

Work Plan No A.21-01 Asset Management Support Services

Scope:

Task 0 – Project Planning and Kick-Off

The goal of this task is to gather the initial information required to customize a training program relevant to the stakeholders and prepare for starting work on asset strategies. Arup will lead this task with support from sub-contractors as needed.

Based on the prioritized 5 asset classes and related stakeholder groups as well as information collected on each asset class's needs/concerns/gaps by BART Operations Planning, we will align with BART the desired outcome of the Asset Class Strategy pilots and finalize each pilot's Asset Management training program in Task 1 and prepare for strategy development.

We will support BART Operations Planning in the development of the Project Plan and agree the sequence of pilot implementation and refine the Project Schedule.

This work task will include:

- Kick-off meeting to identify stakeholders and prioritized asset classes
- Support up to five interviews with stakeholder groups to identify current state, support needs/concerns/gaps, training requirements, and potential asset classes for consideration
- Development of training plan including schedule and stakeholder groups

Deliverables:

- Asset Management overview training plan including training contents, attendees, schedules, desired outcomes
- Subsequent Pilot-based Implementation training plan (inc. Lean/Change management) including training contents, attendees, schedules, desired outcomes
- Project Plan and Refined Schedule

Assumptions:

- BART Operations Planning to provide 5 priority asset classes (We would recommend identifying asset classes that may pose a high likelihood of risk to BART, whether it be risks associated with safety, service delivery, passenger experience or unexpected costs.)
- BART Operations Planning to provide internal BART stakeholder list and contacts

Task 1 – Assets Strategy

The goal of this task is to develop and document a strategic approach to asset interventions throughout their lifecycle and equip BART staff with the knowledge they need to implement within their respective groups. Arup will lead this task with support from AMCL and CodeRed.

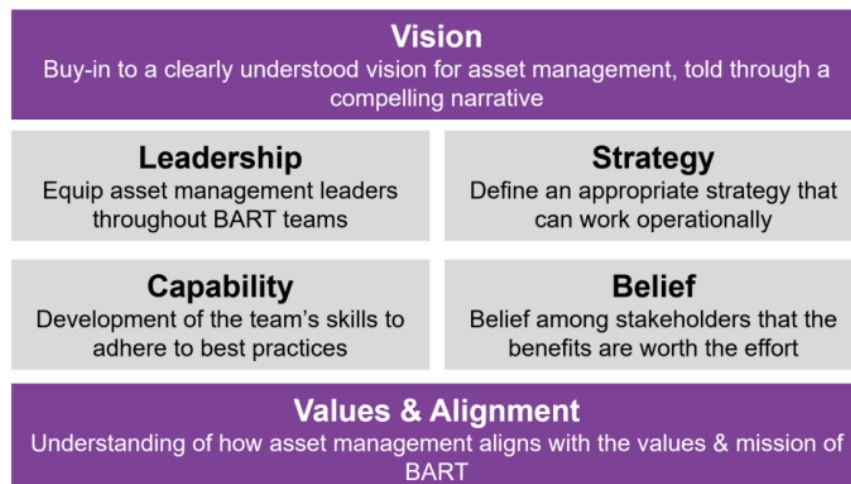
Training

Each group shares a role in the success of asset management at BART. Throughout this task, we, together with BART, will focus on the 5 Asset Class Strategy pilots to train and engage representatives to carry out asset management best practices within their areas of expertise and responsibility. BART staff will provide input to shape the training content and set up the training sessions.

We will make available four types of training to support the 5 asset class pilots, the contents and sequence of which will be informed by Task 0 and co-produced by BART and our team.

1. **Asset Management Refresher:** This 1-day refresher training is for experienced asset management practitioners who are already certified or have received formal training in the past. It aligns to best practices of ISO 55000 and serves to reinforce the foundational knowledge of applying asset management best practices.
2. **Asset Management Basics:** This 4-day training covers the content from the Institute of Asset Management (IAM) certificate level exam. It aligns to best practices of ISO 55000 and serves to give attendees a foundational knowledge in applying asset management best practices.
3. **Strategic Maintenance Principles (RCM):** This will be a deeper dive into RCM principles and how to structure maintenance planning efforts based on potential failure modes and consequences.
4. **Lean Principles and Change Management:** This will be a deeper dive into lean principles and change management during the implementation stage of the 5 Asset Class Strategy pilots, to enable the stakeholder groups to plan the work to meet the new requirements.

The skills provided in training are one part of developing a successful asset management team. In addition to technical skills and an understanding of best practices, attendees should also understand how asset management aligns with the broader vision for success at BART.



Create Standardized Strategic Approach for Asset Classes

Arup will review the existing Asset Class Strategy template based on BART's needs and the stakeholder group inputs, and provide recommendations for potential improvements. The goal of the Asset class strategies is to serve as a tool for stakeholders to create a living document which they will maintain using the skills acquired in the training sessions. The template will continue to be refined through lessons learned during the development and implementation for the pilot asset classes.

All asset management strategy documents should specify how organizational objectives are converted into asset management objectives specific to the asset class. These strategy documents are intended to serve as a starting point from which more detailed asset management plans that define specific roles, resources, and timescales can be created.

This will include:

- Review outcomes from existing maturity assessment to identify additional gaps related to asset management strategies
- Provide comments and recommendations to the Asset Class Strategy template
- Create preferred Implementation Workflow for the 5 pilot asset class strategies based on BART's needs and stakeholder group inputs
- Hold meeting with AM champions within stakeholder groups to review suggested Implementation Workflow and standardized template

Implement Standardized Strategic Approach for Asset Classes

A total of five asset classes will be provided by BART to use as pilot cases. For these asset classes, Arup will work together with stakeholders to populate the Asset Class Strategy template and outline an approach to implementing within the relevant teams.

Based on insights from stakeholder engagement and feedback from the attendees at the Strategic Maintenance Principles training, a list of RCM pilot project recommendations will be created.

This task will include:

- Hold working sessions with up to five stakeholder groups for the 5 pilot asset classes to review goals for standardized approach to asset management planning and populate the Asset Class Strategy template
- Work with appropriate team to workshop effective RCM-based asset management strategies for risk mitigation/minimization for pilot asset class - this will tie into reviewing asset information management, maintenance strategies, risk evaluations, potential identification of templates/tools that need to be developed and similar
- In collaboration with stakeholders, prepare Draft and Final Asset Class Strategy for each of the five asset classes
- Work with stakeholders to outline the implementation approach and sequence to meet the new requirements in the Asset Class Strategy

Continued Improvement

In year 2, a scope will be detailed and agreed upon with BART to continue the implementation of the asset class strategies based on progress made in year 1 following the training sessions. This will be informed by lessons learned in this phase and any needed revisions to the impacted business processes.

Deliverables:

- Lead Asset Management Basics training course (maximum 3 classes of 20 people each)
- Lead Strategic Maintenance Principles (RCM) training course
- Support and help facilitate Lean Principles and Change Management training course led by BART Performance & Innovation team
- Asset Class Strategy template recommendations
- Asset Class Strategy pilot and documents
- Scope for year 2 asset strategy

Assumptions:

- BART Operations Planning to support organizing training sessions with BART staff (scheduling, invites)
- BART Operations Planning to participate in shaping training content based on organizational goals
- BART Performance & Innovation team to provide existing Lean training materials for adaptation and lead the Lean Principles and Change Management training

Task 2 – Asset Data Improvements

The goal of this task is to standardize and document the data requirements embedded in decision-making processes, with considerations for data flows, data architecture, and analytics for predictive maintenance and operational post-processing. Arup will lead this effort with support from CodeRed.

Develop a Strategic Approach to Asset Data Requirements

As part of the 5 Asset Class Strategy pilots, Arup will start developing a new approach towards Asset Data to meet the new requirement and identify the changes needed to BART's existing processes for collecting and maintaining asset data across the asset lifecycle. This will include the types of data collected, how it is structured, and where it is stored. The new workflow processes will be documented alongside the new asset data strategy document.

An important consideration is clearly documented data governance. Arup will gather feedback on any existing data governance in place currently and identify gaps to bridge stakeholder's operational needs and asset management decision making. Data governance will be included in the asset data strategy document.

There may also be gaps in data needed to make informed decisions. By comparing the data available against the data required, Arup will identify gaps and include the data requirements in a document mapping the decision-making processes against the data needs.

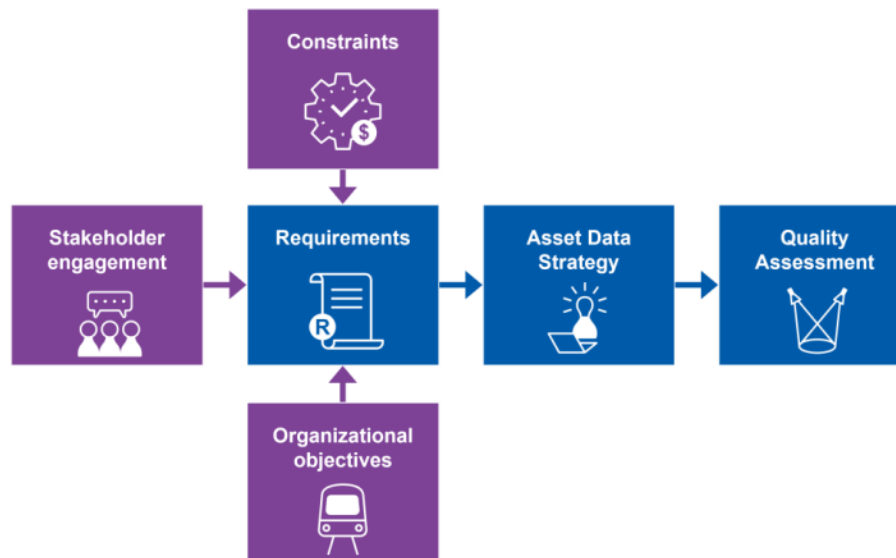
This will include:

- Identify BART's existing decision-making business processes as they relate to effective asset information management, including governance, how asset data is acquired, naming conventions, workflows, integration with Maximo, how this ties into reporting requirements, etc.
- Hold workshops with BART AM leadership and data stakeholders on the existing asset information management strategies, data governance and identify changes needed to bridge stakeholder's operational needs and asset management decision making
- Develop future state Asset information/data requirements and workflow.

Asset Data Strategy will be based on effective risk mitigation/minimization and fold in lessons learned from the existing maturity assessment (connecting all projects to BART's goal in a data-driven way). The data needs will partly be informed and supported by the work done on Asset Class Strategies, in addition to broader asset data management requirements.

Recommendations for Improving Data Quality

Following the 5 Asset Class Strategy Pilots, based on a combination of stakeholder discussions and review of data in Maximo and other asset information systems, Arup will map out the roles and responsibilities related to data ownership, collection, updates, storage, quality control, and reporting. This will be informed by an understanding of the capabilities of existing asset information systems and the limitations within those systems. We will identify data or analytics quality challenges and will make recommendations on changes needed to implement future improvements.



Informing both the data requirements and best practices documents will be the data needs to establish predictive maintenance, particularly as it relates to the five key asset classes from Task 1. This may include needs for real-time data feeds or analytical models based on a combination of data sources. There will also be data needs related to reporting on asset failures as they occur, as well as data needed to perform a root cause and other analysis to learn from the failure and adjust preventative and predictive maintenance practices to avoid future failures.

This will include:

- Across BART asset information systems, assess current workflows, data quality, and identify key data points from an AM perspective
- Review existing asset information and identify data gaps
- Evaluate asset information system capabilities and limits
- Make recommendations regarding asset information management to improve/support predictive maintenance. This could result in eventual changes to or creation of modeling tools, dashboards, new reporting metrics/KPIs, developing asset failure reporting with advanced metrics, etc. NOTE: Implementation of recommendations would occur in year 2.

Continued Improvement

In year 2, a scope will be detailed and agreed upon with BART to continue the implementation of the asset data strategies based on progress made in year 1. This will involve further adjustments to recommendations for better alignment with whole lifecycle management of assets.

Deliverables:

- Asset data strategy document
- Documented Data Architecture, Flows and Outputs requirements
- Decision-making processes amended with Data requirements sections
- Best practices of processes, tools, models and associated roadmaps to improve data capture and analytics including details for pilot asset class
- Scope for year 2 asset data improvements

Assumptions:

- BART Operations Planning to provide internal BART stakeholder list and contacts

Task 3 – Asset Management Program Assessment

The goal of this task is to improve the structure of BART's asset management program. This will be progressed through clear documentation and assessment following asset class strategy pilots.

Asset Management Document Library

Review any current asset management documents and templates and create a shared register for use by all stakeholder groups. Where BART does not have existing documents or templates in place, recommendations will be made based on the Asset Class Strategy and the Asset Data Strategy. Arup will work with BART to prioritize the recommended documents for future development.

This will include:

- Review current AM and related documents and templates and create a shared register amongst stakeholder groups (in alignment with current state assessment in programmatic kickoff)
- Identify gaps against outcomes from maturity assessment, Asset Class Strategy and Asset Data/Information Strategy and create a wish list of standard AM documents and templates and help BART prioritize the list

- Define the outline of prioritized AM documents and template and develop a plan to produce them
- Provide recommendations on creating a centralized document library for all asset management documents that can be easily referenced

Perform a Maturity Assessment of the Asset Management Program (Year 2)

Together with BART, Arup will identify relevant and key capabilities, metrics, and goals for evaluation and benchmarking of maturity. This will be intended to build upon past maturity assessments undertaken by BART and other consultants and will take place after the asset class strategy pilots. Where relevant, it may be desirable to compare against similar transit agencies to learn from peers in addition to traditional benchmarking against ISO and IAM recommendations. After review of desired comparisons and outcomes, Arup will undertake the benchmarking analysis and provide a report of the latest findings highlighting changes since the last benchmarking exercise and changes that have occurred as part of this project's progress.

This will include:

- Review prior benchmarking studies to inform/provide a consistent approach to metrics and benchmarking approach
- Identify relevant or key capabilities/metrics/goals for evaluation for benchmarking maturity
- Identify benchmarking process & potential agencies for comparison
- Conduct benchmarking analysis and provide summary report (including showing changes to AM maturity over time based on previous assessments)

Continued Improvement

In year 2, in addition to the maturity assessment, a scope will be detailed and agreed upon with BART to continue to refine standard documents and templates, and to perform a gap analysis against what would be needed to achieve ISO 55000 certification.

Deliverables:

- AM program documentation and templates
- Maturity assessment of the AM program

Assumptions:

- BART Operations Planning to provide previous maturity assessment

Prime: Arup North America Ltd.

Subconsultant	Amount	DBE (Y/N)	SBE (Y/N)
Turner & Townsend AMCL, Inc.	\$ 125,294	N	N
CodeRed	\$ 138,074	Y	Y

Total Work Plan Value: \$ 764,296