Unstructured data** – Ingestion of unstructured data such as Image files, drawings, graphics, and videos.
- **Semi-structured data** – Ingestion of semi-structured data like user activity log, geographic information, XML, JSON, XER, MPP, PDF, ZIP etc.
- **Business Intelligence and machine learning data**
    - Providing services to perform interactive queries and simulation capabilities with business intelligence and Machine learning capabilities
    - AI/ML algorithms for various models and predictive calculations
    - This may include historical data as well.

(2) Data Storage

- The data storage solution should be designed to manage data securely and efficiently throughout its entire lifecycle, regardless of its format or type. The primary object storage for this purpose will be Cloud Storage, which will support the processing of both large datasets and subsets of records.
- We expect our partner to ensure the ongoing health and reliability of storage buckets, including regular health checks, monitoring, and alerting for storage utilization and potential failures.
- Data archival mechanism setup across all storages as well as purging mechanisms as per agreed guidelines suggested.
- Our data storage architecture should be designed to provide a seamless and robust foundation for our data platform, ensuring data integrity, accessibility, and scalability throughout its lifecycle.

(3) Data Storage Layers

- Raw Layer: Repository for immutable raw data files from core transactional systems, accessed as needed.
- Transformation Layer: Houses transformed data from raw sources, essential for applications and advanced analytics.
- Curated Layer: Stores co-related data ready for consumption by various functions, systems, applications, and analytics models, compatible with advanced analytics tools and software.

(4) Data Processing

- **Overview of ELT Operations**
  - The Digital Partner to follow the existing data processing mechanism to Implement of an industry standard Architecture with distinct layers.
  - Transformation of both structured and unstructured data in batch and real-time modes.
- **Data Transformation and Accessibility**
  - Storage Strategy: Transformed data stored for easy access and consumption by business users and applications.
  - Efficiency and Robustness: Meticulous configuration of the platform and transformation jobs for robustness, efficiency, and parallel execution.
  - Data Translation: Building or housing on a cloud service provider of choice ready to use data format converter to transform source data into recognized data standards such as IFC, DWG/DXF, NWD/NWC etc.
- **Automation and Job Management**
  - Ingestion Pipelines: Automated and idempotent data ingestion pipelines.
  - Transformation Job Design: Partner to propose and use solutions for designing jobs with considerations for parallelism, data integrity, and job reusability.
  - Failure Management and Reusability: Engineering jobs to handle failures gracefully and offer reusability.
- **Tools and Workflow Management**
  - Job Organization: Recommending tools and workflows for job organization, sequencing, scheduling, and triggering.
  - Automated Reporting: Setup of automated reports on job status, success, failure, and retriggering.

(5) Common Data Environment

The vendor should set up the Common Data Environment (CDE) which would be a centralized digital data platform in BMRCL used to collect, manage, and disseminate project data and documentation across all stakeholders. CDE to play a foundational role in the proposed architecture by acting as the core data backbone for design, construction, inspection, billing, and operations-related documents and information. It ensures single source of truth, avoids duplication, improves collaboration, and supports auditability.

1. An existing enterprise data platform (data lake) is already operational within BMRCL. The selected Digital Partner shall leverage and extend this platform as required to fulfill the functional, technical, and integration requirements of the proposed Integrated Project Management System (IPMS).
2. The selected Digital Partner is expected to closely collaborate with the existing data platform team to align, integrate, and enhance the existing systems for the successful deployment and functioning of the IPMS platform.

4.2.5 Application and Core IPMS Layer

The Digital Partner to ensure that all the components (frontend + backend) build, test, and deployed will follow fully automated DevOps pipelines. Following scope and tech specifications to be referred, unless otherwise agreed differently by the parties during the service delivery –

- **Environment management**
  - There should be three types of environments that should be set up:
    - Development environment – to be used for application build.
    - Test environment – to be used for testing & bugs reporting.
    - Production environment – to be used for live application.
  - Provision and Integration of pre-prod, and performance environment should be set up on need basis.

- **CI/CD**
  - DevOps to be set up and CI/CD pipelines with quality gates integrated; with single click onboarding for all projects.
  - All PRs to get checked before merging and qualified via quality gates and test execution results.

- **Testing**
  - Performance testing: Alpha, Beta, SIT, UAT, VAPT, etc.
  - API testing
  - Test data management for easy population and management of data across these environments.
  - All test cases to be managed in a ticketing system and updated post each run with results.

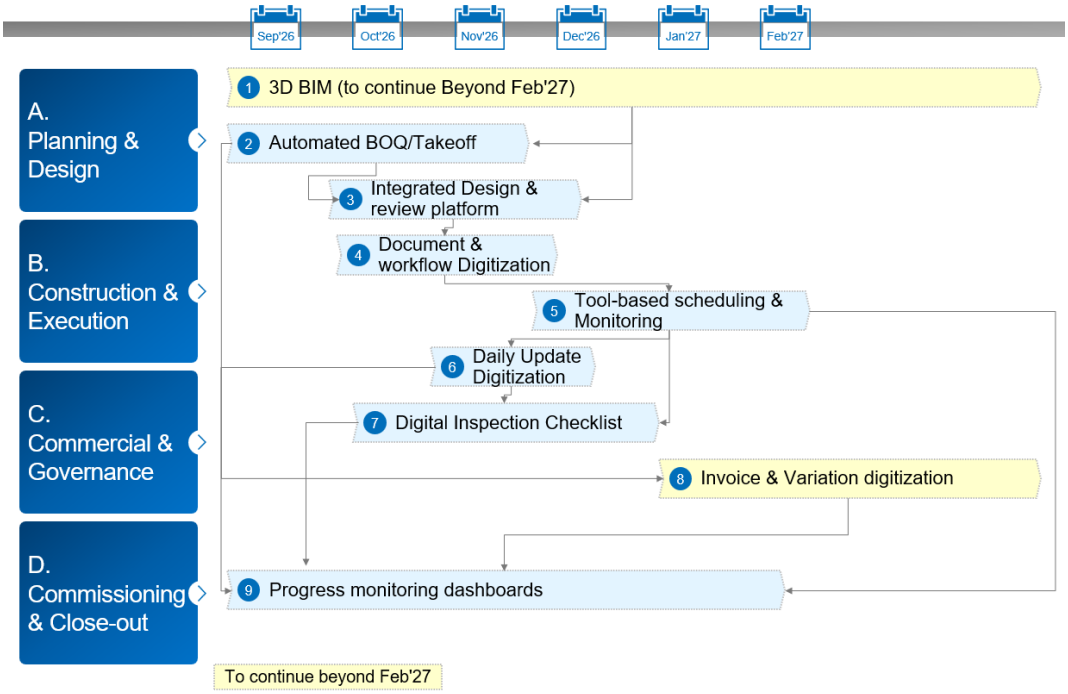
- **Monitoring/Alerting**
  - Reporting environment utilization, releases, test execution status, etc.
  - Alerting/Monitoring around all services in integration environment

- **Accessibility/Single Landing Page for Navigation**

  While individual SaaS modules or tools may have their own access to URLs, the solution shall provide a unified landing page that consolidates and presents embedded or linked access to all integrated IPMS tools and modules. The platform must ensure seamless navigation through single sign-on (SSO), eliminating the need for multiple logins across systems.

The Digital Partner (DP) shall be responsible for the end-to-end design, development, implementation, and support of a robust, scalable, and secure Integrated Project Management System (IPMS) for civil infrastructure construction projects. The solution must address the entire project lifecycle from conceptualization to commissioning and handover. The digital Partner is expected to utilize industry-standard COTS solutions for these modules while keeping custom-built components, as needed.

The Digital Partner is expected to implement the IPMS solution by Feb'27. (This is an indicative representation):



The 9 prioritized modules shall be delivered as per the release-wise mapping in Section 5.1.

3D BIM:

- The solution must support Building Information Modeling (BIM) using 3D models that allow for visualization, stage-wise breakdown, and spatial planning linked to civil (viaducts, stations), architectural, MEP, and system elements (tracks, PSDs, AFC rooms).
- The system should be able to integrate BIM with the project schedule (4D) and cost (5D) in future phases to facilitate advanced planning and monitoring in future. Allow parametric modeling with customizable family libraries.
- Provide multi-disciplinary (Architecture, Structure, MEP) modeling within a single federated file environment with **native support for export to IFC, DWG, NWC, and RVT formats.**
- The selected BIM authoring tool must support the **generation of COBie-compliant deliverables, including the ability to export a complete COBie dataset (e.g., in XLSX/XML format).**
- The IPMS shall support importing, managing, and viewing 3D BIM models from leading authoring tools in native and open formats such as IFC, RVT, and DGN. A sample of drawings can be provided by BMRCL upon request during the pre-bid query resolution session.
- The solution should provide high-performance 3D visualization with features such as sectioning, layer control, zoom, pan, rotation, and object property interrogation, accessible via both desktop and mobile devices.
- The IPMS shall provide or integrate with tools that perform automated clash detection and design coordination between disciplines, with clash reports linked to issue tracking workflows.
- All BIM data shall **comply with ISO 19650 standards** for information management, and support COBie data exchange to ensure interoperability for asset handover and lifecycle management.

- Support **Level of Detail (LOD) 100–500** modeling standards and enable work-sharing with real-time team synchronization through cloud collaboration.
- **Out-of-the-box solutions will be preferred for the deployment of this solution.**

Automated takeoff

- The solution shall provide automated quantity takeoff functionalities by integrating directly with 3D drawings and BIM models.
- Automated Quantity Extraction from BIM Models: The system shall automatically extract quantities, dimensions, and measurements from 2D drawings and 3D BIM models, ensuring accuracy and minimizing manual intervention.
- Automated takeoff shall be provided using 3D BIM models for key metro elements such as piles, pier caps, station slabs, U-girders, and track beds.
- The solution should enable auto-mapping to BoQ items in civil/systems contracts, aiding both DPR and contractor billing validation. Visual verification and change tracking are essential.
- Dynamic Updates with Design Changes: The takeoff module shall **automatically update quantities when the source design or BIM model is revised**, maintaining synchronization with the latest approved version.
- Multi-Format Input Support: The solution **shall support takeoff from multiple file formats including DWG, PDF, RVT, IFC, and DGN**, with consistent measurement and scaling accuracy.
- Extracted quantities shall integrate directly into the Bill of Quantities (BoQ) and cost estimation modules, enabling automated cost calculation and budget tracking.
- Auditability & Traceability: The system shall maintain a complete audit trail of quantity takeoffs, including source files, date/time stamps, and user details for compliance and verification purposes.
- **Cloud based Out-of-the-box solutions from the same ecosystem as 3D BIM will be preferred for the deployment of this solution for seamless integration and data flow.**

Integrated design and review platform:

- The Digital Partner shall implement a design review platform tailored for metro civil packages (stations, viaducts, tunnels) and systems (signaling, telecom, traction). It shall allow real-time collaboration between PMC, GC, and contractors.
- Digital Partner shall use **cost-effective**, **industry-leading platform** that is proven, scalable, and widely adopted in large infrastructure or metro projects without compromising functionality.
- The platform **must support Revit central models** (used by DDC employed for BMRCL Phase 3) with native publishing to a common data environment.
- It should allow BIM model validation, clash detection, redlining, and version-controlled approval workflows across metro design stakeholders.
- The platform shall enable concurrent design collaboration among civil, structural, systems, and architectural teams, with **support for multiple file formats (e.g., DWG, RVT, DGN, IFC)** and discipline-specific/ permission-based access controls.
- The platform should provide robust version control for all design files and models, including version comparison, change tracking, clash communication tracking, approval workflows, and rollback capabilities.
- The system shall support in-platform design reviews, annotations, live redlining, comment threading, and issue assignment, ensuring traceability of design feedback to resolution.

- The platform shall be seamless with IPMS document management, schedule, and cost modules, ensuring that design updates are reflected in project timelines, budgets, and construction sequences.
- The platform should **support cloud-hosted shared models** with real-time team collaboration Support accessibility via web and desktop, without local server infrastructure.
- **Cloud based out-of-the-box solutions from the same ecosystem as 3D BIM will be preferred for the deployment of this solution for seamless integration and data flow.**
- All approvals must autogenerate the e-sign of the approver that can be attached to the document visible digitally and at the time of printouts.

Document and Workflow Digitization

- The solution must offer configurable business process workflows for forms for **NCRs, RFIs, SORs, method statements, site memos, contracts, Variation requests**, etc. without custom coding.
- The system shall enable configuration and automation of approval workflows for construction-related processes (e.g., RFIs, submittals, inspection requests, NCRs, drawing approvals) with role-based routing and notifications.
- The IPMS shall provide a secure, version-controlled repository for all construction documents including GFC drawings, specifications, permits, inspection records, and correspondence, ensuring single source of truth.
- The solution shall allow on-site personnel to access, update, and upload construction documentation directly from mobile devices, with offline capability and synchronization to the central system when online.
- The module shall **integrate with the organization's existing CDE (Common Data Environment), ERP, Project Control tools, Primavera, or equivalent schedule data (used by contractors)** to avoid duplication and ensure seamless data exchange.
- Each document must be traceable to specific metro packages (e.g., CP-101, UG-02) and linked with work fronts. It shall support configurable approval hierarchies involving EPC contractors, GC, and metro corporation authorities. It should also link the stakeholders involved at each stage with the document – tagging creator, reviewer approver, etc.
- All workflows and document transactions shall be time-stamped, user-attributed, and stored in **compliance with applicable standards (e.g., ISO 9001 for quality records, ISO 19650 for BIM documentation)** to ensure audit readiness.
- The solution should be deployable as a **secure cloud-based solution with ISO 27001 compliance.**
- **If Cloud based out-of-the-box solutions is recommended – preferably, the same tool be used for other solutions like invoice digitization.**
- All approvals must autogenerate the e-sign of the approver that can be attached to the document visible digitally and at the time of printouts.
- The proposed solution should be configurable – BMRCL teams should be able to independently create digitized documentation or workflows post the implementation; additionally, they should be able to change the existing workflows of document format/fields without any tech development.

Invoice and variation digitization

- The system shall allow digitization of contractor billing, stage-wise invoices (e.g., for viaduct span completion, station roof casting), milestone validation, and variation tracking. It should align with metro agency's standard billing formats, track variation orders, claims, and integrate with finance or ERP systems.
- The system shall enable contractors, vendors, and consultants to submit invoices digitally, with configurable multi-level approval of workflows, automated notifications, and electronic sign-off.
- The invoicing module shall be integrated with contract terms, BoQ items, and progress measurements to automatically validate claimed amounts against approved work completion.
- The solution shall provide an automated process for initiating, reviewing, approving, and tracking variation orders, including scope changes, quantity adjustments, and associated cost impacts.
- The system shall validate invoices, and variation of claims against contractual conditions, statutory tax requirements, and budget allocations before submission for approval.
- All invoice and variation-related transactions shall be time-stamped, user-attributed, and stored with version control, enabling full traceability and generation of real-time status and exception reports.
- The module shall **integrate natively with the organization's existing CDE (Common Data Environment), ERP, Project Control tools, Primavera, or equivalent schedule data (used by contractors)** to avoid duplication and ensure seamless data exchange.
- All workflows and document transactions shall be time-stamped, user-attributed, and stored in **compliance with applicable standards (e.g., ISO 9001 for quality records, ISO 19650 for BIM documentation)** to ensure audit readiness.
- The solution should be deployable as a **secure cloud-based solution with ISO 27001 compliance.**
- Digital Partner shall use **cost-effective**, **industry-leading platform** that is proven, scalable, and widely adopted in large infrastructure or metro projects without compromising functionality.
- **If Cloud based out-of-the-box solutions is recommended – preferably, the same tool be used for other solutions like document & workflow digitization.**
- All approvals must autogenerate the e-sign of the approver that can be attached to the document visible digitally and at the time of printouts.

Tool-based scheduling & Monitoring

- The Digital Partner shall integrate or provide advanced scheduling tools for metro construction packages.
- Digital Partner shall use **cost-effective**, **industry-leading platform** that is proven, scalable, and widely adopted in large infrastructure or metro projects without compromising functionality.
- It must align with various scheduling requirements for metro and allow package-level schedules (e.g., tunneling, station finishes). The tool should auto-highlight critical path deviations and allow re-sequencing of activities.
- The solution should provide a construction scheduling tool compliant with industry standards such as **CPM (Critical Path Method), PERT, and PMBOK guidelines, supporting baseline creation, tracking, variance analysis, baseline management, and schedule comparison.**
- The scheduling tool shall integrate with cost management, resource planning, and progress monitoring modules to ensure unified project control and real-time status visibility.

- Integrate natively with project controls platforms and provide features to export and import schedule data in XER and XML formats.
- Scenario Planning & What-If Analysis: The platform shall enable simulation of schedule scenarios, impact analysis of delays, and optimization of resource allocation using built-in analytical models.
- The tool shall support preparation and management of schedules at multiple levels—master schedule, contract-level schedules, and activity-level schedules—across multiple concurrent projects.
- The system should provide automated alerts for schedule deviations, critical path changes, and milestone slippages, along with configurable dashboards and reporting for stakeholders.
- Allow multi-user simultaneous access with role-based permissions with the option to integrate/combine schedules.
- The tool should also manage Extension of Time (EoT) analysis without significant manual intervention.
- Centralized Tracking: The system shall provide a unified module to manage and track access dates between civil and systems packages (e.g., stations, viaducts, tunnels, signaling, telecom, traction), ensuring real-time visibility for all stakeholders.
- Dynamic Integration: The platform shall integrate access data with construction schedules and progress dashboards to automatically reflect civil completion and systems interface readiness.
- Should have an automated validation feature – The tool should be able to compare the resources, material and machinery needed against the ideal values per activity and highlight any overutilization or underutilization.
- This validation process shall happen post submission of Work Breakdown Structure and monthly workplans (or any other activity schedule) by the contractor. During this validation, any underutilization of resources or mismatch from ideal values for activity duration, estimated number of resources or material etc. will be highlighted via alerts.

Daily update digitization

- The solution must provide a mobile/tablet-based interface for DPR entry from metro sites. Daily updates must capture labor count, equipment hours, work quantities (e.g., track laid, concreting done), with photo evidence and geo-tagged timestamps. It should also support shift-wise reporting and linkage with progress and billing modules.
- The module shall provide access to all authorized personnel, including users from civil and systems departments, site engineers, and supervisory staff. The solution should not impose any restriction on the number of users or concurrent access, and such unlimited user access shall be provided **without any additional license cost impact** to the client.
- This module shall seamlessly integrate with all other modules of the IPMS system and other components of overall solution to enable automatic data exchange and provide necessary information.
- Mobile & Web-Based Daily Reporting: The system shall provide mobile and web interfaces for site engineers, supervisors, and contractors to record daily progress updates, resource utilization, safety observations, and site photos in real time.
- Automated Data Validation & Timestamping: All daily updates shall be auto-validated for completeness, geo-tagged, and time-stamped to ensure authenticity and traceability of site data.
- Integration with Project Progress & KPI Dashboards: Daily updates shall be automatically consolidated into the central IPMS to update project progress dashboards, schedule variance indicators, and productivity KPIs.

- Multimedia & Document Attachment Support: The platform shall allow attaching site photos, videos, drawings, and relevant documents directly to the daily update records for context and verification.
- Automated Consolidation & Escalation: The system shall generate daily summary reports and trigger alerts to relevant stakeholders in case of deviations, delays, safety incidents, or quality non-conformances reported in the daily updates.
- The module shall **integrate natively with the organization's existing CDE (Common Data Environment), ERP, Project Control tools, Primavera, or equivalent schedule data (used by contractors)** to avoid duplication and ensure seamless data exchange.
- All workflows and document transactions shall be time-stamped, user-attributed, and stored in **compliance with applicable standards (e.g., ISO 9001 for quality records, ISO 19650 for BIM documentation)** to ensure audit readiness.
- The solution should be deployable as a **secure cloud-based solution with ISO 27001 compliance and provide customization (without any limitation) as per BMRCL's requirement.**
- **If Cloud based out-of-the-box solutions is recommended – The selected tool should preferably belong to the ecosystem used for Workflow Digitization & Construction Documentation**
- All approvals must autogenerate the e-sign of the approver that can be attached to the document visible digitally and at the time of printouts.

Progress monitoring dashboard

- The system shall include dashboards tracking physical, financial, and milestone progress across elevated, underground, and depot packages.
- The Progress Monitoring Dashboard module will generate comprehensive dashboards and reports by collecting, consolidating, and analyzing data from all IPMS modules and other integrated data sources within the overall solution.
- It should integrate package-level progress (e.g., UG-01, CP-301) with earned value metrics, heatmaps, alerts on delays, and contractor performance KPIs. Customizable views for MD, GC, and PMC shall be included.
- Real-Time Data Integration: The dashboard shall provide real-time integration with project schedules, cost control, quality assurance, safety logs, and daily site updates to present accurate progress status.
- Multi-Level Progress Visualization: The system shall allow progress tracking at various levels—overall project, contract package, work breakdown structure (WBS), and individual activity level—with drill-down capabilities.
- Automated Variance & Trend Analysis: The dashboard shall highlight schedule slippages, cost overruns, productivity trends, and earned value metrics/Financial S-curve through automated variance and trend analysis.
- Customizable KPIs & Stakeholder Views: The system shall provide configurable dashboards to display Key Performance Indicators (KPIs) relevant to different stakeholders, with role-based access control and exportable reports.
- This should be **compatible/allow integrations with Axpert built dashboards** (developed earlier for Phase 2A/2B)
- The dashboard shall provide visualizations to integrate budget, fund disbursement, expense data from ERP/finance systems, funding utilization and visibility into multilateral funding conditions and

compliance checks. It should also have automated alerts on cost overruns and fund draw timelines.

- The solution should have the functionality that enables dashboards to support query-based reporting, allowing users to filter, retrieve, and analyze data dynamically through custom query inputs.

Digital inspection checklist

- The vendor shall deploy a fully digital and configurable inspection checklist platform to support civil, structural, MEP, and systems inspections. The platform must:
  - Support role-based access for engineers, contractors, and PMC teams.
  - Enable location-tagged and image-supported inspection records.
  - Integrate predefined standards (e.g., IRC, IS codes, Metro QA norms).
  - Allow offline functionality and synchronization upon connectivity restoration.
- Customizable Digital Forms – The system shall allow creation, modification, and management of inspection checklists in digital format, configurable by inspection type, asset category, project stage.
- Mobile & Offline Capability – The inspection checklist module shall be accessible via mobile devices with offline functionality, enabling inspectors to capture data and sync automatically once connectivity is restored.
- Photo & Video Evidence Attachment – The system shall allow inspectors to attach photos, videos, and annotated drawings directly to checklist items for enhanced evidence-based verification.
- Automated Non-Conformance Reporting (NCR) – Any non-compliance detected during inspection shall trigger an automated NCR workflow, linking it with rectification tasks and timelines.
- Analytics & Compliance Reports – The system shall generate real-time inspection analytics, compliance trend reports, and dashboards for quality assurance monitoring and audit purposes.
- Should extend to include field management – identification of next steps or activities needed for approving the inspection and assigning the activity to relevant personnel.
- All workflows and document transactions shall be time-stamped, user-attributed, and stored in **compliance with applicable standards (e.g., ISO 9001 for quality records, ISO 19650 for BIM documentation)** to ensure audit readiness.
- The solution should be deployable as a **secure cloud-based solution with ISO 27001 compliance.**
- All approvals must autogenerate the e-sign of the approver that can be attached to the document visible digitally and at the time of printouts.

4.2.6 Presentation Layer

The presentation layer of the proposed solution will include the following items –

- Central Web Portal
- Field Mobile App

All sections of the presentation layer should be accessible to all stakeholders (design consultants, civil contractors, systems contractors, equipment vendors, etc.) involved in the construction process should be provided with role based access to the web portal and mobile app. Common login credentials must be

used across the web portal and app to allow user to access only relevant sections/views from the presentation layer.

(1) Central Web Portal

The Central Web Portal in the proposed architecture will serve as a unified landing platform, seamlessly connecting existing dashboards (provided by individual modules of IPMS core components), and other project management tools, enabling real-time visibility of KPIs, project metrics, and analytics across all modules.

The scope includes but not limited are as follows:

- The vendor shall design and develop a Central Web Portal that consolidates data from multiple project management and IPMS platforms (e.g., various IPMS modules) through secure APIs or integration services.
- The dashboards will comprise a set of interlinked screens that will fetch data from the various sources delineated in this document. Various data sources may include (but not limited to) various on-premises data sources from BMRCL, data sources of various add-on tools and platforms of IPMS.
- The dashboards can be developed through a custom UX/UI framework or in-house developed visualization, preferably hosted on cloud. In case the vendor wants to use an OOTB solution, they can use a standard BI platform such as Power BI, Tableau, Qlik Sense. However, the vendor must propose an approach that minimizes BI licensing costs while ensuring unrestricted access for all authorized users, without limitations on the number of viewers or consumers of the dashboards.
- The visualization / BI platform should comply with major global standards including ISO 27001/27017/27018, SOC 1/2/3, CSA STAR, PCI DSS, GDPR, FIPS 140-2, and multiple regional compliance frameworks. It should support enterprise-grade security through encryption, enterprise IAM / SSO-based access control or equivalent, DLP, sensitivity labels where applicable, and end-to-end audit logging.
- The partner is expected to provide full stack development capabilities to build custom screens (wrappers) to provide custom functionality to the dashboards beyond that provided by the native platform.
- Detailed screen designs shall be shared with the partner during the course of engagement.
- The partner will be expected to conduct a comprehensive evaluation of the existing source system applications and data sources to be integrated with IPMS to power dashboards.
- The partner will be expected to map drilldowns (basis issue trees) for metrics being put on the dashboard (wherever applicable).
- The partner will be expected to develop trigger capabilities for the dashboard wherein metrics which go out of defined threshold range should get highlighted/escalated. Escalations could be in the form of text messages, app pop-ups, e-mails, being highlighted in a trigger dashboard etc.
- Integrated Data Aggregation – The vendor shall design and develop a Central Web Portal that consolidates data from multiple project management and design platforms through secure APIs or integration services.
- Single Landing Page for Navigation – The dashboard shall provide a unified landing page enabling users to access embedded or linked dashboards from all integrated tools and modules of IPMS and overall solution (e.g. Central Web Portal, Phase 2A/2B dashboard, BIM, Takeoff, etc.) without requiring multiple logins.
- Role-Based KPI Views – The system shall support role-based access to KPIs, ensuring that executives, project managers, engineers, and QA teams see data relevant to their responsibilities.

- Customizable KPI Widgets – The dashboard shall allow creation and arrangement of configurable widgets displaying key project metrics such as schedule adherence, budget variance, risk status, quality performance, safety incidents, and progress trends.
- Real-Time Data Sync – The dashboard shall provide near real-time data refresh from integrated systems, leveraging event-based or scheduled data synchronization mechanisms.
- Cross-Platform Accessibility – The dashboard shall be web-based, responsive, and optimized for desktop, tablet, and mobile devices, ensuring easy accessibility for field and office users.
- Data Visualization Standards – The system shall use interactive charts, heat maps, drill-down tables, and graphical indicators that comply with modern UX/UI standards for clarity and usability.
- Drill-Down & Multi-Level Navigation – Users shall be able to click on KPI metrics to view detailed reports, timelines, and underlying transaction data across integrated systems.
- Security & Governance – The dashboard shall comply with BMRCL's security policies, including secure authentication, data encryption, and audit logging for all user interactions.
- Scalable & Extensible Architecture – The vendor shall design the dashboard to allow integration with additional tools and data sources in the future without significant rework, ensuring long-term scalability.
- This central web portal should be able to pull data and integrate with the existing dashboards developed on Axpert platform for Phase 2A/2B to ensure a single window of reporting & data access.
- The developed dashboards should be customizable & configurable in nature allowing for creation and refinement of dashboards post implementation without any coding or tech development.

(2) Field Mobile App

- The Vendor should develop a custom Central Mobile Application that will serve as a unified landing page, providing secure, single-point access to various individual mobile applications with IPMS and modules from others.
- The solution shall support seamless navigation, integration with existing and future apps, and ensure consistent user experience across platforms and devices.
- The Central Mobile App should be built to easily accommodate future tools, dashboards, and mobile applications without requiring a major redesign.
- The module shall provide access to all authorized personnel, including users from civil and systems departments, site engineers, and supervisory staff. The solution should not impose any restriction on the number of users or concurrent access, and such unlimited user access shall be provided without any additional license cost impact to the client.
- The Vendor shall enable Single Sign-On (SSO) capabilities to allow users to authenticate and access all integrated modules, complying with the existing enterprise identity management framework.
- The application should be compatible with both Android and iOS platforms, supporting the latest OS versions and ensuring consistent functionality and performance across devices.
- The Vendor should ensure that the app follows a unified design language for UI/UX, enabling consistent user experience across all integrated modules, aligned with the client's branding guidelines.
- The Central Mobile App shall adhere to ISO 27001 and IS 17428 security standards, including secure communication protocols, encryption of data in transit and at rest, and multi-factor authentication.

- The security features of the app should ensure that the app user is not able to copy data or take screenshots on the field app.
- The Vendor ensures that the application supports real-time data retrieval from all integrated modules, with appropriate caching mechanisms to optimize performance without compromising data accuracy.
- The Vendor should provide offline mode functionality for critical modules, enabling users to continue certain operations without an internet connection, with automatic synchronization upon reconnection.
- The Vendor should provide post-deployment support, including bug fixes, security patches, and upgrades to maintain compatibility with updated OS versions and newly onboard modules.
- The app should be able to capture details like role, username, assigned site, etc. and auto populate several fields in a data entry form. It should also have geo-fencing to avoid filling of any site related data remotely.
- This mobile application should be able to pull data and integrate with the existing mobile application developed on Axpert platform for Phase 2A/2B to ensure a single window of input for all documentation & workflows.

4.2.7 Internal and External Integrations

The Digital Partner (DP) is expected to ensure integration between all internal IPMS modules and external systems. A list of integrations is provided below; In addition to this if there are any other critical systems that are discovered at the time of implementation, the digital partner is expected to build API based integrations with those systems as well.

4.2.7.1 Integration within various IPMS modules

The selected Digital Partner (DP) shall ensure seamless integration between various modules with the IPMS platform. An indicative integration list (but not exhaustive) is provided as below:

Key integrations buy module	Suggested integrations
3D BIM	2D CAD Drawings, Design Codes & Standards, BoQ/Technical specs, BIM Execution Plan (BEP for Asset Codes/Tagging Schema) WBS, Scheduling tool, GIS Maps/Shapefiles
Automated BoQ/Takeoff	3D BIM Model, BoQ, WBS from scheduling tool, CDE, ERP,2D drawing
Integrated Design & Review Platform	Core 2D & 3D design data, Project metadata (ID, phase, revision), scheduling tool, Field/mobile app
Document & Workflow Digitization	Central Drawing documents, Drawing Collaboration tool, Scheduling tool, ERP, Field-app, Dashboard
Invoice & Variation Digitization	ERP, Scheduling, Takeoff Tool, Contract Module, Document & Workflow Digitization module, Field app, Dashboard
Tool-based scheduling & Monitoring	BIM 3D, Collaboration module, Document & Workflow Digitization module, Takeoff, Field app, Contracts Module, Dashboard, ERP
Daily Update Digitization	Scheduling, Document & Workflow Digitization module, ERP, QA/QC, Collaboration tool, ERP, Dashboard
Progress Monitoring Dashboards	Scheduling, ERP, Document & Workflow Digitization module Field App, Doc 52 mgmt. module

Key integrations buy module	Suggested integrations
Digital Inspection Checklist	Drawings, Field app, Scheduling, 3D BIM, NCR Module, Contract Module, Handover module, Reports, and dashboards

4.2.7.2 Integration with Integrated Control Tower

The selected Digital Partner (DP) shall ensure seamless integration between the proposed IPMS platform and the Integrated Control Tower (ICT) to facilitate real-time transmission of key project KPIs and analytics. This integration is critical for enterprise-wide visibility, central command, and proactive governance.

The suggested solution should support the following (not exhaustive) capabilities:

- **KPI Data Extraction & Mapping**
  - Identify and extract key KPIs from IPMS (e.g., progress %, delay index, inspection status, financial burn, resource utilization).
  - Define data formats, refresh frequency, and transmission protocols in consultation with ICT team.
- **API-Based Data Exchange**
  - Develop and expose secure, standards-based APIs (REST/ Odata/others) for pushing KPI data to ICT dashboard.
  - Ensure APIs are modular, scalable, and compatible with the ICT data ingestion layer.
- **Real-Time & Scheduled Updates**
  - Enable both real-time streaming and batch updates (e.g., hourly/daily) depending on KPI nature and ICT capability.
  - Include error handling, retry mechanisms, and timestamp validation.
- **Data Normalization & Semantic Layer Alignment**
  - Align project master data, codes, and attributes with the existing semantic layer and taxonomy of ICT.
  - Resolve any schema mismatches or duplications to maintain consistency across dashboards.
- **Security & Compliance**
  - Implement encryption (TLS/SSL) and access control for all data exchanges.
  - Comply with organizational data governance policies and ensure auditability of transmitted data.
- **Monitoring & Logging**
  - Provide logs and dashboards to track API calls, data pushed, failures, and system health.
  - Include configurable alerts for failed data syncs or inconsistent KPI values.
- **Validation and Sign-off**
  - Collaborate with ICT technical team to validate KPIs after integration.
  - Provide test cases and user acceptance documents for ICT data validation.

4.2.7.3 Integration with SIMPLE Platform developed for Phase 2A/2B.

The selected Digital Partner (DP) shall ensure seamless integration between the proposed IPMS platform, and the existing SIMPLE platform developed by BMRCL & Agile Labs for project monitoring of Phase 2A/2B construction. This integration will facilitate real-time transmission of key project KPIs and analytics from SIMPLE to IPMS. This integration is critical for enterprise-wide project visibility and control.

The suggested solution should support the following (not exhaustive) capabilities:

- **Dashboard Screens Mapping**
  - Identify and extract dashboard screens from SIMPLE associated with the defined departments/use cases.
  - Develop a landing page on IPMS platform to establish connectivity with SIMPLE Dashboards
  - Define refresh frequency, and transmission protocols in consultation with SIMPLE team
- **Field Application & Workflow integration**
  - The developed application should serve as a single interface of data collection with the ability to push and pull data from the existing SIMPLE mobile development/database.
  - Existing SIMPLE workflows, process maps and RACI structures shall be made available as baseline functional requirements for IPMS. The Digital Partner shall reuse, replicate, configure or improve such workflows, as appropriate, while preserving the underlying approved business process.
  - The implementation shall not require continued dependence on the SIMPLE/ Axpert technology stack unless such dependency is specifically required for integration with the existing operational system.
- **Real-Time & Scheduled Updates**
  - Enable both real-time streaming and batch updates (e.g., hourly/daily) depending on dashboard nature and SIMPLE capability.
  - Include error handling, retry mechanisms, and timestamp validation.
- **Data Normalization & Semantic Layer Alignment**
  - Resolve any schema mismatches or duplications to maintain consistency across dashboards.
- **Security & Compliance**
  - Implement encryption (TLS/SSL) and access control for all data exchanges.
  - Comply with organizational data governance policies and ensure auditability of transmitted data.
- **Monitoring & Logging**
  - Provide logs and dashboards to track data pulls, failures, and system health.
  - Include configurable alerts for failed data syncs or inconsistent KPI values.
- **Validation and Sign-off**
  - Collaborate with SIMPLE technical team to validate integration, Provide test cases and user acceptance documents for data validation.

4.2.7.4 Integration with Contractor systems and BMRCL on-premises systems.

- The selected Digital Partner (DP) shall ensure seamless integration with BMRCL's on-premises systems, and contractor/consultant platforms to enable seamless data flow across all stakeholders.
- All integrations should adhere to open interoperability standards and APIs (REST, SOAP, JSON, XML, IFC, etc.) to ensure compatibility with existing ERP, BIM, scheduling, and document management systems.

- The SI vendor shall maintain, monitor, and update integration interfaces throughout the project lifecycle, ensuring continued compatibility with upgrades or changes in BMRCL and contractor systems **without additional cost impact** to the client.
- The Digital Partner shall be responsible for migration and onboarding of relevant historical and current data from existing BMRCL systems, databases, spreadsheets, document repositories and approved third-party systems into the IPMS data layer/CDE, wherever required for implementation. This shall include data discovery, extraction, profiling, cleansing, deduplication, mapping, transformation, validation, reconciliation, migration logs and business sign-off. The Digital Partner shall prepare a detailed Data Migration Plan identifying source systems, data owners, data fields, migration approach, data quality issues, validation rules, cutover approach and fallback mechanism.

4.3 Other Functional requirements:

4.3.1 Performance & scalability

(1) Data Processing Speed

- The solution should adhere to industry standard data processing speeds.
- Real-time data processing latency to be in the milliseconds to seconds range.
- System must be able to handle high throughput, processing millions of events/records per second.
- System should be able to handle batch processing data volumes up to few Gigabytes in 5-10mins.

(2) Data Query Speed:

- The system should have response time for querying data return results in seconds to minutes for moderate to large-sized datasets (e.g., 500GB to 1 TB).

(3) Data Transformation Speed

- The system should have data Transformation time for medium to complex transformations in the range of 1-5 minutes per GB of data.

(4) Data Storage and Retrieval Speed

- The system should be able to read and store the data at the rate of several GB per second

(5) Data availability in dashboards/reports

Users	Number
Dashboard Users	100
Concurrent Dashboard Users across platform	80-100
Responsiveness	1-3 secs; The dashboard screens response time is expected to be ~2 seconds per tab refresh including data and information load

(6) Data availability in Field Mobile App

Users	Number
Mobile App Users	~100

Concurrent Users across App	80-100
Responsiveness	1-3 secs; The app screens response time is expected to be ~2 seconds per screen refresh including data & information load

(7) Data availability in API

Users	Number
API calls supporting Users	80-100
Concurrent Users across platform	80-100
Responsiveness	2 secs; The API response time is expected to be ~2 seconds per tab refresh including data and information load

(8) Application availability

- Application is expected to be available 99.5%.

(9) Scalability

- The solution must be able to scale horizontally and vertically to meet growing data and processing demands. The vendor must provide a detailed scalability plan, including recommendations for infrastructure growth and resource allocation.
- The solution must support auto-scaling capabilities, automatically adjusting resources in response to fluctuating workloads and traffic. The vendor should define thresholds and strategies for auto-scaling based on system load and performance requirements.
- The solution must be able to handle increasing data volumes without degradation in performance. The solution must maintain or improve performance (e.g., data processing speed, query response time) as the scale of data increases.
- The data storage solution must support the scalable growth of data. The vendor must describe the data storage architecture and outline how the system can scale to accommodate future data growth without requiring a full redesign of the system.

4.3.2 Reuse of Existing Components and interoperability

To preserve BMRCL's existing investments and ensure interoperability with the project management system (PMS) developed for Phase 2A/2B, the Digital Partner shall integrate with and, where technically and commercially appropriate, reuse or extend existing components

BMRCL/ JICA shall make available to all eligible bidders/ selected Digital Partner, as applicable, the technical information reasonably required for such integration, including available interface specifications, APIs, data structures, workflow documentation and relevant architectural information.

The Digital Partner shall:

- Evaluate existing components for reuse based on functionality, interoperability, maintainability, lifecycle cost and technical suitability
- Re-use or extend such components where this provides demonstrable technical or economic advantage to BMRCL

- Ensure compatibility and seamless data exchange through documented interfaces and recognized standards.
- Be permitted to propose an alternative approach where it demonstrates superior functionality, lifecycle cost, interoperability, maintainability or reduced vendor dependency, subject to approval by the Authority/ Client's technical committee.

All source code and documentation made under the above provisions shall be subject to code review and approval by the designated technical team of JICA DXLab/BMRCL or its designated agency.

4.4 Non-functional Requirements

Following specifications to be referred to for different items, unless otherwise agreed differently by the parties during the service delivery –

- Micro front-end UI development
- Lazy loading
- Caching on Client side
- Optimized assets (images, videos)
- Low network speed/no-network handling
- Memory management and profiling

4.4.1 Screen size and resolution.

The following non-functional requirements shall be applicable IPMS dashboard.

Criteria	Description
Supported Screen sizes /resolution. 601 x 962 768 x 1024 810 x 1080 820 x 1180 1280 x 800 2560 x 1600 2048 x 2732	All popular tablet screen sizes (7 Inches or 10.2 Inches) Minimum screen size supported: 5 inches (limit the download) Maximum screen size supported: 12.9 inches (iPad Pro) Adaptive towards Aspect ratio
Screen layout (mobile devices) 360 x 800 390 x 844 393 x 873 412 x 915 414 x 896 360 x 780 1440 x 3200 2208 x 1768	All Popular mobile phone screen layouts Minimum screen size supported: 6 inches Maximum screen size supported: 7.6 inches (Samsung Z Fold) Minimum screen resolution: 360 x 800 px (Samsung S20) Maximum screen resolution: 1440 x 3040 px (Samsung Z Fold)

Criteria	Description
Supported Screen sizes (Laptop) 1920×1080 1366×768 1536×864 1280×720	Support for desktops from size 13”-15”
Browser supported with version	The solution shall support current stable versions of modern browsers, including Microsoft Edge, Google Chrome, Mozilla Firefox and Apple Safari. Edge Safari 15 and above Firefox 89 Onwards Google Chrome 94 and above
Mobile Platforms	The mobile app / mobile web access shall support current stable Android and iOS versions, with compatibility tested on representative devices. Any OEM / SaaS-specific browser or mobile OS limitations should be clearly disclosed in the proposal.
	Any OEM / SaaS-specific browser or mobile OS limitations should be clearly disclosed in the proposal.
Languages Supported	English, Kanada

4.4.2 Coding practice

All software code and scripts produced by the Digital Partner must follow JICA DXLab’s coding standards. The Digital Partner is expected to showcase coding best practices and periodically review with JICA DXLab team for code review as part of the sprints and the Digital Partner is expected to support during the review process. Some of these would include (but not be limited to):

- Integration archetypes between IPMS components and with other overall solution components
- Mobile app and Dashboard design and demo
- Features of various IPMS modules with actual output
- Git flow/trunk-based model for code branching
- 90-95% unit test coverage for new code changes that are coming in
- Functional and regression testing
- Smoke and sanity automated testing.
- Security testing
- Code review and merging strategy.
- Standard code linters and static checks
- Quality gates defined with following variables
    - Code smells – A

- Duplicate code - <3%
- Maintainability and reliability of code – A
- Security – A
- Unit Test coverage >80%

All code to have standardized logging practices automated using common libraries.

Localization: Data to be localized with regional storage (India) on the corresponding cloud and SaaS services used.

5 Implementation Timeline

The Project will be run following Agile Scrum model with agreed scope at every program increment. Partner is expected to formulate the team in Pod Structure with Scrum Master, PO, and development pod members. The project will consist of 9 solutions that will be deployed.

The contract is expected to commence upon Partner onboarding and shall remain valid till **15 February 2027**. Within this period, the Digital Partner shall design, configure, develop, integrate, test, deploy and hand over the prioritized IPMS scope covering the following 9 solutions in 2 releases

S.No	Release	Module	Category
1	Release 2	3D BIM	Design, Commercial Integration & Final Go-live
2	Release 2	Automated BoQ/Takeoff	Design, Commercial Integration & Final Go-live
3	Release 2	Integrated Design & Review Platform	Design, Commercial Integration & Final Go-live
4	Release 1	Document & Workflow Digitization	Core Digitization & Project Controls
5	Release 1	Daily Update Digitization	Core Digitization & Project Controls
6	Release 2	Tool-based Scheduling & Monitoring	Core Digitization & Project Controls
7	Release 1	Digital Inspection Checklist	Core Digitization & Project Controls
8	Release 2	Invoice & Variation Digitization	Design, Commercial Integration & Final Go-live
9	Across Release 1 and Release 2	Progress Monitoring Dashboards	Initial dashboards in Release 1; final integrated dashboards in Release 2

Progress Monitoring Dashboards shall be implemented in two stages. Initial dashboards shall be delivered in Release 1 using data from workflow, daily updates, inspections and scheduling. Final integrated dashboards shall be delivered in Release 2 after integration of BIM, BoQ/takeoff, design review, commercial and cross-module data flows.

The Vendor shall prepare and implement a **Phased Capability Development Plan** to deliver the specified IPMS solutions, CDE and dashboard over the total duration of contract from Effective Date of Contract ("T" stands for Effective Date of Contract) till 15th February 2027:

Sr. No	Process	Activities/Deliverables	Completion Timeline
1	**Milestone 1: Project Kickoff and Design Approval**	Partner onboarding, project kick-off, team mobilization, governance cadence, sprint ceremonies, escalation matrix, project tracker, dependency tracker	T + 1 week
2	**Milestone 2: Architecture & Design Sign-off**	Finalize solution architecture, hosting approach, integration architecture, CDE design, security approach, license plan, data inputs and access readiness	T + 2 week
Release 1: Core Field & Workflow Digitization modules: Document & Workflow Digitization, Daily Update Digitization, Digital Inspection Checklist, Initial Progress Monitoring Dashboard			
3	**Release 1 Setup**	Release 1 sprint plan, module BRDs/TRDs, workflow inventory, role matrix, form templates, approval hierarchy and field app requirements	T + 3 week
4	**Base Platform & CDE Setup**	CDE configuration, document repository, metadata structure, role-based access, audit trail, basic integration layer and environment setup	T + 4 week
5	**Release 1 Module Configuration/Development**	Configure/develop Document & Workflow Digitization, Daily Update Digitization, Digital Inspection Checklist and initial Progress Monitoring Dashboard workflows	T+6 week
6	**Release 1 CDE Integration**	Integrate Release 1 modules with CDE, user access, document repository, field app, dashboard data layer and notification workflows	T+7 week
7	**Release 1 Pilot Testing & Refinement**	Run field pilot, collect feedback, fix defects, refine forms/workflows/dashboards, validate audit trail and access controls	T+8 week
8	**Milestone 3: Release 1 UAT, Training & Sign-off**	Conduct SIT/UAT, train Release 1 users, finalize SOPs, release notes and obtain sign-off for Release 1 modules	T+8 week
Release 2: Planning, Design & Schedule Integration – 3D BIM, Automated BoQ/ Takeoff, Integrated Design & Review Platform, Tool based scheduling and monitoring, Invoice & Variation Digitization, Final Progress Monitoring Dashboards			
9	**Release 2 Setup**	Release 2 sprint plan, BIM/design data readiness check, schedule data readiness check, WBS/activity structure validation and license provisioning	T+9 week
10	**Release 2 Module Configuration/Development**	Configure/develop 3D BIM, Automated BoQ/ Takeoff, Integrated Design & Review Platform, Tool based scheduling and monitoring, Invoice & Variation Digitization,	T+12 week
11	**Release 2 CDE Integration**	Integrate Release 2 modules with CDE, design repositories, BIM/takeoff outputs, document workflows, scheduling data, BoQ/measurement sheets, invoice/variation workflows and dashboard data layer	T+14 week

Sr. No	Process	Activities/Deliverables	Completion Timeline
12	**Release 2 Pilot Testing & Refinement incl. HyperCare transition plan**	Run field pilot, collect feedback, fix defects, refine forms/workflows/dashboards, validate audit trail and access controls; Finalize 30-day hypercare plan, issue tracker, SLA process, support team, escalation matrix and AMC/steady-state transition plan	T+15 week
13	**Milestone 4: Release 2 UAT, Training & Sign-off**	Conduct SIT/UAT, train Release 2 users, finalize SOPs, release notes and obtain sign-off for Release 2 modules	T+17 week
	Final Go-Live plan		
14	**Final UAT, Production and end-to-end testing and Go-live**	Conduct end-to-end UAT across all 9 modules with BMRCL teams, resolve priority defects, validate integrated dashboards, complete performance/security checks and finalize production deployment	T + 17 week
15	**Training, Documentation & Handover**	Complete end-user training, admin training, SOPs, user manuals, technical documentation, configuration documents, runbooks, release notes and knowledge transfer	T+17 week

The Vendor shall:

- Submit a detailed implementation roadmap, with milestones, deliverables, resource allocation, and interdependencies, within four (4) weeks of contract award.
- Ensure that each release is functionally complete, tested, and signed off by the Purchaser before proceeding to the next release.
- Maintain continuous alignment with BMRCL's program priorities and incorporate feedback from preceding releases into subsequent releases and final go-live
- Provide progress reports and dashboards on a weekly basis, indicating the status of each capability.

6 Deliverables

The list of deliverables to be submitted for the proposed scope is as follows:

1. Business Requirement Document (BRD) basis the proposed scope
2. Detailed Technical specification document.
3. Entity Relationship Diagram for Data Models
4. Architecture documents – Solution Architecture, Infrastructure Architecture, Integration Architecture, System Architecture, Network architecture
5. Infrastructure specifications for different environments
6. Details of cloud services and their specifications (BOM)
7. List of tools/software proposed for each solution, third-party services, their specifications and license model, Number and duration of license and method of use of license to make it cost effective.
8. Prototypes for Central Web Portal and Field Mobile App
9. Flow chart for algorithms/workflows proposed along with sequence diagram.
10. Integration documentation
11. API specifications along with Swagger Docs
12. DevOps architecture & CI/CD Setup details, Code Repository/Library
    a. The Digital Partner shall hand over to BMRCL all source code, configuration files, workflow definitions, business rules, integration logic, APIs, scripts, data models, deployment documentation, user manuals, technical documentation and other project-specific artefacts developed or configured for IPMS. BMRCL shall receive perpetual, royalty-free rights to use, operate, maintain, modify and extend all such project-specific components for its internal purposes. For third-party/OEM/SaaS products, the Digital Partner shall clearly specify license terms, usage rights, restrictions and dependencies, and ensure that BMRCL receives all rights necessary for continued operation of IPMS beyond the contract period
13. Functional Release Notes
14. System Performance Report
15. API Performance Test Reports
16. Completely developed, configured, and integrated IPMS solutions – 9 solutions (as detailed in **"Section 4.2.5"**) with mobile field app and Central web portal (as detailed in the **"Section 4.2.6"**)

For all custom components, extensions, integrations, scripts, APIs, workflows, dashboards, reports, data models, automation logic and configurations developed specifically for BMRCL under this engagement, the Digital Partner shall hand over the relevant source code, configuration files, documentation, deployment artefacts, test scripts and operating manuals to BMRCL.

7 Payment milestones

The payment for the implementation of the Common Data Environment (CDE), Integrated Project Management System (IPMS), Advanced Dashboard, and AI-enabled solutions shall be made as per the following milestones, subject to completion of deliverables and acceptance by the Digital Partner.

Sl. No	Milestone	Description	Payment %	Acceptance Criteria
Milestone 1	Project Kick-off & Design Approval	Completion of requirement gathering, system study, and design workshops; submission and approval of Detailed Solution Architecture (including CDE, IPMS, dashboard) and Integration Architecture client sign-off on Functional & Technical Specifications.	10%	Approved design documents Signed-off functional and technical specifications.
Milestone 2	Base platform, CDE and environment setup	Setup of base infrastructure/ environments, CDE configuration, metadata structure, user roles, access controls, document repository, DevOps/CI-CD setup and base integration layer	10%	CDE and base platform functional in staging environment; access controls configured; environment readiness and architecture validation completed
Milestone 3A	Release 1 build and integration — Core Field & Workflow Digitization	Development/configuration and integration of Release 1 modules: Document & Workflow Digitization, Daily Update Digitization, Digital Inspection Checklist and initial Progress Monitoring Dashboards	20%	Release 1 modules functional in staging; workflows configured; forms/field app flows available; initial dashboards connected to Release 1 data sources
Milestone 3B	Release 1 testing, training and acceptance	Completion of SIT, UAT, defect resolution, user training, SOPs and sign-off for Release 1 modules	10%	Successful SIT/UAT reports; training completion evidence; Release 1 acceptance sign-off
Milestone 4A	Milestone 4A: Release 2 build and integration — Planning, Design & Schedule Integration	Configuration/development and integration of Release 2 modules: 3D BIM, Automated BoQ/Takeoff, Tool Based Scheduling & Monitoring, Integrated Design & Review Platform, Invoice & Variation Digitization and final Progress Monitoring Dashboards	20%	Release 2 modules functional in staging; BIM/design/schedule data integration demonstrated; relevant dashboards and integration flows available

Sl. No	Milestone	Description	Payment %	Acceptance Criteria
Milestone 4B	Release 2 testing, training and acceptance	Completion of SIT, integration testing, UAT, defect resolution, training and sign-off for Release 2 modules	10%	Successful SIT/UAT reports; training completion evidence; Release 2 acceptance sign-off
Milestone 5	Production Go-live, Documentation and Handover	Signed go-live certificate; final UAT completion report; all 9 modules deployed to production; final integrated dashboards validated; training completion reports; documentation and handover pack submitted.	15%	All 9 modules functional in staging; commercial workflows configured; integrated dashboards available; cross-module integration demonstrated
Milestone 6	Hypercare completion and final acceptance	Completion of 30-day hypercare support, defect closure, performance stabilization, support transition and AMC/steady-state support plan	5%	Hypercare closure report; open critical defects closed or accepted; final acceptance sign-off; support transition plan approved

8 Hypercare and Support Requirements

8.1 Hypercare support

- The proposal to include provision and plan for hyper care support post-production roll out for **release-wise stabilization during implementation and 30-day hypercare post final go-live.**
- The Hypercare phase shall include dedicated on-site and remote support to resolve issues, fine-tune system performance, and address user feedback.
- Vendors shall deploy skilled technical and functional experts during Hypercare to ensure uninterrupted system availability.
- Comprehensive incident tracking, resolution reporting, and user assistance shall be provided throughout the Hypercare period
- The vendor shall transition to standard Annual Maintenance and Support (AMS) services after the successful completion of Hypercare.

8.2 Support Requirements

8.2.1 Infrastructure, Cloud Operations, DevOps, and IPMS support

- Dedicated support to managing Infrastructure, Cloud Operations, DevOps and IPMS and platform and integration with 3rd parties.
- Infrastructure monitoring to provide proactive alerts on anomalies in infrastructure and 3rd party API integrations.

8.2.2 Support timings

- Monday through Saturday -9 AM – 7 PM.
- On call support between 6:00 pm-09:00 am for P1 tickets only
- Regular maintenance of DevOps build pipeline

8.2.3 Proactive Monitoring support

- Shall monitor the health of the infrastructure, CDE and IPMS platform and proactively identify issues that may impact performance.
- All monitored items are assigned two alert levels, based on specific thresholds. When the first threshold is breached, ‘Warning’ notifications shall be triggered. When the second set of thresholds are breached, ‘Failed’ notifications shall be triggered.
- Shall proactively seek to remediate any issues before Failure.
- Remediation should be managed using Change control process.
- Provide centralized support to triage defects from end customer /BMRCL IPMS users based on severity and provide first response.
- The SLA for Support is as follows:

Severity	Description	Reaction time	Resolution time	Frequency of Update	RCA time
P1 Critical	**Extremely Critical** – Preventing multiple customers from performing tasks critical to the normal operation of application	1 business hour	4 business hour	1 business hour	6 business hours
P2 High	**Significant** – Preventing customer from performing tasks essential to the normal operation of application	2 business hours	8 business hours	2 business hour	12 business hours
P3 Medium	**Moderate –** One of the functions is disrupted or impaired, with little or no impact on application	8 business hours	24 business hours	Every 4hours	40 business hours
P4 Low	**Negligible** – Incident of a non-critical nature	8 business hours	40 business hours	Every day	40 business hours

The SLA requirements for the support to be provided between 9AM to 7PM (6 Days a week):

Severity Level	First Response Time	Work Around Time	Permanent Fix Time
Severity 1	1 Hour	4 Hours	24 Hours
Severity 2	2 Hours	8 Hours	48 Hours
Severity 3	8 Hours	24 Hours	96 Hours
Severity 4	8 Hours	40 Hours	120 Hours

8.3 Backup Management

The proposal shall provide an integrated backup solution which protects the IPMS's critical business data. Managed backup shall include the following, aligning with prescribed Backup Policy:

- Backup of entire Virtual Machines, all supported applications, database, file system etc.
- Backup status monitoring
- Email alerts & notification for backup completion & backup failure.
- Restore specific data and machines upon request.
- Weekly backup reporting
- Remediation of issues preventing the installation or performance of managed backup
- All back-up data shall be retained as per prescribed backup policy.

8.4 Change Request Effort Thresholds

Change requests requiring effort up to forty (40) person-hours per task shall be covered under the Annual Maintenance/Support Contract at no additional cost.

For any change request exceeding forty (40) person-hours, the Digital Partner shall submit a detailed effort estimate, scope, timeline, and commercial impact for approval by the Client prior to commencement of work. No work shall begin without written approval from the Client.

9 Liquidated damages

- The Digital Partner should deliver all components, modules, and integrations of the CDE, IPMS, Dashboard, and mobile app within the agreed timelines. In the event of any delay in achieving the contractual milestones, JICA shall be entitled to impose Liquidated Damages (LD)
- The Liquidated Damages are recovered from the Digital Partner for delay and not as penalty, and its imposition shall be without prejudice to any other contractual rights or remedies available.
- The amount of Liquidated Damages leviable under the Contract shall be the genuine pre-estimate of the loss suffered because of which the Liquidated Damages have been levied on the Digital Partner. The Liquidated Damages may be recovered from any amount of money due to the Digital Partner.
- For every week of delay beyond the Contract end date the Digital Partner will be liable to pay 0.5% of Contract value per week subject to maximum ceiling of 10% of Contract value. The following conditions apply:
    - Mitigating Circumstances: If the delay is caused by factors beyond the control of the Digital Partner, such as force majeure events or delays attributable to BMRCL, the penalty shall not apply.
    - Notice of Delay: The Digital Partner shall notify BMRCL in writing as soon as a delay is anticipated, providing reasons for the delay and a revised timeline for completion.
    - Efforts to Mitigate: Both parties shall make reasonable efforts to mitigate the impact of the delay and work collaboratively to achieve project completion.

10 Appendix 1: Submission Checklist

Section	Document/Form	Description	Format of Submission
1. Eligibility & Qualification Documents	Copy of certificate of incorporation/partnership/ any other government recognized certificate.	Proof of incorporation or registration of the bidding entity in India and proof of the number of years in operation	PDF
	Consortium Agreement (if applicable)	Signed MoU or agreement defining lead member and roles of consortium partners	PDF
	Financial Turnover Certificate	Audited financial statement or certificate for last 3 years	PDF/Excel
	Self-certification from *CEO/Authorized*	Self-certification confirming there is no conflict of interest – the Bidder is involved in a single bid. None of the Bidder's	Digitally signed PDF

Section	Document/Form	Description	Format of Submission
	signatory: Conflict of Interest Declaration	subsidiaries, associate or holding company or companies having common director/s or companies in the same group of promoters/management are participating in the bid process	
	Self-certification from CEO/Authorized signatory: *Declaration that proposed team is free of criminal records*	Self-certification confirming that the Bidder's management and proposed team members do not have a history of corruption, arrest records, or involvement with criminal organizations	Digitally signed PDF
	Self-certification from CEO/Authorized signatory: *Declaration of Non-Blacklisting by JICA*	Self-certification confirming that the bidder was not blacklisted by JICA in the past	Digitally signed PDF
2. Technical Proposal	Executive Summary	Summary of their technical proposal with unique value proposition of the bidder to deploy IPMS at BMRCL	RFP Annexure Template - Form 1
	Company Profile	Company's history, financials, structure and management, number of employees, location, and management policy	RFP Annexure Template - Form 2
	Project Experience Forms	6 project execution reports with details of similar projects in LCPM/Metro rail/Public sector	RFP Annexure Template - Form 3
	Solution Architecture Document	System architecture, integrations, data flow, infrastructure layout, data requirements from BMRCL & other stakeholders,	RFP Annexure Template - Form 4
	Functional Coverage Matrix	Module-wise mapping of solution capabilities against RFP scope, List of name & number of licenses needed for each solution	RFP Annexure Template - Form 5
	Implementation Methodology	Project plan (approach & methodology), milestones, governance model, Capability build, training & documentation	RFP Annexure Template - Form 6
	Team Composition	Team size & structure with breakdown of roles and responsibilities of the project team to be deployed	RFP Annexure Template - Form 7
3. Commercial Proposal	Commercial Bid Summary	Lump sum pricing for the entire scope with module-wise cost for implementation/development, License, and maintenance across 2 releases	RFP Annexure Template - Form 8
	Implementation Cost Breakdown	Development fee for existing scope over the 2 releases	RFP Annexure Template - Form 9

Section	Document/Form	Description	Format of Submission
	License Cost Breakdown	Pricing, number, and tenure for software licenses across 2 releases	RFP Annexure Template - Form 10
	AMC/Support Costs	Post-deployment support costs and SLAs across 2 releases	RFP Annexure Template - Form 11
	Rate Card	Rate card for distinct roles/levels proposed	RFP Annexure Template - Form 12
5. Presentation Deck	Summary of proposal	key information from all forms and highlight the unique value addition from the bidder's proposal, to be used for technical presentation rounds	PDF/PPT
6. Declaration	Declaration by Digital Partner	Declaration by the bidder – that they have understood the terms and conditions associated with this RFP Document and they agree to comply with the same.	Signed PDF

10.1 RFP Annexure Template–Form 1

Category	Description
Proposal Summary	Brief note of the partner's response for an executive-level audience.
	How are you uniquely positioned to achieve stated objectives of this RFP.
Relevant Expertise and Experience	Brief note on Relevant Indian/Global experience with role played in delivery
	Brief note on Experience in metro/rail projects with role played in delivery
	Brief note on Experience in public sector development with role played in delivery
	Relevant Partnerships with a CSP of Choice
	Relevant case studies/experience in specific functional areas
	Marquee 3rd party tools/solutions/ libraries implemented as part of previous delivery
Delivery Approach	Brief note on your prescription for following Scrum (Agile) based Software Delivery.
	Entry criterion & Definition of Ready ('DoR')
	Exit criterion & Definition of Done('DoD')
	Testing Excellence
	Test driven development (TDD) approach
	Approach for Unit Code coverage checks
	Approach for Integration Testing
	Approach for Regression Testing
	Tools that partner proposes to meet requirements. Tools include but not limited to
	Code Quality Tools
	DevSecOps tools

Category	Description
	IT Operations/Application Performance Management (APM)/Observability tools
Hypercare Support	Provision and Plan for Hypercare support postproduction roll out
Transfer To Operations (TTO)	Approach to transferring from Dev Team to Operations Team post hyper care
	Duration and Plan for handholding during the transfer

10.2 RFP Annexure Template – Form 2

10.2.1 Company information

ID	Question	Response
1	Name of the Bidder	
2	Year of Incorporation	
3	Corporate Identity No (in registered country allocated by respective govt.)	
4	Place of Registration/Principal Business	
5	Complete Postal Address	
6	Pin code/ZIP code	
7	Telephone no's (with country/area codes)	
8	Geographical coverage/Delivery location	
9	Certifications	

10.2.2 Contact information

RFP Main contact person (Please name a SINGLE POINT OF CONTACT for all your company divisions for this RFP)

ID	Question	Primary Contact PoC	Backup Contact PoC
1	Name		
2	Position within the company		
3	Mobile number		
4	E-mail address		

10.2.3 Financials (Pls provide all figures in USD)

ID	Metric	FY 22-23	FY 23-24	FY 24-25
1	Revenue			
2	Profit			

10.2.4 Employees & Resources

Please provide average headcount over the last 12 months

ID	Location	Technical	Non-Technical	Total
1	India			
2	Other than India			
3	Total			

10.2.5 Technical capability and experience with proposed technology stack

ID	Technical capability	Experience with proposed technology stack	Remarks
1			
2			
3			
4			
5			
6			
7			

10.2.6 Taxation Details

ID	Particular	Details
1	Identification no. assigned by tax authority in country of registration	
2	Category of Tax Registration as per applicable law authority in country of registration	
3	Registered/Certified Offices from where the Services would be supported and Place of Service Site for Tax	
4	Contact Names, Nos & email IDs for Tax matters (Please mention primary and secondary contacts)	

10.2.7 Supporting Documents

- Audited copies of the P&L or Chartered Account Certificate for atleast 2 years
- Copy of Certificate of incorporation/partnership/ any other government recognized certificate mentioning dates.
- Self-certified letter from CEO/ authorized body for Number of employees, Local workforce
- Signed and stamped No-deviation certificate

10.3 RFP Annexure Template – Form 3

10.3.1 Project References

		Reference 1	Reference 2	Reference 3	Reference 4 …
Overview	Company name				
	Projects name				
	Type of Credential (India LCPM, Metro/Rail, Public Sector)				
	Industry/Sector				
	Country/Location				
Project Details	Project description & scope				
	Solution Architecture/Tech Stack				
	Implementation methodology				
	Integration				
	Data flow				
	Software configuration				
	Outcome KPIs				
	Team construct				
	Any other relevant project details				
Duration & Value	Duration *(months)*				
	Start date - Should be in last 5 yrs *(mm-yyyy)*				
	End date *(mm-yyyy)*				
	No. of person-months				
	# of years for Tie-up				
	Project value *(range in USD equivalent)*				
Reference Contact	Name				
	Designation				
	Contact Number				
	Email address				
Role	Role of the bidder				
	If Sub-Co, Main-Contractor				
Documents	Documentary evidence submitted				

10.3.2 Supporting Documents

- Documentary evidence like Purchase Orders, Copies of the Service Contracts or work, completion certificates from the client confirming the details of the project executed to be submitted with following details.
- Each report should not be more than five pages long. (12 font size min).

10.4 RFP Annexure Template – Form 4

10.4.1 Solution Architecture

ID	Component	Sub-component	Proposed Solution	Implementation approach	Relevant experience of execution
1	Front End	Dashboard platform			
		Field Mobile App			
		API services			
		Data flow			
2	Back End & CDE	Tech Stack			
		Data services			
		Standards Compliance and Metadata Support			
3	Integration & API	Detailed approach for integrations (ensure Real-time and bi-directional data flow)			
		Tech stack supporting Non-functional requirements			
		Provisioning for SDKs, sandbox environments, etc.			
4	Infrastructure, Networking, Hosting and Security	Infrastructure & network architecture			
		Infrastructure as a code tools usage			
		Hosting approach			
		Data security & compliance			
5	Data Analytics	Data analytics architecture and framework			
		Approach for data ingestion, transformation, and preparation for analytics workloads.			
		Approach to data models, warehouses, and data lakes			
		Analytical tools and frameworks used			
6	Data Governance	Catalog			
		Lineage			
		Quality Assurance			

Guiding principles:

- The proposed architecture encompasses key principles and design patterns for ensuring a robust, scalable, and flexible solution.
- The front-end will prioritize responsiveness and an intuitive user experience, while the back end will utilize scalable and secure architecture.
- Integrations will follow API-first principles for seamless interoperability.
- The infrastructure will prioritize high availability and disaster recovery.

10.4.2 Supporting Documents

- Technical Architecture diagram with integration approach
- Infrastructure and network architecture diagram

10.5 RFP Annexure Template – Form 5

10.5.1 Functional coverage

Release (1/2)	Solution	Can be covered in scope?	In-house or out-sourced	Delivery mode (Build/ OOTB/ Hybrid)	License Name	Eco-system Name	Standards compliance (ISO 19650, PMBOK, IFC, etc.)	Imple-mentation approach	Prior imple-mentation reference
Release 2	3D BIM								
Release 2	Automated BoQ/Takeoff								
Release 2	Integrated Design & Review Platform								
Release 1	Document & Workflow Digitization								
Release 1	Daily Update Digitization								
Release 2	Tool-based Scheduling & Monitoring								
Release 1	Digital Inspection Checklist								
Release 2	Invoice & Variation Digitization								
Across Release 1 and Release 2	Progress Monitoring Dashboards								

10.5.2 Integration Across Modules

Release	Solution	Native integrations (which modules, which ecosystem)	Integration Required (which modules/ solutions)	Integration approach	Relevant integration experience
Release 2	3D BIM				
Release 2	Automated BoQ/Takeoff				
Release 2	Integrated Design & Review Platform				
Release 1	Document & Workflow Digitization				
Release 1	Daily Update Digitization				
Release 2	Tool-based Scheduling & Monitoring				
Release 1	Digital Inspection Checklist				
Release 2	Invoice & Variation Digitization				
Across Release 1 and Release 2	Progress Monitoring Dashboards				

Also, mention the total number of ecosystems involved

10.5.3 New Age Technology & Analytics

Release	Solution	OOTB/Custom build?	Analytics algorithm/model proposed	Analytics approach	Relevant experience
Across releases	Progress monitoring dashboards				

Also list down the new age capabilities (associated with AI/Gen AI etc.) that are possessed by the firm with the applicable use case for BMRCL (preferably with previous implementation examples)

10.5.4 Utilization & Methodology of Licenses

Release	Solution	License Type (SaaS/ Perpetual)	Estimated No. of Licenses	Deviations/ assumptions	Approach to optimize recurring license / subscription / access / infrastructure costs	Client reference for such optimization
Release 2	3D BIM					

Release	Solution	License Type (SaaS/ Perpetual)	Estimated No. of Licenses	Deviations/ assumptions	Approach to optimize recurring license / subscription / access / infrastructure costs	Client reference for such optimization
Release 2	Automated BoQ/Takeoff					
Release 2	Integrated Design & Review Platform					
Release 1	Document & Workflow Digitization					
Release 1	Daily Update Digitization					
Release 2	Tool-based Scheduling & Monitoring					
Release 1	Digital Inspection Checklist					
Release 2	Invoice & Variation Digitization					
Across Release 1 and Release 2	Progress Monitoring Dashboards					

10.5.5 Quality of IPMS Solutioning

Release	Solution	Native integ-rations (which modules, which eco-system)	Custo-mization needed	Open APIs available	Number of comp-anies using the license	Built-in Analy-tics / hosting and deploym ent model	Offline capability?	Mobile comp-atible?	Avail-ability of know-ledge base & docu-mentation
Release 2	3D BIM								
Release 2	Automated BoQ/Takeoff								
Release 2	Integrated Design & Review Platform								
Release 1	Document & Workflow Digitization								
Release 1	Daily Update Digitization								
Release 2	Tool-based Scheduling & Monitoring								
Release 1	Digital Inspection Checklist								

Release	Solution	Native integ-rations (which modules, which eco-system)	Custo-mization needed	Open APIs available	Number of comp-anies using the license	Built-in Analy-tics / hosting and deploym ent model	Offline capability?	Mobile comp-atible?	Avail-ability of know-ledge base & docu-mentation
Release 2	Invoice & Variation Digitization								
Across Release 1 and Release 2	Progress Monitoring Dashboards								

10.6 RFP Annexure Template – Form 6

10.6.1 Project Plan & Delivery

ID	Parameter	Response
1	Summary of 5-month project delivery plan with milestones & timelines of develop, test, rollout and support	
2	Resource management strategy	
3	Agile methodology - proposed structure, ceremonies & tools	
4	Examples/References	

10.6.2 Capacity Build & Training

ID	Parameter	Response
1	BMRCL capacity build strategy	
2	Training plan, material & schedule	
3	Knowledge Transfer & handover plan	
4	References/examples	

10.6.3 Maintenance & Support

ID	Parameter	Response
1	Support framework (helpdesk/SLAs)	
2	Maintenance & Operations Plan	
3	Security & Reliability management plan	
4	Relevant Past experience	

10.6.4 Documentation

ID	Parameter	Response
1	List of Documents	
2	Documentation plan	
3	References attached	

10.6.5 Supporting Documents

- 5-months Project Schedule/Workplan on MS projects/equivalent tool
- Reference & Templates for Documentation

10.7 RFP Annexure Template – Form 7

10.7.1 Proposed Team Structure

ID	Type of Role	Role	Will be interviewed?	Number of resources	Skillset
1	Tech Development	Project Lead/ Manager	Yes		
2	Tech Development	Solution / Infrastructure Architect	Yes		
3	Tech Development	Integration Architect	No		
4	Tech Development	Delivery Manager	No		
5	Tech Development	Advanced analytics/ AI and new age applications expert	No		
6	Tech Development	Technology Lead (Front end, back ends, Apps)	-		
7	Tech Development	Business Analyst/PO	-		
8	Tech Development	App Developer	-		
9	Tech Development	UI/UX Engineer	-		
10	Tech Development	QA Engineer	-		
11	Tech Development	IT Security	-		
12	Subject Matter Expert	Metro/Infra mgmt. expert	No		
13	Subject Matter Expert	Construction mgmt. expert	-		
14	Subject Matter Expert	BIM expert	No		
15	Subject Matter Expert	Project controls expert	No		
16	Subject Matter Expert	Contracts/procurement expert	-		
17	Others	Others (Specify)	-		

10.7.2 Proposed Team Members

ID	Name (Optional)	Surname (Optional)	Role in the Project	Educational qualification	Total years of experience	Tenure with the Digital Partners organization/entity	IPMS experience (years)	Base location	Certifications	List main relevant projects for the scope of this RFP, incl. project descriptions, starting/ending periods, designation & role played by the person in this project, client/industry, and key impact to business/tech performance (max 500 words each)		
										Project 1	Project 2	Project 3
1												
2												

- It is mandatory to add Information of the named experts who are subject to technical evaluation in the above table; The information on other team members can also be added
- Attrition or replacement of any of the named experts on or after the date of Technical Presentation should be honored within two weeks. Resources must be replaced with a resource of equal or higher competence. The replacement of the resource shall be interviewed by evaluation team prior to the final hiring.

10.8 RFP Annexure Template – Form 8

10.8.1 Total Costs for 5 months (Contract Period)

ID	Description	Cost (USD) inclusive of all taxes
1	Implementation	
2	Licenses	
	Total	

10.8.2 Total Costs post contract period

ID	Description	Cost (USD) inclusive of all taxes
1	Licenses	
2	Maintenance & Support	
	Total	**0**

10.8.3 Commercial Bid – NPV of 3 year TCO

ID	Description	Cost (USD) inclusive of all taxes
1	Implementation + Licenses	0
2	Licenses + Maintenance & Support	0
3	Licenses + Maintenance & Support	0
4	Maintenance & Support	0
	Total NPV of 3yr TCO (@10% IRR)	**$**

10.9 RFP Annexure Template – Form 9

10.9.1 Implementation/ Build Cost

ID	Solution	Particulars	Number of Person-days (X)	Blended Person-day rate (Y)	One Time Development Cost (Z) = (X) * (Y)	Taxes (A)	Total Cost (USD)inclusive of all taxes (B) = (Z) + (A)	Remarks/Assumptions
1	3D BIM							
2	Automated BoQ/ Takeoff							
3	Integrated design & review platform							

ID	Solution	Particulars	Number of Person-days (X)	Blended Person-day rate (Y)	One Time Development Cost (Z) = (X) * (Y)	Taxes (A)	Total Cost (USD)inclusive of all taxes (B) = (Z) + (A)	Remarks/Assumptions
4	Document & workflow digitization							
5	Daily update digitization							
6	Tool-based scheduling & Monitoring							
7	Digital Inspection Checklist							
8	Invoice & Variation digitization							
9	Progress monitoring dashboards							

Note: Provide tentative estimate of resources by category of skill set & profession. Ex: Project Manager, Solution architect, Developers, etc.

10.10 RFP Annexure Template – Form 10

10.10.1 License Cost during Period of implementation

ID	Solution	Software tool with Version	License type (Perpetual/ sub-scription/ User based)	Number of licenses	License Duration	Total cost	Assumptions/Terms & conditions
1	3D BIM						
2	Automated BoQ/ Takeoff						
3	Integrated design & review platform						
4	Document & workflow digitization						
5	Daily update digitization						
6	Tool-based scheduling & Monitoring						
7	Digital Inspection Checklist						
8	Invoice & Variation digitization						
9	Progress monitoring dashboards						

10.10.2 License Cost post Period of implementation

ID	Solution	Software tool with Version	License type (Perpetual/ subscription/ User based)	Number of licenses	License Duration	Cost per license (Considering no lock-in)	Cost per license (Considering 2-3yrs lock-in)	Cost per license (Considering 4-5yrs lock-in)	Total cost (Considering no lock-in)	Total cost (Considering 2-3yrs lock-in)	Total cost (Considering 4-5yrs lock-in)	Assumptions/Terms & conditions
1	3D BIM											
2	Automated BoQ/ Takeoff											
3	Integrated design & review platform											
4	Document & workflow digitization											
5	Daily update digitization											
6	Tool-based scheduling & Monitoring											
7	Digital Inspection Checklist											
8	Invoice & Variation digitization											
9	Progress monitoring dashboards											

10.11 RFP Annexure Template – Form 11

10.11.1 Support & Maintenance Rate Card as per Role

ID	Role	Monthly Rates (in USD) inclusive of taxes
1	Project Manager	
2	App Developers	
3	Backend engineers	
4	Support Engineer	
5	Technical support staff	
6	QA Engineer	
7	Others (Specify)	

10.11.2 Breakdown of Support & Maintenance Services

ID	Service type	Description	Response time	Any associated terms & conditions
1				
2				
3				

10.11.3 Maintenance of Software, Tools & Licensing Co st

ID	Solution	Software tool with Version	License type (Perpetual/ subscription/ User based)	Number of licenses	License Duration	AMC cost per license (Considering no lock-in)	AMC cost per license (Considering 2-3yrs lock-in)	AMC cost per license (Considering 4-5yrs lock-in)	Total cost (Considering no lock-in)	Total cost (Considering 2-3yrs lock-in)	Total cost (Considering 4-5yrs lock-in)	Assumptions/T erms & conditions
1	3D BIM											
2	Automated BoQ/ Takeoff											
3	Integrated design & review platform											
4	Document & workflow digitization											
5	Daily update digitization											
6	Tool-based scheduling & Monitoring											
7	Digital Inspection Checklist											
8	Invoice & Variation digitization											
9	Progress monitoring dashboards											

10.12 RFP Annexure Template – Form 12

10.12.1 Rate Card

ID	Role	Rates per hour (in USD)
1	Project Director	
2	Project Manager	
3	Integration Architect	
4	Scrum Master	
5	Ops Lead	
6	Engineering Manager	
7	Technology Manager	
8	Sr. Software Architect	
9	Sr. Business Analyst	

ID	Role	Rates per hour (in USD)
10	Business Analyst	
11	Sr. Flutter Developer	
12	Sr. Java Developer	
13	Java Developer	
14	Sr. Data Engineer	
15	Data Engineer	
16	Sr. DevOps Engineer	
17	DevOps Engineer	
18	Sr. QA Engineer/Tester	
19	QA Engineer/Tester	
20	UI/UX Designer	

10.13 RFP Annexure Template – RFP Query Format

Query Submission Format

Sr. No.	Section in RFP	Sub section in RFP	Excerpts from the RFP	Page No.	Detailed query	Justification

11 Appendix 2: Declaration by Digital Partner

We have fully understood the terms and conditions outlined in the RFP Document and hereby accept and agree to comply with these terms and conditions without any reservations.

We also confirm the validity, truthfulness, and correctness of scanned copies of documents, affidavits, and undertakings uploaded during the shortlisting process and for this RFP, to the best of our knowledge and belief. We will bear responsibility for any disputes regarding the validity and truthfulness of such documents, affidavits, and undertakings, and commit to providing originals and self-certified copies of all such documents for scrutiny upon demand.

We further confirm that should our bid be accepted; we agree to adhere to all such terms and conditions in the resultant Contract. We undertake to treat this Bid/RFP and your written Letter of Award as a binding Contract between us until a formal Contract is signed or issued.

We hereby confirm that the information provided above is accurate and complete, with no concealment of facts, and commit to informing you of any future changes to these details. We understand that any

misinterpretation or misrepresentation will be considered a violation of the Code of Integrity and may lead to legal actions against us.

We confirm that we are duly authorized to submit this Bid and to make commitments on behalf of the Bidder, recognizing that our digital or digitized signature is valid and legally binding, with supporting documents provided herewith.

Rights of JICA to Reject Bid(s):

We understand that JICA is not obligated to accept the lowest or any bid received in response to the RFP Document.

(Signature with date)

(Name and designation, duly authorized to sign Bid for and on behalf of the Bidder)
(Name, address, and seal of Bidder]