F I N A L

Asset Management Current Situation Analysis and Improvement Plan

Prepared for

Discovery Clean Water Alliance

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Acronyms and Abbreviations

the Alliance	Discovery Clean Water Alliance
AM	Asset Management
AMP	Asset Management Plan
BCE	Business Case Evaluation
CAMRA	Comprehensive Asset Management Review and Assessment
CIP	capital improvement plan
CIS	Customer Information System
CMMS	Computerized Maintenance Management System
COF	consequence of failure
District	Clark Regional Wastewater District
GIS	geographic information system
IIMM	International Infrastructure Asset Management Manual
ISO	International Standards Organization
IT	Information Technology
KFA	Key Focus Area
LOF	likelihood of failure
LOS	level of service
MPulse™	Brand name of Microsoft asset management software
O&M	operations and maintenance
RACI	Responsible, Accountable, Consulted, and Informed
RTPO	Ridgefield Treatment Plant and Outfall
SCTP	Salmon Creek Treatment Plant
SCTPO	Salmon Creek Treatment Plant and Outfall
SOP	standard operations procedure
SRF	State Revolving Fund
WLC	whole life cost
WIFIA	Water Infrastructure Finance and Innovation Act (U.S. Environmental Protection Agency)

SECTION 1

Introduction

The Discovery Clean Water Alliance (the Alliance) retained CH2M to review and assess the current state of asset management practices and capabilities, and develop a "roadmap" to guide the Alliance in improving the management of its infrastructure assets. This report identifies the gaps in the current manner in which assets are managed as compared to best asset management practices, and recommends initiatives that the Alliance should implement to close these gaps over time. The recommended initiatives are prioritized and assigned to 2-year intervals that coincide with the Alliance's biennial budget period. As such, they establish a project improvement plan that applies modern asset management principles and practices.

1.1 Background

The Alliance is a regional wastewater agency partnership established in January 2013, pursuant to Revised Code of Washington Chapter 39.106, Joint Municipal Utility Services (RCW 39.106). The Member agencies of the Alliance are the Clark Regional Wastewater District (District), Clark County, the City of Ridgefield, and the City of Battle Ground. An interlocal formation agreement between these agencies forms the framework under which the Alliance operates.

The Alliance provides wastewater transmission and treatment for the urban growth areas managed by Clark County, Washington, as well as for the City of Ridgefield and the City of Battle Ground. However, the infrastructure assets within the service area are operated and maintained by the different Members as shown in Table 1-1. Figure 1-1 shows the service area of the Alliance as well as the ownership of assets.

Table 1-1. Ownership and Operation and Maintenance of Alliance Assets

Asset	Ownership	Operation & Maintenance by:
Salmon Creek Interceptor	Alliance	Clark County
Klineline Interceptor	Alliance	Clark County
36th Avenue Pump Station	Alliance	Clark County
117th Street Pump Station	Alliance	Clark County
36th Avenue Force Main	Alliance	Clark County
117th Street Pump Station Force Main	Alliance	Clark County
Salmon Creek Treatment Plant and Outfall (SCTPO)	Alliance	Clark County
Ridgefield Treatment Plant and Outfall (RTPO)	Alliance	City of Ridgefield
Battle Ground Force Main	Alliance	Clark County
Ridgefield Wastewater Collection System	District	District
Battle Ground Collection System	City of Battle Ground	City of Battle Ground
District Collection System (Clark County Urban Area)	District	District

The governance structure of the Alliance (Figure 1-2) is complex as well. The Board of Directors is made up of four elected officials, a District Commissioner, a Clark County Councilor, a City of Battle Ground Council member and the Mayor of the City of Ridgefield. The Alliance has no employees, but the functions of the Alliance are delivered by employees of the Members. The Alliance is administered by the District.

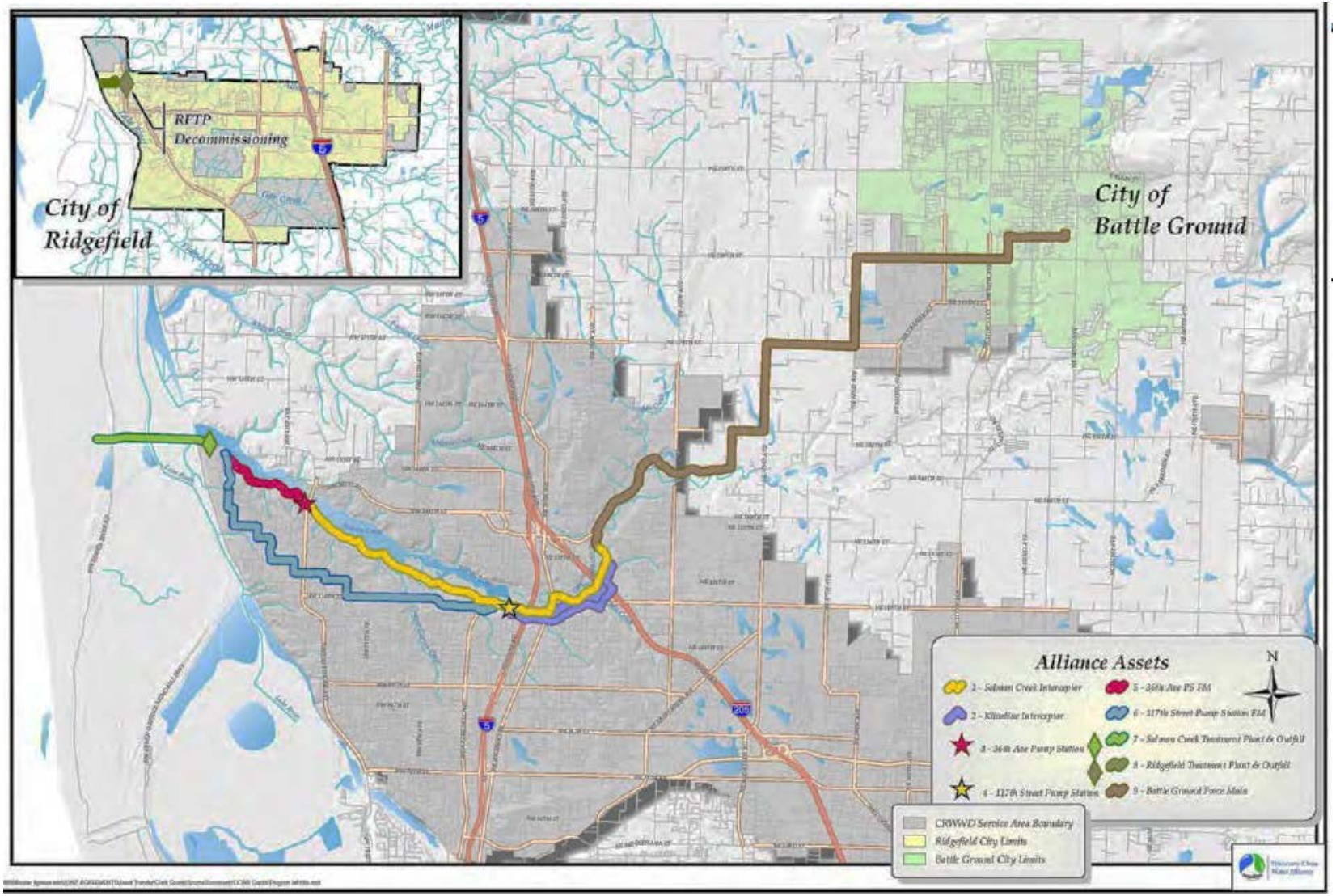

Figure 1-1. Discovery Clean Water Alliance Assets and Member Service Areas

Source: Discovery Clean Water Alliance 2017-2018 Adopted Capital and Operating Budget

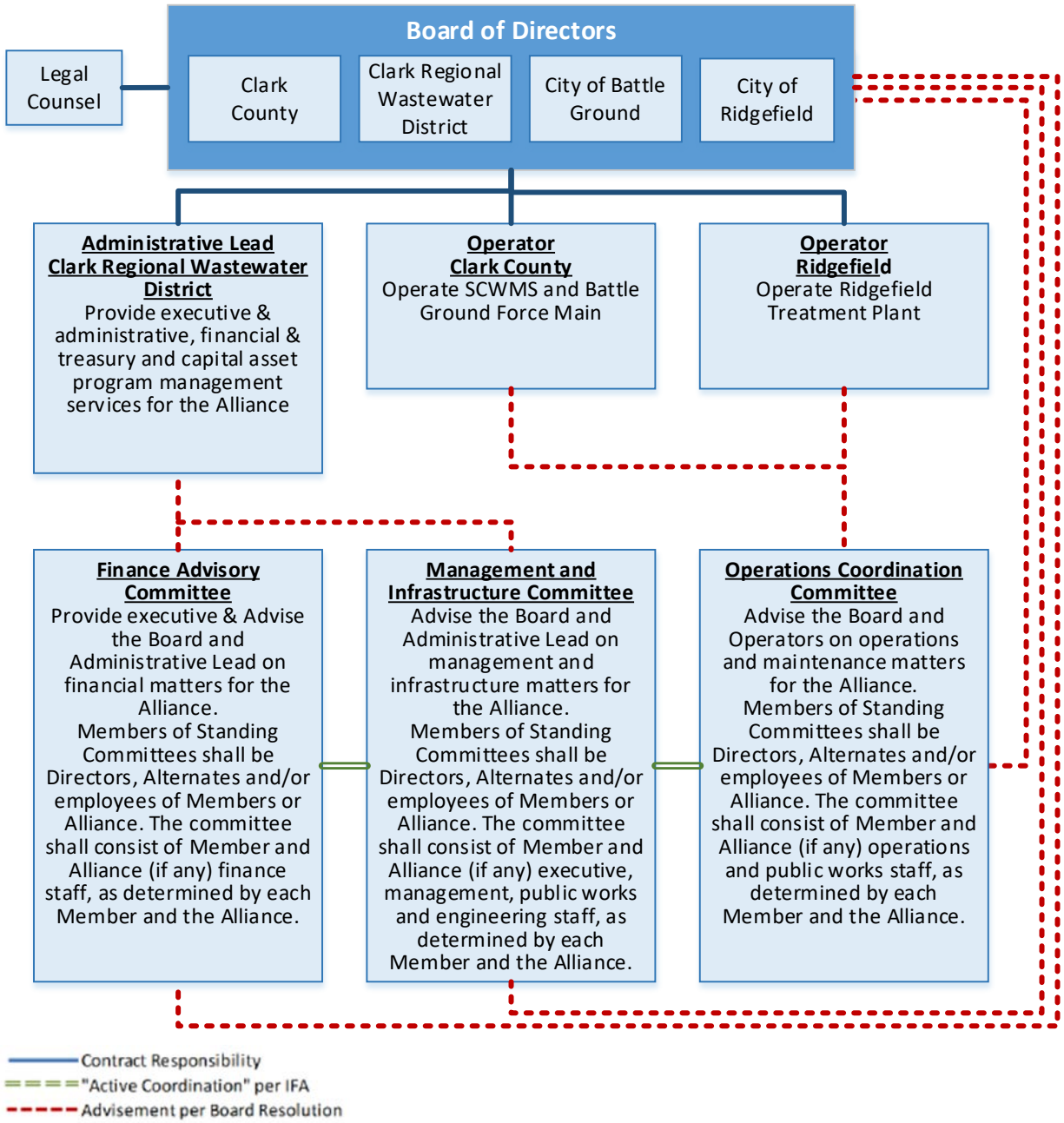

Figure 1-2. Discovery Clean Water Alliance Governance Structure

Source: Discover Clean Water Alliance 2017–2018 Adopted Capital and Operating Budget

SCWMS = Salmon Creek Wastewater Management System

1.2 Foundational Elements of Asset Management

Over the past few decades, the management of infrastructure assets has advanced significantly. In the 1980s, both Australia and the United Kingdom restructured the water sector in their countries. This restructuring led to utilities being held more accountable for delivering quality services to their customers while keeping rates as low as practical. As a result, the water sector began adopting new approaches to making better decisions for investment in infrastructure.

By the year 2000, several guidance documents were published in Australia, New Zealand, and the United Kingdom, describing key principles for better managing infrastructure assets and providing methods for gaining the most value from those assets. These principles and methods made their way to the United States in the early 2000s with U.S.-centric asset management publications, and by 2010 water sector utility managers were becoming aware of how the implementation of asset management principles and practices could help improve service levels, improve reliability of service, and lead to making more rigorous and defensible decisions in both capital and operational spending.

In 2014, the International Standards Organization (ISO) released the first international standard for asset management, ISO 15000. As with other ISO standards, ISO 15000 is a "management system." A management system is the way in which an organization manages the inter-related parts of its business in order to achieve its objectives.[1]

Benefits of Adopting Asset Management Principles and Practices

- Informed and defensible asset investment decisions
- Better managed risk
- Improved asset reliability
- Improved efficiency and effectiveness
- Improved service delivery
- Improved customer satisfaction
- Improved regulatory compliance
- Improved bond rating
- Possible higher priority ranking for SRF and WIFIA
- Improved internal coordination and communication
- Overall enhanced reputation

ISO 55000 includes three parts: (1) ISO 55000 provides an overview of the standards, asset management principles and terminology; (2) ISO 55001 stipulates the asset management system requirements, and (3) ISO 55002 offers guidelines for the application of the requirements included in ISO 55001. While organizations can eventually achieve certification in the ISO standard, most water sector utilities are using the standard to incorporate the best-in-class principles and practices included in ISO 55000, 55001 and 55002 to improve service and optimize investments.

ISO 55000 defines asset management as the "*coordinated activity of an organization to realize value from assets,*" and further states that "a*sset management involves the balancing of costs, opportunities and risks against the desired performance of assets, to achieve the organizational objectives*."[2] As such, coordinated activities, realizing value from assets, using risk management to balance the objective of delivering established levels of service while minimizing lifecycle costs, are the cornerstone principles of asset management.

1.3 Asset Management Maturity Level

Because assets fundamentally exist to provide value to customers and other stakeholders, as well as the environment, asset management is very much focused on understanding the connection between the assets and the service they provide, with ultimately all investment linked to either maintaining or enhancing service. In addition, people "do" asset management and, therefore, the quality of asset management is reliant on people, their knowledge, competence, motivation, and teamwork. To be truly effective, asset management needs to be multi-disciplinary, involving many parts of the organization including, but not limited to, leadership and management, finance, planning, engineering, operations, and maintenance.

Within a public agency context, the customers, stakeholders, elected and appointed officials, and regulators usually expect good to best asset management practice. Consequently, understanding how to define asset management, how well is it being practiced, and what is "good practice" is important.

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[1] Management system standards. (2017, April 10). Retrieved June 15, 2017, from https://www.iso.org/management-system-standards.html

[2] Asset management: BS ISO 55000:2014, BS ISO 55001:2014 and BS ISO 55002:2014. (2014). London: BSI Standards Ltd.

With this in mind, the Alliance decided to engage in an asset management maturity assessment to obtain a better understanding of its capabilities and competencies with regard to asset management. There are a few approaches available to carry out asset management assessments; the times for the assessments range from a few hours to nearly a week. The Alliance chose to undertake a 4-hour Comprehensive Asset Management Review and Assessment (CAMRA) developed by CH2M. This 4-hour approach was an efficient investment that provided initial awareness for Alliance Member agencies of Asset Management programmatic principles and practices. Furthermore, it aligned with the current capacity of the Member agencies to support Asset Management program development in its early stages.

CAMRA was used to obtain an understanding of the current level of maturity, when assessed against 38 themes spread over the following seven Key Focus Areas (KFAs) of asset management:

1. Organizational Context
2. Asset Management Vision and Leadership
3. Asset Management Objectives and Targets
4. Asset Management Information Requirements
5. Planning to Achieve Asset Management Objectives
6. Operational Planning and Control
7. Asset Management Enablers and Support

These seven KFAs are aligned to the content of ISO 55001; however, the 38 questions and the KFAs above have been developed to specifically focus on asset management in a public-sector environment. CAMRA, therefore, focuses on the intent of the international standard, but is not intended to be a formal assessment against the standard

CAMRA provides the means for the Alliance to identify its "maturity level" in each of the 38 themes. The maturity level is based on a five-point Asset Management Maturity Scale as shown in Figure 1-3.

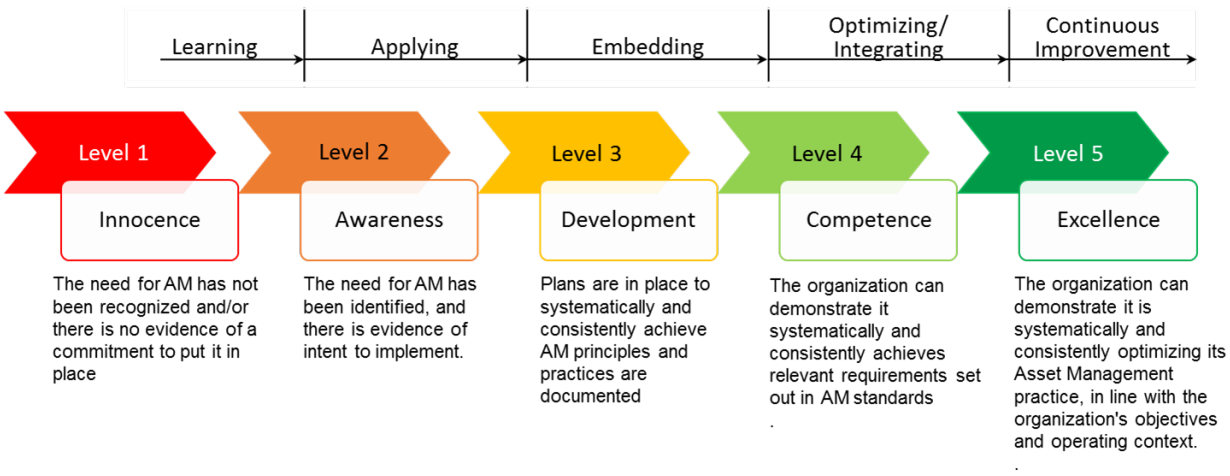


Figure 1-3. Asset Management Maturity Scale

AM = asset management

SECTION 2

Assessing Asset Management Maturity

CAMRA focuses on asset management practices, not assets. It provides a baseline for an action plan to address key gaps, as well as identifying strengths. It is workshop-based with the objective to capture a single maturity level score by consensus of workshop participants for each of the 38 themes. At the workshop, an Excel-based tool, the CAMRA tool, developed by CH2M, is used to record and evaluate the input from the participants.

2.1 Results from the CAMRA Workshop

The CAMRA workshop was held on June 8, 2017, at the District office of the Clark Regional Wastewater District. There were 12 participants from the Alliance's member agencies that provide services to the Alliance: the Clark Regional Wastewater District, Clark County, and the City of Ridgefield. Currently, the City of Battle Ground is not contracted as a service provider for the Alliance. Attendees represented leadership, management, administration, finance, planning, engineering, operations and maintenance (O&M). The workshop was facilitated by CH2M. material from the workshop is provided in Appendix A.

2.1.1 Current Level of Maturity

The Alliance's current maturity level over the 38 themes ranged from Level 1 (Innocence) to Level 5 (Excellence), with a median of Level 2 (Awareness). Several themes were found to be at Level 1, while only one theme – Legal, Regulatory & Statutory Requirements – was determined to already be at Level 5, Excellence. Table 2-1 and Figure 2-1 show the current maturity levels of the 38 themes.

Table 2-1. Current Maturity Levels of the 38 Themes

Key Focus Areas	Themes	Average Maturity Level				
		Level 1 Innocence	Level 2 Awareness	Level 3 Development	Level 4 Competence	Level 5 Excellence
Organizational Context	Organizational Strategic Plan & Organizational Objectives	✓				
	Understanding the Needs of Stakeholders		✓			
Asset Management Vision & Leadership	Asset Management Policy & Strategic Asset Management Plan	✓				
	Asset Management Leadership & Governance		✓			
	Asset Management Roles & Responsibilities		✓			
	Prioritized Plan for the Development of Asset Management Business Processes & Procedures	✓				
	Prioritized Plan for the Development of Asset Management Skills and Competences	✓				
	Prioritized Plan for Information Technology Functional Requirements	✓				
Asset Management Objectives & Targets	Asset Management Objectives - Performance Metrics/Levels of Service		✓			
	Future Trends (Impact of Growth)				✓	
	Legal, Regulatory & Statutory Requirements					✓
Asset Management Information Requirements	Asset Information Strategy & Asset Information Improvement Plan	✓				
	Asset Inventory		✓			
	Asset Information Standards		✓			
	Asset Information		✓			

Table 2-1. Current Maturity Levels of the 38 Themes

Key Focus Areas	Themes	Average Maturity Level				
		Level 1 Innocence	Level 2 Awareness	Level 3 Development	Level 4 Competence	Level 5 Excellence
	Information Management		✓			
	Asset Knowledge/Analysis of Data		✓			
Planning to Achieve Asset Management Objectives	Asset Strategies		✓			
	Risk Framework - Strategic Level		✓			
	Risk Framework - Asset Level		✓			
	Optimized Asset Intervention Planning			✓		
	Asset Management Plans	✓				
	Capital Investment Plan Development & Governance		✓			
Operational Planning & Control	Capital Projects - Planning, Design, Construction, Commissioning			✓		
	Operations Management			✓		
	Maintenance Management		✓			
	Investigation and Recording of Routine Asset Failures and Reactive Work		✓			
	Contracted Operations and Maintenance			✓		
	Materials Management		✓			
	Emergency Preparedness and Response			✓		
	Investigation of Major Asset Failures & Incidents			✓		
	Shutdown and Outage Management				✓	
Asset Management Enablers & Support	Asset Information Systems Implementation Plan	✓				
	Control of Documented Information		✓			
	Knowledge Retention and Succession Planning		✓			
	Asset Management Quality Assurance & Management Review	✓				
	Continual Improvement Culture		✓			
	Communication and Change Management		✓			

The current maturity levels of the seven KFAs, calculated by averaging the levels of the themes within each KFA, are shown in Table 2-2.

Table 2-2. Current Maturity Level of Key Focus Areas
Determined by Averaging Maturity Levels of Themes within Each Key Focus Area

Key Focus Area	Average Maturity Level		
	Level 1 to Level 2 Innocence to Awareness	Level 2 to Level 3 Awareness to Development	Level 3 to Level 4 Development to Competence
Organizational Context	✓		
Asset Management Vision and Leadership	✓		
Asset Management Objectives and Targets		✓	✓
Asset Management Information Requirements	✓		
Planning to Achieve Asset Management Objectives		✓	
Operational Planning and Control			
Asset Management Enablers and Support	✓		

Key Focus Areas		Theme	
1	Organizational Context	1	Organizational Strategic Plan & Organizational Objectives
		2	Understanding the Needs of Stakeholders
2	Asset Management Vision & Leadership	3	Asset Management Policy & Strategic Asset Management Plan
		4	Asset Management Leadership & Governance
		5	Asset Management Roles & Responsibilities
		6	Prioritized Plan for The Development of Asset Management Business Processes & Procedures
		7	Prioritized Plan for the Development of Asset Management Skills & Competences
		8	Prioritized Plan for Information Technology Functional Requirements
3	Asset Management Objectives & Targets	9	Asset Management Objectives - Performance Metrics/Levels of Service
		10	Future Trends (Impact of Growth)
		11	Legal, Regulatory & Statutory Requirements
4	Asset Management Information Requirements	12	Asset Information Strategy & Asset Information Improvement Plan
		13	Asset Inventory
		14	Asset Information Standards
		15	Asset Information
		16	Information Management
		17	Asset Knowledge/Analysis of Data
5	Planning to Achieve Asset Management Objectives	18	Asset Strategies
		19	Risk Framework - Strategic Level
		20	Risk Framework - Asset Level
		21	Optimized Asset Intervention Planning
		22	Asset Management Plans
		23	Capital Investment Plan Development & Governance
6	Operational Planning & Control	24	Capital Projects - Planning, Design, Construction & Commissioning
		25	Operations Management
		26	Maintenance Management
		27	Investigation and Recording of Routine Asset Failures & Reactive Work
		28	Contracted Operations & Maintenance
		29	Materials Management
		30	Emergency Preparedness & Response
		31	Investigation of Major Asset Failures & Incidents
		32	Shutdown and Outage Management
7	Asset Management Enablers & Support	33	Asset Information Systems Implementation plan
		34	Control of Documented Information
		35	Knowledge Retention & Succession Planning
		36	Asset Management Quality Assurance & Management Review
		37	Continual Improvement Culture
		38	Communication & Change Management

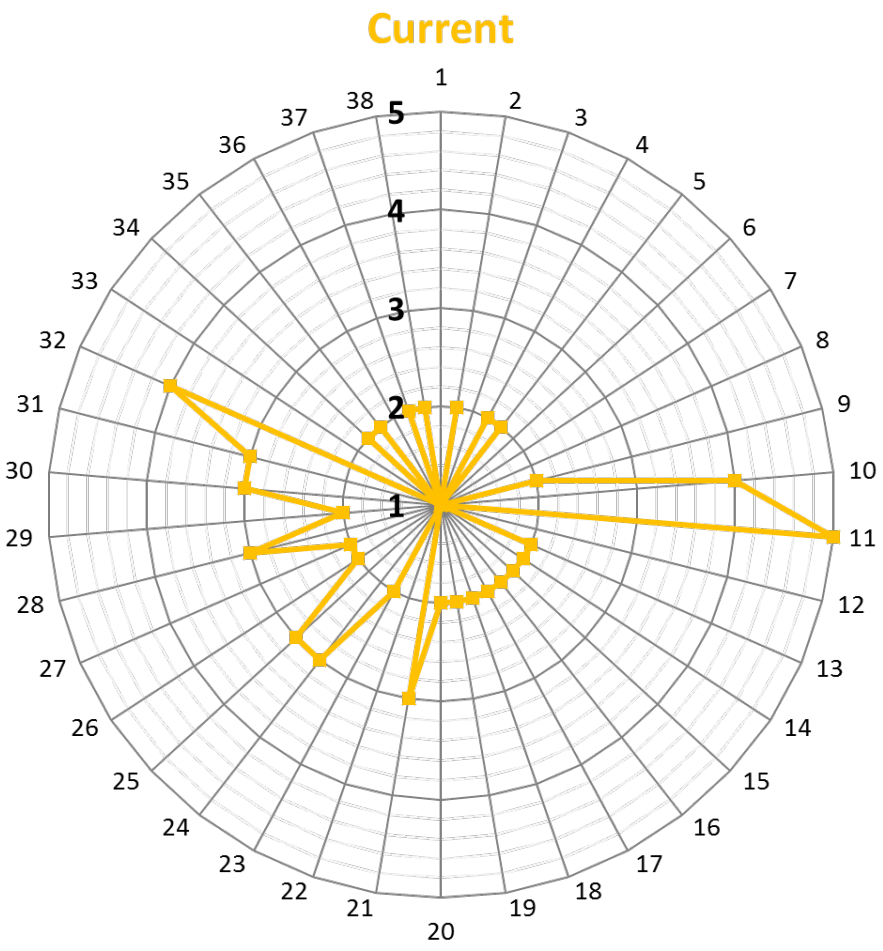


Figure 2-1. Current Levels of Maturity by Asset Management Theme

In reviewing the results of CAMRA it is crucial to keep in mind that while the Alliance owns the infrastructure assets, other entities manage, operate and maintain them. In general, consensus was easily reached on the current level of maturity for most themes. However, because the entities have many differences in policies, information systems, bargaining unit agreements, organizational culture, and other tangible and intangible characteristics, the current levels of maturity for several themes were seen differently among the participants. These themes were primarily within the KFA of Asset Management Enablers and Support.

2.1.2 Future Levels of Maturity

For determining the short-, medium-, and long-term maturity level targets, workshop participants agreed to the following timeframes, consistent with the Alliance's biennial budget process:

- Short-term – achieve by the end of 2020
- Medium-term – achieve by the end of 2022
- Long-term – achieve by the end of 2024

Consensus was reached for all the themes after discussion of the anticipated amount of available resources in staff, time, and funding, for each of the Members. The theme that elicited the most divergent view was Maintenance Management. More detail on this theme and the others is presented in Section 2.2.

Table 2-3 lists the themes by KFA with the current maturity level, along with the short-, medium-, and long-term targets. Figure 2-2, 2-3, and 2-4 are radar charts of the maturity level targets for the 38 themes in the short-, medium-, and long-term, respectively. Figure 2-5 shows the current maturity level as well as the future maturity level targets on a single radar chart. Figure 2-6 shows the same for the seven KFAs.

The radar charts are designed so that each of the 38 themes are shown on the outside of the chart and their maturity levels (1 through 5) are shown by the distance from the chart's center.

Key Focus Areas		Theme	
1	Organizational Context	1	Organizational Strategic Plan & Organizational Objectives
		2	Understanding the Needs of Stakeholders
2	Asset Management Vision & Leadership	3	Asset Management Policy & Strategic Asset Management Plan
		4	Asset Management Leadership & Governance
		5	Asset Management Roles & Responsibilities
		6	Prioritized Plan for The Development of Asset Management Business Processes & Procedures
		7	Prioritized Plan for the Development of Asset Management Skills & Competences
		8	Prioritized Plan for Information Technology Functional Requirements
3	Asset Management Objectives & Targets	9	Asset Management Objectives - Performance Metrics/Levels of Service
		10	Future Trends (Impact of Growth)
		11	Legal, Regulatory & Statutory Requirements
4	Asset Management Information Requirements	12	Asset Information Strategy & Asset Information Improvement Plan
		13	Asset Inventory
		14	Asset Information Standards
		15	Asset Information
		16	Information Management
		17	Asset Knowledge/Analysis of Data
5	Planning to Achieve Asset Management Objectives	18	Asset Strategies
		19	Risk Framework - Strategic Level
		20	Risk Framework - Asset Level
		21	Optimized Asset Intervention Planning
		22	Asset Management Plans
		23	Capital Investment Plan Development & Governance
6	Operational Planning & Control	24	Capital Projects - Planning, Design, Construction & Commissioning
		25	Operations Management
		26	Maintenance Management
		27	Investigation and Recording of Routine Asset Failures & Reactive Work
		28	Contracted Operations & Maintenance
		29	Materials Management
		30	Emergency Preparedness & Response
		31	Investigation of Major Asset Failures & Incidents
		32	Shutdown and Outage Management
7	Asset Management Enablers & Support	33	Asset Information Systems Implementation plan
		34	Control of Documented Information
		35	Knowledge Retention & Succession Planning
		36	Asset Management Quality Assurance & Management Review
		37	Continual Improvement Culture
		38	Communication & Change Management

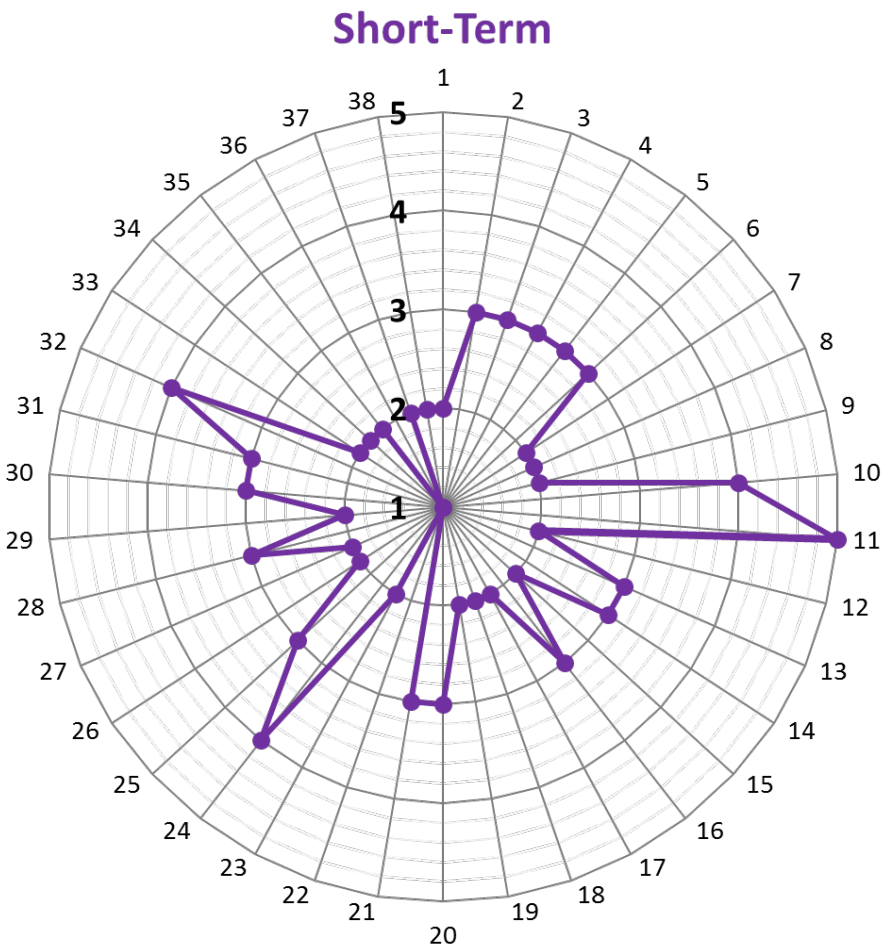


Figure 2-2. Short-term (end of 2020) Target Levels of Maturity by Asset Management Theme

Key Focus Areas	Theme
1 Organizational Context	1 Organizational Strategic Plan & Organizational Objectives
	2 Understanding the Needs of Stakeholders
2 Asset Management Vision & Leadership	3 Asset Management Policy & Strategic Asset Management Plan
	4 Asset Management Leadership & Governance
	5 Asset Management Roles & Responsibilities
	6 Prioritized Plan for The Development of Asset Management Business Processes & Procedures
	7 Prioritized Plan for the Development of Asset Management Skills & Competences
	8 Prioritized Plan for Information Technology Functional Requirements
3 Asset Management Objectives & Targets	9 Asset Management Objectives - Performance Metrics/Levels of Service
	10 Future Trends (Impact of Growth)
	11 Legal, Regulatory & Statutory Requirements
4 Asset Management Information Requirements	12 Asset Information Strategy & Asset Information Improvement Plan
	13 Asset Inventory
	14 Asset Information Standards
	15 Asset Information
	16 Information Management
	17 Asset Knowledge/Analysis of Data
5 Planning to Achieve Asset Management Objectives	18 Asset Strategies
	19 Risk Framework - Strategic Level
	20 Risk Framework - Asset Level
	21 Optimized Asset Intervention Planning
	22 Asset Management Plans
	23 Capital Investment Plan Development & Governance
6 Operational Planning & Control	24 Capital Projects - Planning, Design, Construction & Commissioning
	25 Operations Management
	26 Maintenance Management
	27 Investigation and Recording of Routine Asset Failures & Reactive Work
	28 Contracted Operations & Maintenance
	29 Materials Management
	30 Emergency Preparedness & Response
	31 Investigation of Major Asset Failures & Incidents
	32 Shutdown and Outage Management
7 Asset Management Enablers & Support	33 Asset Information Systems Implementation plan
	34 Control of Documented Information
	35 Knowledge Retention & Succession Planning
	36 Asset Management Quality Assurance & Management Review
	37 Continual Improvement Culture
	38 Communication & Change Management

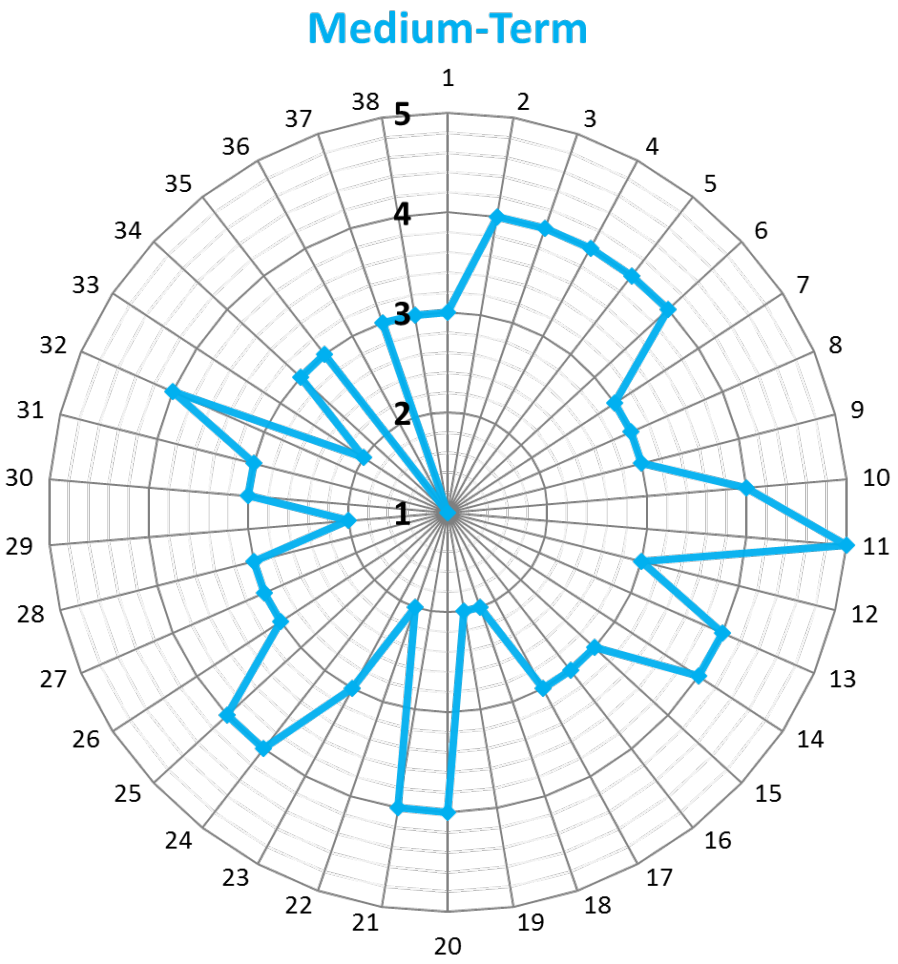


Figure 2-3. Medium-term (end of 2022) Target Levels of Maturity by Asset Management Theme

Key Focus Areas		Theme	
1	Organizational Context	1	Organizational Strategic Plan & Organizational Objectives
		2	Understanding the Needs of Stakeholders
2	Asset Management Vision & Leadership	3	Asset Management Policy & Strategic Asset Management Plan
		4	Asset Management Leadership & Governance
		5	Asset Management Roles & Responsibilities
		6	Prioritized Plan for The Development of Asset Management Business Processes & Procedures
		7	Prioritized Plan for the Development of Asset Management Skills & Competences
		8	Prioritized Plan for Information Technology Functional Requirements
3	Asset Management Objectives & Targets	9	Asset Management Objectives - Performance Metrics/Levels of Service
		10	Future Trends (Impact of Growth)
		11	Legal, Regulatory & Statutory Requirements
4	Asset Management Information Requirements	12	Asset Information Strategy & Asset Information Improvement Plan
		13	Asset Inventory
		14	Asset Information Standards
		15	Asset Information
		16	Information Management
		17	Asset Knowledge/Analysis of Data
5	Planning to Achieve Asset Management Objectives	18	Asset Strategies
		19	Risk Framework - Strategic Level
		20	Risk Framework - Asset Level
		21	Optimized Asset Intervention Planning
		22	Asset Management Plans
		23	Capital Investment Plan Development & Governance
6	Operational Planning & Control	24	Capital Projects - Planning, Design, Construction & Commissioning
		25	Operations Management
		26	Maintenance Management
		27	Investigation and Recording of Routine Asset Failures & Reactive Work
		28	Contracted Operations & Maintenance
		29	Materials Management
		30	Emergency Preparedness & Response
		31	Investigation of Major Asset Failures & Incidents
		32	Shutdown and Outage Management
7	Asset Management Enablers & Support	33	Asset Information Systems Implementation plan
		34	Control of Documented Information
		35	Knowledge Retention & Succession Planning
		36	Asset Management Quality Assurance & Management Review
		37	Continual Improvement Culture
		38	Communication & Change Management

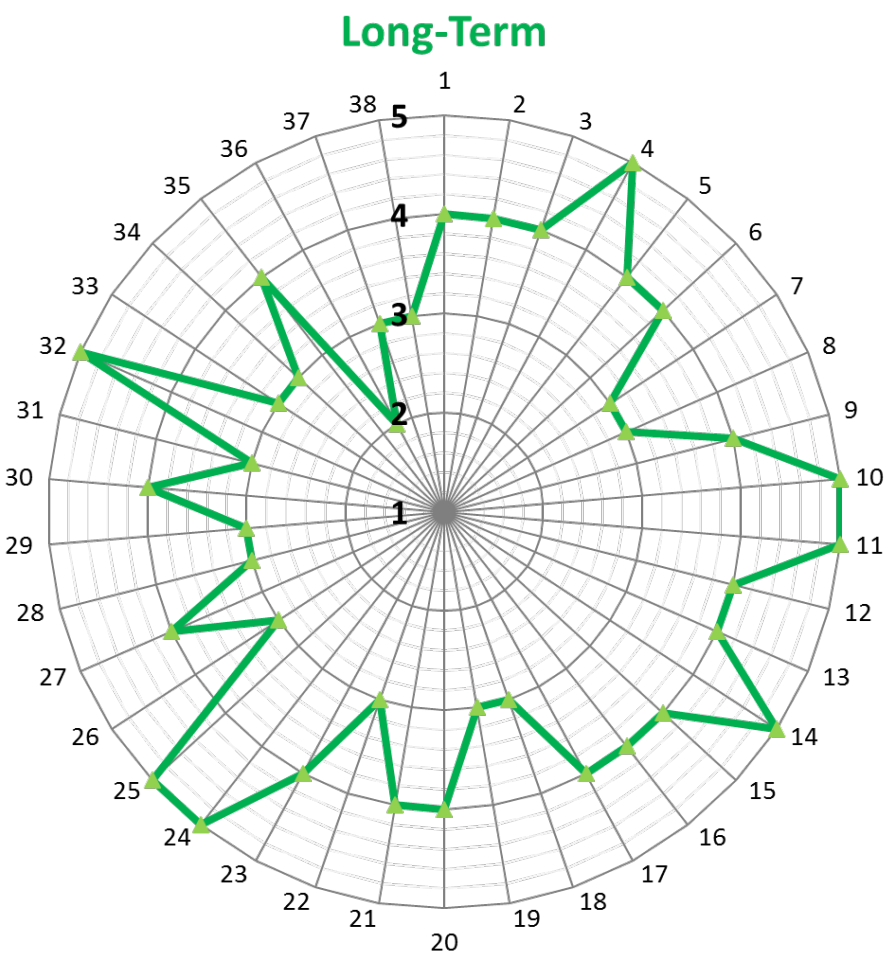


Figure 2-4. Long-term (end of 2024) Target Levels of Maturity by Asset Management Theme

Key Focus Areas	Theme
1 Organizational Context	1 Organizational Strategic Plan & Organizational Objectives
	2 Understanding the Needs of Stakeholders
2 Asset Management Vision & Leadership	3 Asset Management Policy & Strategic Asset Management Plan
	4 Asset Management Leadership & Governance
	5 Asset Management Roles & Responsibilities
	6 Prioritized Plan for The Development of Asset Management Business Processes & Procedures
	7 Prioritized Plan for the Development of Asset Management Skills & Competences
	8 Prioritized Plan for Information Technology Functional Requirements
3 Asset Management Objectives & Targets	9 Asset Management Objectives - Performance Metrics/Levels of Service
	10 Future Trends (Impact of Growth)
	11 Legal, Regulatory & Statutory Requirements
4 Asset Management Information Requirements	12 Asset Information Strategy & Asset Information Improvement Plan
	13 Asset Inventory
	14 Asset Information Standards
	15 Asset Information
	16 Information Management
	17 Asset Knowledge/Analysis of Data
5 Planning to Achieve Asset Management Objectives	18 Asset Strategies
	19 Risk Framework - Strategic Level
	20 Risk Framework - Asset Level
	21 Optimized Asset Intervention Planning
	22 Asset Management Plans
	23 Capital Investment Plan Development & Governance
6 Operational Planning & Control	24 Capital Projects - Planning, Design, Construction & Commissioning
	25 Operations Management
	26 Maintenance Management
	27 Investigation and Recording of Routine Asset Failures & Reactive Work
	28 Contracted Operations & Maintenance
	29 Materials Management
	30 Emergency Preparedness & Response
	31 Investigation of Major Asset Failures & Incidents
	32 Shutdown and Outage Management
7 Asset Management Enablers & Support	33 Asset Information Systems Implementation plan
	34 Control of Documented Information
	35 Knowledge Retention & Succession Planning
	36 Asset Management Quality Assurance & Management Review
	37 Continual Improvement Culture
	38 Communication & Change Management

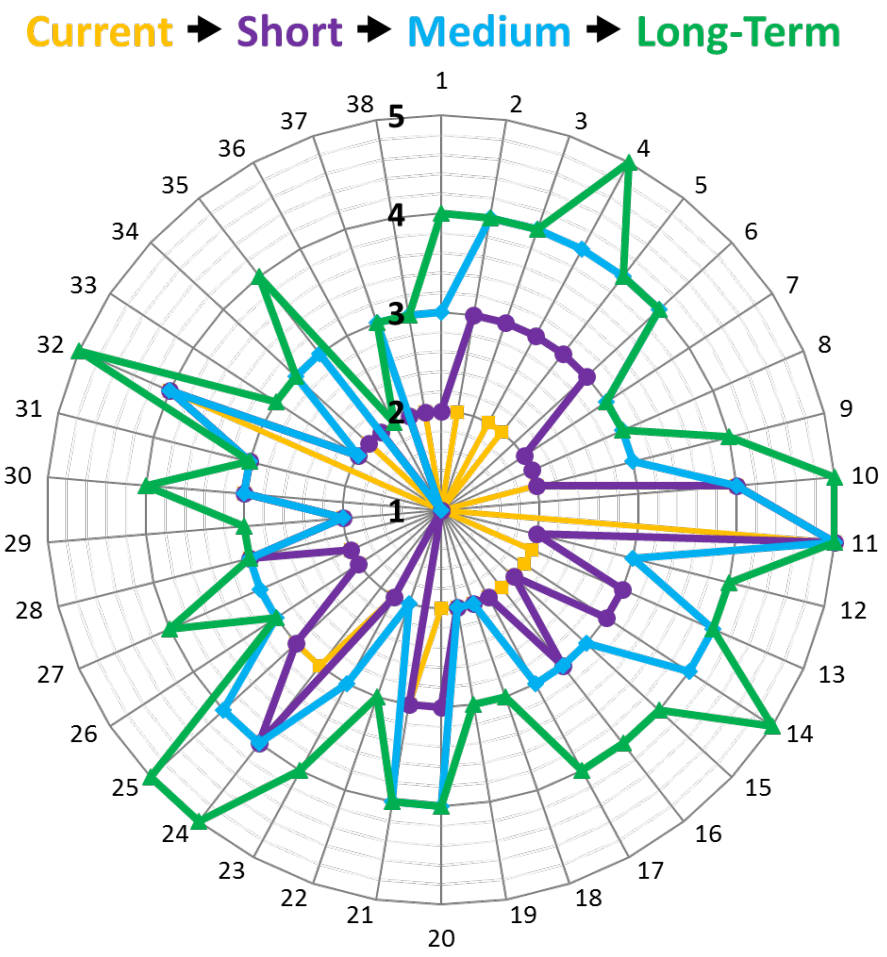


Figure 2-5. Current, Short-, Medium- and Long-term Target Levels of Maturity by Asset Management Theme

Key Focus Areas	
1	Organizational Context
2	Asset Management Vision & Leadership
3	Asset Management Objectives & Targets
4	Asset Management Information Requirements
5	Planning to Achieve Asset Management Objectives
6	Operational Planning & Control
7	Asset Management Enablers & Support

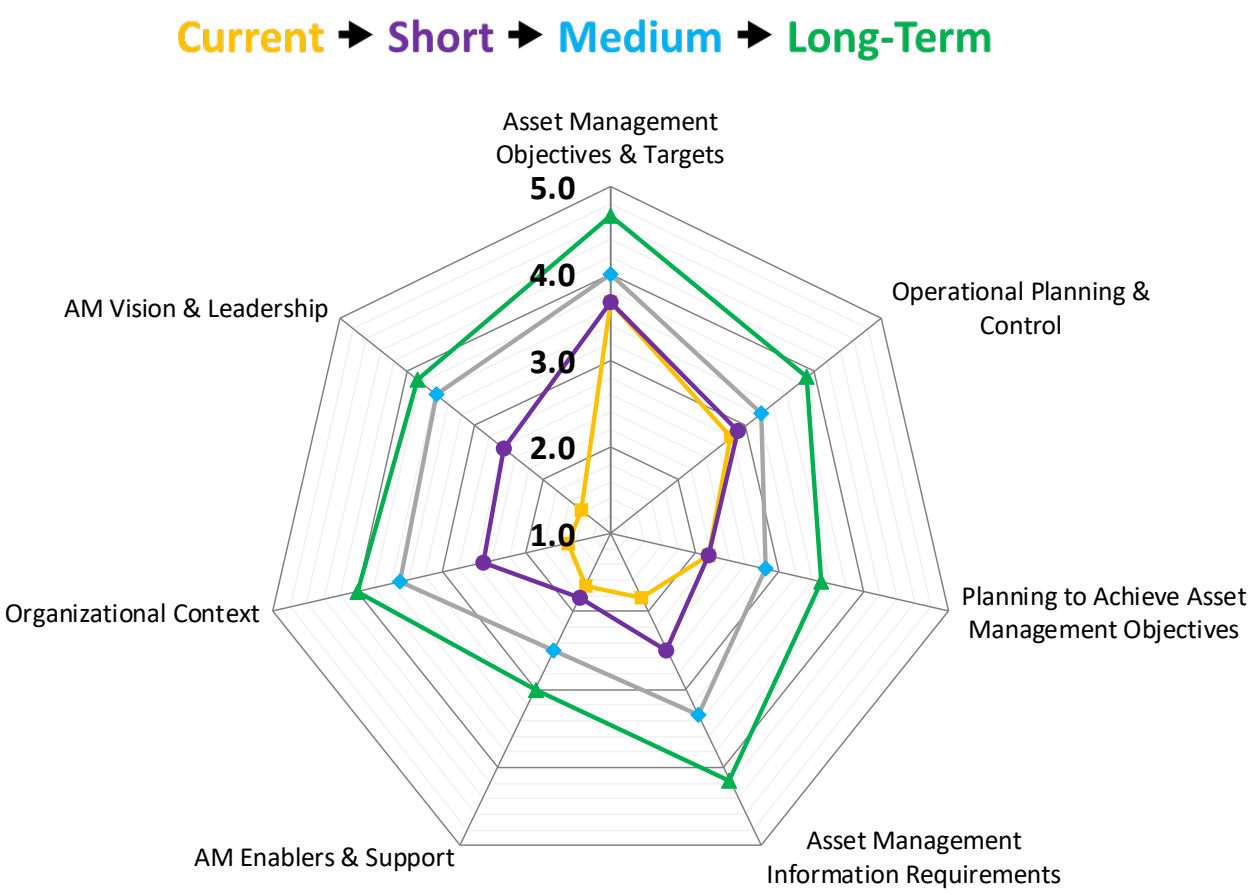


Figure 2-6. Current, Short-, Medium-, and Long-term Target Levels of Maturity by Key Focus Area

2.2 Observations from the CAMRA Results and Workshop

The following subsections describe CH2M's observations and provisional conclusions from the results of the CAMRA tool, information provided through the information and comments from the workshop participants, and discussions with staff from the District, Clark County and the City of Ridgefield during onsite tours of facilities. The observations and provisional conclusions are presented by KFA.

2.2.1 Organizational Context

For asset management to be successful and sustainable, it must be aligned and consistent with the environment in which the organization strives to achieve its objectives. Internal to the utility, Organization Context includes its approach to governance, organizational culture, and policies affecting its employees. Externally, Organization Context includes the utility's relationships with customers and other stakeholders and an understanding of their expectations and influences.

The two themes associated with Organizational Context are (1) Organizational Strategic Plan and Organizational Objectives, and (2) the Understanding of Needs of Stakeholders.

Figure 2-6 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the two themes in this KFA.

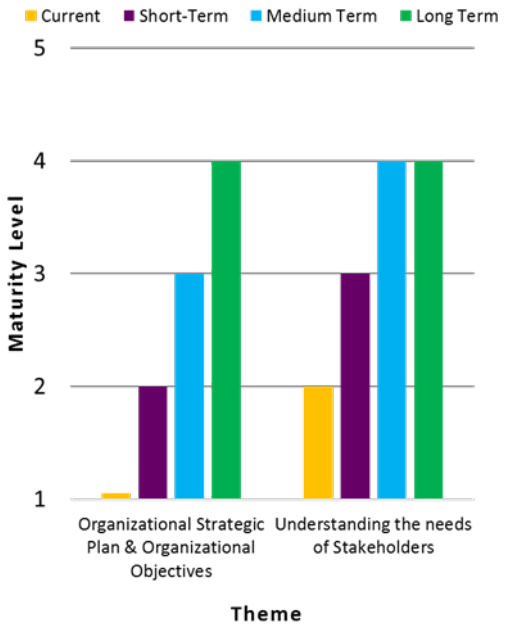


Figure 2-6. CAMRA Results for the *Organizational Context* KFA

2.2.1.1 Organizational Strategic Plan and Organizational Objectives (Theme 1)

A strategic plan sets out an organization's priorities, to focus its financial and human resources, to meet established short-term and long-term organizational objectives. These objectives lead to how infrastructure assets are managed, operated and maintained. Thus, good asset management practices must be aligned with the organization's strategic plan, meaning that employees performing "on-the-ground" daily activities must be aware of the organizational objectives. In asset management terms, this is commonly referred to as "line of sight," as employees should understand the reason for their activities and how their activities benefit the utility, its customers and other stakeholders, and the environment.

Because of the unique structure of the Alliance, having employees from three different agencies managing the Alliance's assets, an organizational strategic plan and objectives have not yet been established; consequently, the current maturity was considered to be at Level 1. However, while the Alliance's Members may not be able to arrive at a formal, Board-approved strategic plan in the next several years, the Alliance's adopted Core Values can provide a strong foundation for developing a staff-led and staff-endorsed strategic

ALLIANCE CORE VALUES

1. *Ensure reliable, predictable service for all customers*
2. *Manage resources responsibly, efficiently and equitably*
3. *Protect public and environmental health*
4. *Optimize use of existing facilities*
5. *Be financially transparent*
6. *Use new technologies to achieve system efficiencies and environmental protection*
7. *Provide a fair, positive and secure work environment for utility employees*
8. *Ensure capacity to support regional land use and economic development decisions*
9. *Invest in improvements that create system-wide benefits*
10. *Make business decisions collaboratively with all partners*

plan and organizational objectives. As such, the maturity level for this theme is proposed for steady increase over the next 6-years.

2.2.1.2 Understanding the Needs of Stakeholders (Theme 2)

Identifying relevant stakeholders and understanding their needs and expectations is a fundamental success factor for every organization. Good asset management practice dictates that utilities should be actively engaging both internal and external stakeholders in order to translate their needs and expectations into the utility's decision making. The Alliance has already made significant progress in identifying and engaging its stakeholders. For example, its Core Values were validated through a statistically-valid customer survey. The Alliance engages it stakeholders by conducting meetings with community groups and providing tours of its facilities. The Alliance and District have robust websites, and District provides its customers bimonthly newsletters. In addition, the Alliance maintains good relationships with regulatory agencies. Nevertheless, communications with stakeholders on specific issues related to asset management has been somewhat slow. Thus, the current maturity in this theme was determined to be Level 2, although staff believed it was getting close to Level 3. By 2020, Level 3 will be reached, and by 2022, Level 4.

2.2.2 Asset Management Vision and Leadership

Probably the most crucial element for successful implementation of asset management principles and practices is the commitment of top management. Utility leadership must be actively and visibly engaged in promoting asset management, and all managers must have and must articulate a unified vision. Six themes are associated with this KFA. They include establishing an Asset Management Policy and Strategic Asset Management Plan (SAMP), having formal governance procedures, identifying staff responsibilities, and creating plans for developing business processes, staff competencies, and information technology (IT) functional requirements. Figure 2-7 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the six themes in this KFA.

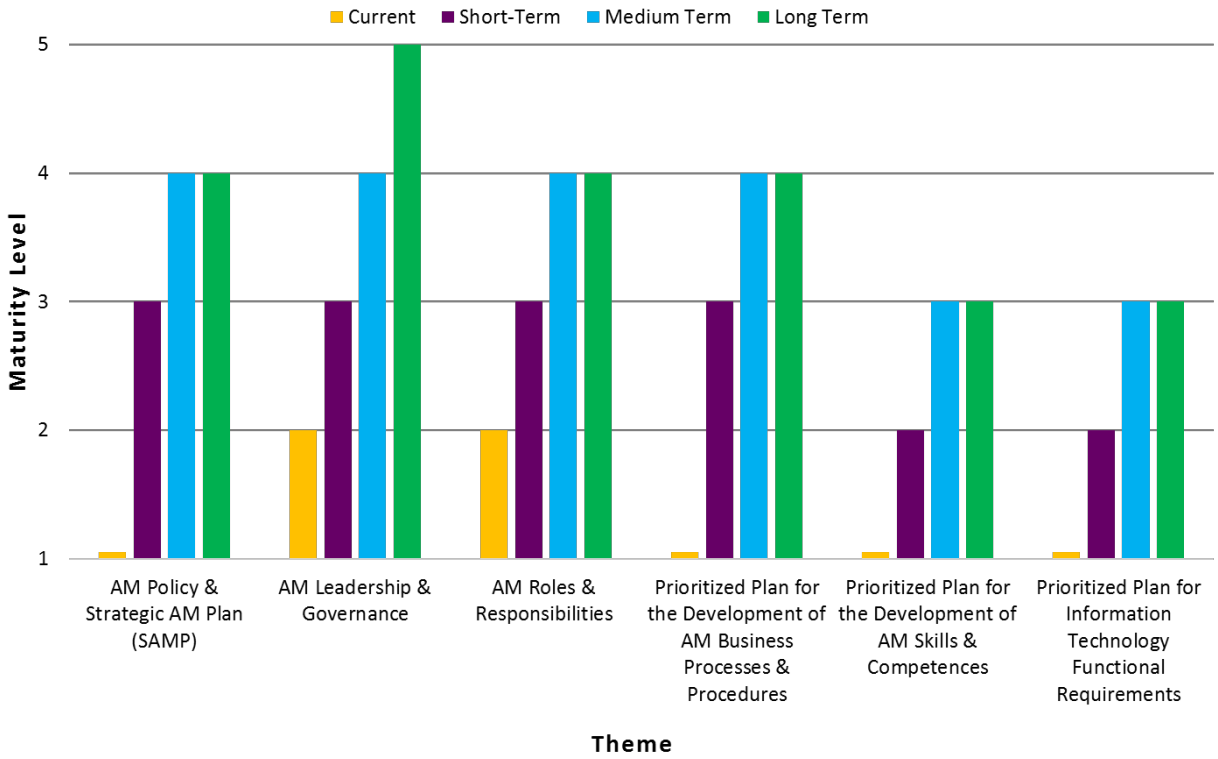


Figure 2-7. CAMRA Results for the *Asset Management Vision and Leadership* KFA
AM = asset management

2.2.2.1 Asset Management Policy and Strategic Asset Management Plan (Theme 3)

The Asset Management Policy is a formal document that sets out the high-level principles by which the utility will manage its assets, as formally expressed by its leadership and top management. Its main goal is to guide asset management decision-making to achieve organizational objectives. The Asset Management Policy may be approved by the Board of Directors, signed-off on by the organization's chief executive, or agreed to through a formal meeting of the organization's leadership. In the case of the Alliance, the initial Asset Management Policy may be formally adopted at a meeting of the Management/Infrastructure Committee, made up of Alliance Member representatives.

The SAMP documents the approach to implementing the Asset Management Policy by linking the utility's strategy and the Policy to how decisions are made and how assets are managed, operated and maintained over their lifecycle. The SAMP includes an overview of the utility's assets, sets out the utility's asset management objectives, its governance structure, risk framework, roles and responsibilities, and performance management system, among other organization-wide strategies.

Workshop participants found this theme's current maturity to be between a Level 1 and Level 2, but settled on Level 1. However, because of the Alliance's clarity in its adopted Core Values, it was believed that an Asset Management Policy and SAMP could be developed, documented and endorsed in the by 2020, and made widely available with a process in place for periodic review and updated by in the by 2022. As such, this theme's maturity was planned at Level 3 in the short-term, and Level 4 in the medium-term.

2.2.2.2 Asset Management Leadership and Governance (Theme 4)

This theme focuses on the commitment and promotion of asset management by executive management. It also includes ensuring that a governance structure is in place to establish policies and procedures for managing assets, monitoring and enhancing associated policies and procedures, and establishing consistent frameworks across the utility. In addition, this theme includes providing the funding and resources necessary to effectively implement and embed asset management principles and practices throughout the organization.

The current maturity of this theme was rated at Level 2. There was consensus that the maturity level could be increased steadily over the next 6 years, subject to funding and resources, to achieve a Level 5 maturity in the long-term (by 2024).

2.2.2.3 Asset Management Roles and Responsibilities (Theme 5)

Formally establishing roles, responsibilities and authorities for key asset management functions are the focus of this theme. This is especially important since the Alliance's assets are managed, operated, and maintained by employees of different agencies with different job descriptions for similar positions, and varying human resource policies. Consequently, there may be duplication of roles in different job descriptions, overlapping roles, responsibilities and authorities, and only limited understanding of asset management related roles, responsibilities and authorities.

Since some job descriptions document some asset management roles, responsibilities, and authorities, the workshop participants rated the theme's maturity as Level 2. There is, however, an individual assigned to examine the elements of this theme and lead an effort to bring its maturity to Level 3 in the short-term and Level 4 in the medium-term.

2.2.2.4 Prioritized Plan for the Development of Asset Management Business Processes and Procedures (Theme 6)

Having documented business processes with clear process maps and written standard operations procedures (SOPs) is crucial to consistency in all aspects of utility management to ensure that consistent

and defensible decisions are made, performance is appropriately measured and reported, and day-to-day activities are carried out efficiently and effectively. A wastewater utility can have hundreds of business processes in which employees engage on regular or irregular timeframes. This theme targets the identification and prioritization of those business processes and SOPs, with a written plan for carrying out business process mapping and producing SOPs for all key activities related to asset management; it does not require that the processes and SOPs be done, but rather focuses on whether a plan is in place.

Because no plan currently exists, the maturity this theme was scored a Level 1. However, the District does do some process mapping, and therefore the workshop participants projected that an increase to a maturity Level 3 could be accomplished in the short-term with a Level 4 maturity reached in the medium term.

2.2.2.5 Prioritized Plan for the Development of Asset Management Skills and Competencies (Theme 7)

As with the previous theme, this theme addresses the depth and breadth of a plan to identify and establish the staff competencies and the skill levels needed for the Alliance to implement good asset management practices throughout the organization. The plan would typically include the competency categories and skills required with associated descriptions, along with a scope of prioritized actions to recruit and train staff, and incorporate outsourced functions if desired.

This theme was found to be at maturity Level 1 since no plan exists. However, with the availability of The Institute of Asset Management's Competences Framework, and institutional knowledge of staff, reaching a maturity Level 2 in the short-term was deemed doable, with an improvement to maturity Level 3 in the medium-term.

2.2.2.6 Prioritized Plan for Information Technology Functional Requirements (Theme 8)

Like the previous two themes, this theme is aimed at having a plan for defining and documenting the functional requirements of IT software and hardware needed by the utility to optimize its management of assets. Developing such a plan requires involvement of a wide range of staff to identify their needs, activities, and how information and data need to be gathered, shared, reported and maintained. Since IT hardware and software (including handheld devices) can have substantial initial costs, replacement costs, as well as ongoing operational costs, the functional requirements should be prioritized.

While member entities of the Alliance already use information technology such as computerized maintenance management systems (CMMS), geographic information systems (GIS), customer information systems, and human resources management information systems, these tools are neither linked nor used to their fullest capability, and in some cases, are legacy software and hardware. As such, this theme was given a current maturity Level 1, but with sufficient resources and coordination between the Member, it was suggested that a maturity Level 2 could be reached by 2020, and a Level 3 by 2022. Going beyond a Level 3 was considered to be unreasonable with the current structure of the Alliance.

2.2.3 Asset Management Objectives and Targets

Asset management objectives provide the essential link (i.e., line of site) between the organizational strategy and the Asset Management Plans (AMPs), which describe how the objectives are going to be achieved. As such, the asset management objectives and their targets are set by the utility consistent with the organizational objectives and the Asset Management Policy. Important elements of this KFA include considering future trends in population, development, and associated capacity needs, as well as current, anticipated, and future legal and regulatory requirement. Figure 2-8 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the three themes in this KFA.

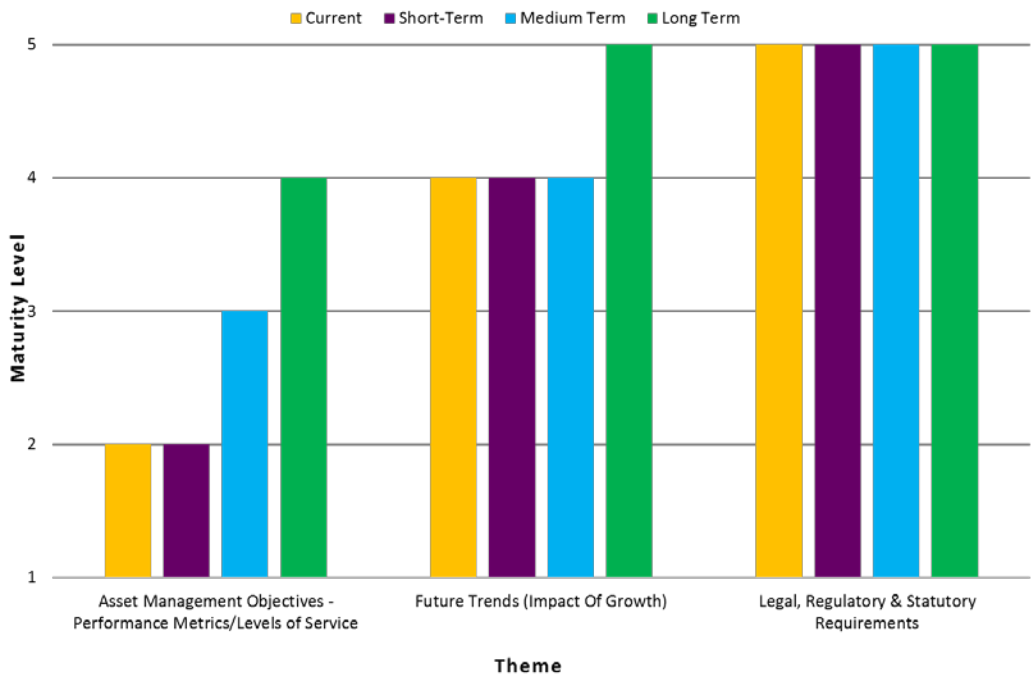


Figure 2-8. CAMRA Results for the *AM Objectives and Targets* KFA

2.2.3.1 Asset Management Objectives – Performance Metrics/Levels of Service (Theme 9)

Typical asset management objectives may address the total cost of ownership, customer satisfaction, environmental impact, levels of service, performance, reliability, cost to customer, etc. Targets should be established so that they meet the "SMART" criteria of being specific, measurable, achievable, realistic and time-bound.

Although asset management objectives, performance metrics or levels of service have not been developed by the Alliance, there is a substantial basis on which to build and improve the maturity level of this theme. The Alliance's Core Values, along with its Asset Management Guiding Principles, and other statements contained in the Alliance's capital plan, are excellent starting points; thus, this theme received a current maturity Level 2. However, substantial additional effort is required to bring the maturity to a Level 3; reaching this level is not anticipated before the medium-term in 2022.

2.2.3.2 Future Trends (Impact of Growth) (Theme 10)

The impact of population growth or decline, as well as population movement and commercial and industrial development can place significant demands on a utility's assets, impinge on the utility's ability to meet permit requirements, and affect the delivery of established service levels. Other trends, such as a demand for reclaimed water or Class A biosolids can also influence the capital and O&M planning process. This theme measures the organization's maturity with respect to how it forecasts, analyzes, and monitors future demands on its assets.

The Alliance is very cognizant of the need to project future trends and their impact on the utility's assets and service levels. Substantial adverse conditions, such as a building moratorium, can be the result of the Alliance having insufficient capacity to meet demand, causing political and economic distress. Fortunately, the Alliance has developed tools to make sure that growth is being tracked and modeled for future demands over a 50-year period. The maturity of this theme was clearly a Level 4, with the only gap in reaching a Level 5 being the linkage to a strategic plan, which does not currently exist.

2.2.3.3 Legal, Regulatory and Statutory Requirements (Theme 11)

As a highly-regulated sector, wastewater utilities are subject to numerous federal, state, and even local laws, statutes, and regulations. While most utilities are keenly aware of their requirements under the National Pollutant Discharge Elimination System or other operating permits, good asset management dictates that utilities must actively monitor legal and regulatory matters that can impact operations, capital planning, and costs. In fact, best practice organizations dedicate resources for designated staff to be involved in organizations that advocate on behalf of the wastewater sector, or even to be directly involved in educating lawmakers and regulators on the impacts of proposed statutes and regulations. It should be noted that this theme is not limited to environmental statutes and regulations, but includes other laws, regulations, and codes under which a utility operates.

This is one theme in which the Alliance excels, with a maturity Level 5. The Alliance invested a lot in this theme to stay in the forefront, including participation with Association of Washington Cities, Washington Association of Sewer and Water Districts and the National Association of Clean Water Agencies. The Alliance has signed joint letters with Camas, and Vancouver related to common advocacy for/against regulatory approaches, has provided comments to the Southwest Clean Air Agency rulemaking, and proactively monitors statutory and regulatory activity for topics that affect Alliance operations, such as the new Washington State water quality standards.

2.2.4 Asset Management Information Requirements

Effective and sustainable asset management is information and data intensive. The essential precept to efficient asset management is to identify the information and data required to make robust and defensible decisions for investing in assets throughout their lifecycles. So, the organization should define what information is needed, establish the appropriate registers for the information and data, standardize the collection, format, and maintenance of the information and data, and use the information and data to make better decisions on asset investments. Figure 2-9 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the six themes in this KFA.

2.2.4.1 Asset Information Strategy and Asset Information Improvement Plan (Theme 12)

With thousands of assets providing hundreds of functions, it's easy for a wastewater utility embarking on asset management to become "data rich but information poor." Good asset management practice dictates that information and data must be of value; it must serve a purpose such as enhancing O&M and reliability, improving capital decision-making, increasing accuracy of long-term planning, and/or delivering higher levels of service. Information and data must also be reliable and relevant, and be available to analysts and decision-makers. It is costly to collect, store, and maintain information and data, so having an established strategy and a plan to continually improve data collection, storage, and accessibility is important.

Because Alliance assets are operated and maintained by different entities, there have been inconsistencies in capturing asset information and data, and most of the information and data that exist cannot be relied upon. The Alliance understands that an asset information strategy and improvement plan is needed, but also realizes that the establishment of service levels should come first. The current of maturity of this theme was clearly a Level 1. Although the maturity level was targeted to steadily increase through the long-term, staff noted that considerable effort will be needed to even achieve a Level 2.

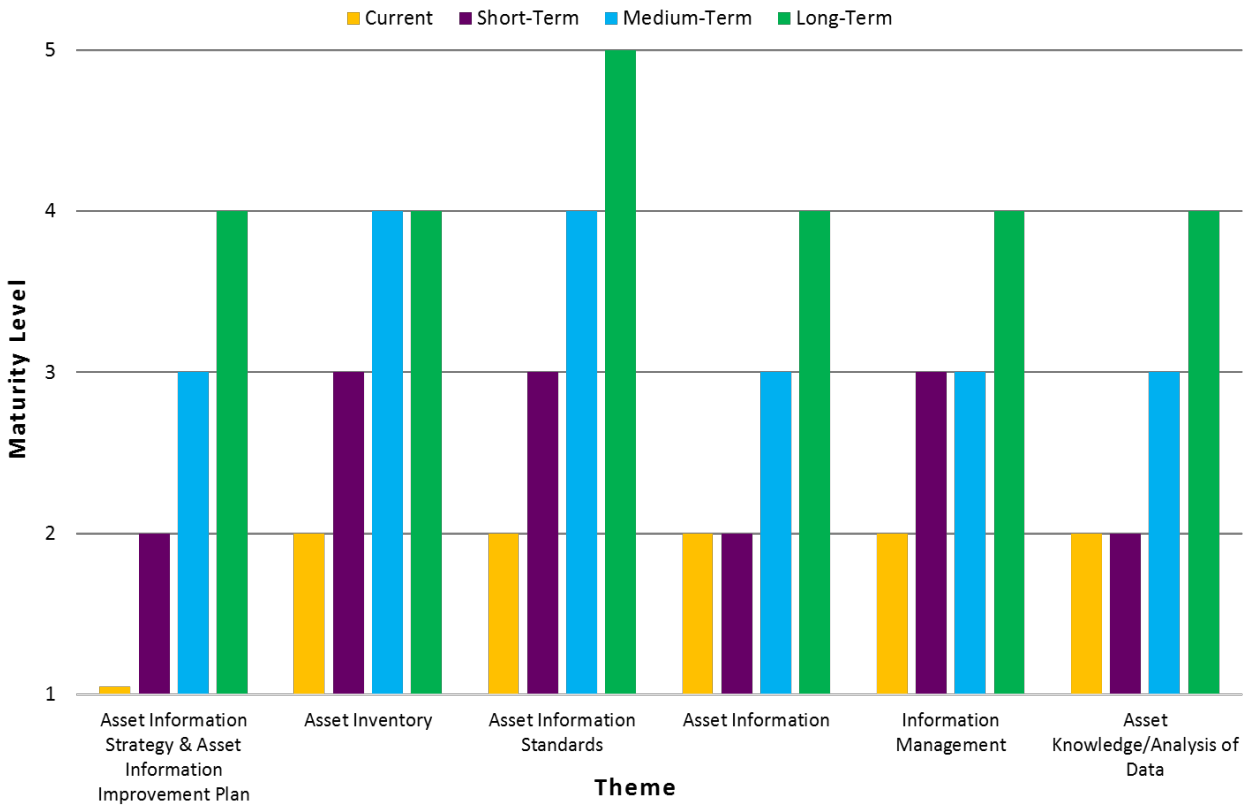


Figure 2-9. CAMRA Results for the *Asset Management Information Requirements* KFA

2.2.4.2 Asset Inventory (Theme 13)

Since it is difficult, if not impossible, to manage assets if you don't know you have them, developing and maintaining an asset inventory is crucial to asset management. Typically, the repository for infrastructure assets is the utility's CMMS for vertical assets and the GIS for linear assets. Good asset management practice is for the asset inventory to be set up in a hierarchal format to better understand interrelated risks of asset failure, and allow for costs to be "rolled-up" to asset groups and systems. The asset inventory should be kept current, be accessible to staff responsible for O&M and planning, and include assets down to the maintenance-managed component or in accordance with the Asset Information Strategy.

The County has a relatively good asset database in the MPulse™ CMMS, and the City of Ridgefield has a preventive maintenance spreadsheet that includes the assets at the Ridgefield Treatment Plant. However, the assets are not in hierarchal format, and the confidence level in the completeness and accuracy of the information cannot be verified at this time. Consequently, the current maturity of this theme was scored a Level 2. Workshop attendees proposed that the Alliance can achieve a Level 3 maturity in the short-term and a Level 4 maturity in the medium-term.

2.2.4.3 Asset Information Standards (Theme 14)

Asset information standards are the written requirements that define the consistent structure of information and data that is required for effectively managing assets. The standards must include why the data are needed, how they are collected and measured, the format and units of the data, the schedule of data collection, the repository for the information and data, and the responsible staff member(s). The asset information standards should also define the asset hierarchy, and the required quality and accuracy of the information and data.

Workshop participants agreed that the Alliance is currently at a maturity Level 2, although there were some comments that insufficient written guidance exists about how information and data should be managed. Realizing that this theme is important to focus on, and that asset information standards are a prerequisite to having the correct data and information to make decisions, the Alliance should strive toward a maturity of Level 3 in the short-term, Level of 4 in the medium-term, and Level 5 in the long-term.

2.2.4.4 Asset Information (Theme 15)

This theme addresses the information and data associated with assets (i.e., asset attributes) that serve as the utility's asset register, whether that register is located in the CMMS, GIS, or is an Excel spreadsheet. It also addresses the sufficiency, currency, and quality (accuracy) of the information and data. Examples of asset attributes that are needed include a unique asset identification number, asset type, manufacturer, model and serial numbers, installation date, material type, location, availability of spare parts, history of maintenance activities, safety information, maintenance job plans (SOPs), original cost, cost of maintenance, condition, and the likelihood, consequence (i.e., criticality), and risk of failure.

The current maturity level for this theme was determined to be a Level 2. Some asset attribute information and data exist, but their currency and accuracy are questionable. Because of the resources required to increase the maturity level of this theme, workshop participants projected that the Alliance will still be at a maturity Level 2 in the short-term, but using available information and data, supplemented by institutional knowledge of staff, and condition assessments already performed as well as those that may done in the future, the maturity level could increase to a Level 3 in the medium-term and to a Level 4 in the long-term.

2.2.4.5 Information Management (Theme 16)

As an asset-intensive organization, wastewater utilities need up-to-date and accurate information and data. This theme supplements the previous themes in this KFA, by addressing the maturity of the processes to ensure that asset data and information are current, processes are in place for the periodic review and updating of the information and data to maintain currency and accuracy, an archival procedure is followed for historical purposes, that access controls exist to restrict who can change the asset information and data, and that cybersecurity measures have been taken to protect the database.

Workshop participants scored the current maturity of this theme at a Level 2, since there exist some controls on asset information, but it is decentralized with the different Members having their own controls, cyber-protection, and IT access requirements. Further, there is no periodic review of the currency or accuracy of the data and information. However, participants expressed some optimism that the maturity level of information management could be brought up to a Level 3 in the short-term and a Level 4 in the long-term.

2.2.4.6 Asset Knowledge/Analysis of Data (Theme 17)

For asset data to be of value, the data must be turned into knowledge that can be used to make decisions. Such knowledge includes the risk of asset failure calculated from asset attribute information and data with the risk framework to prioritize rehabilitation and replacement. This theme also includes the analysis of historical failure data to optimize maintenance and prevent future failures, as well as projecting when assets will reach the end of their useful life, or no longer have the capacity to meet demands. In some cases, analysis can be performed by using models or proprietary software, but staff involvement remains crucial.

Although current and high-quality asset attribute data have been limited, the Alliance has been using available information, such as equipment run-time and some limited condition grades to assess the risk of failure of some assets, and develop lists of needed investments and prepare budget requests. Nevertheless, due to the varying budget processes of the Alliance Members, budget requests identified

by agency staff can be left unfunded at the agency level without clear explanation to the Alliance. Additionally, only capital projects exceeding a specific threshold cost are implemented by the Alliance, yet capital planning and asset management requires understanding of condition, criticality, and performance of all assets. As such, this theme was given a current maturity of Level 2. Because of the diverse funding processes from the different entities, the maturity level was expected to remain at a Level 2 in the short-term, but efforts will be made to reach a Level 3 in the medium-term and a Level 4 in the long-term.

2.2.5 Planning to Achieve Asset Management Objectives

This KFA addresses enterprise-wide activities necessary to enable the utility to accomplish its asset management objectives, comply with its Asset Management Policy and SAMP, and support the organization to deliver its mission and achieve its vision. The majority of the themes in this KFA focus on the utility's infrastructure assets themselves. Figure 2-10 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the six themes in this KFA.

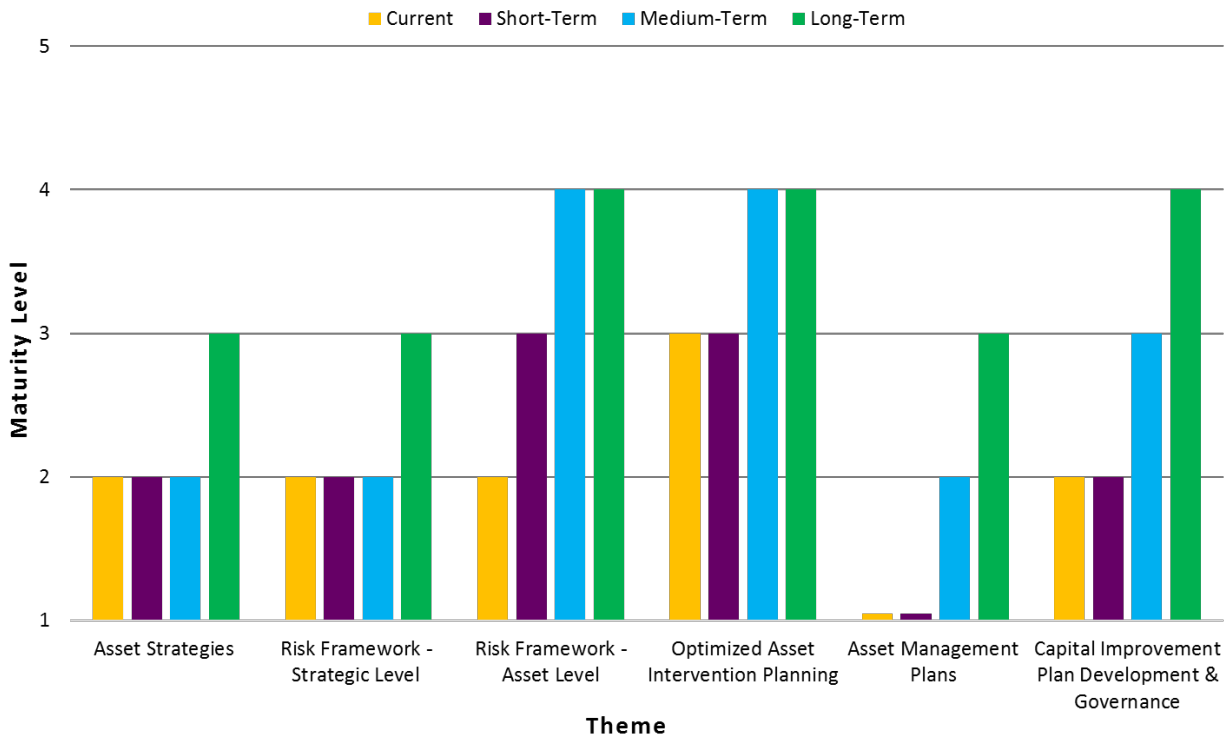


Figure 2-10. CAMRA Results for the Planning to Achieve Asset Management Objectives KFA

2.2.5.1 Asset Strategies (Theme 18)

Having formal asset strategies consistent with the Asset Management Policy and SAMP, documents how organizational objectives are converted into asset management objectives and provides the basis for developing AMPs and the associated lifecycle activities needed for assets to deliver the levels of service established by the utility. Asset management strategies outline the approach for how asset-related decisions will be made. For example, how maintenance levels will be determined, how repair versus rehabilitation versus replacement decisions will be made, what materials will be allowed in the system, and what criteria will be put in place to determine which assets require redundancy.

The asset strategies addressing the Alliance's assets are ad hoc, without formal standards or written guidance. Therefore, the current maturity level for this theme was scored at Level 2. Further, because

asset strategies must be based on asset management objectives and the Asset Management Policy, which are not yet in place, workshop participants estimated that a Level 2 maturity will remain through the medium-term. A Level 3 maturity, however, is being targeted for the long-term.

2.2.5.2 Risk Framework – Strategic Level (Theme 19)

Since asset management principles and practices must be within the line of sight of the organizational objectives, it is important to identify key risks and mitigation actions at the enterprise level to ensure and demonstrate good governance. This theme considers both the internal and external environment in which the organization operates. External enterprise risks include threats to organizational objectives such as funding sources, political environment, regulatory changes, demographics, etc. Internal risks include health and safety, labor shortages, organizational culture, competencies and skill levels, information management, budget constraints, etc. To manage risks at the strategic level, a risk framework and risk register should be developed consistent with the organization's strategic objectives.

The Alliance's current maturity for this theme was determined to be Level 2. The staff tracks regulatory and legal changes, monitors pending expansion to the urban service area and capacity demands. Some of the threats are being addressed by Member agencies, such as pending loss of staff due to retirements are being considered and risk mitigation actions are being put into place (e.g., succession planning, workforce planning). As with the previous theme, the maturity level is expected to remain at Level 2 through the medium-term, with a maturity Level 3 targeted for the long-term.

2.2.5.3 Risk Framework – Asset Level (Theme 20)

As part of the capital planning process for the Alliance, Member staff has developed a provisional risk framework to identify the consequence, likelihood, and risk of asset failure for some asset systems and asset groups. Some capital projects were identified using this provisional risk matrix, but a more formal risk framework is desired.

Since a provisional framework is in place and there is an understanding that the backbone of asset management is managing asset risk, the maturity of this theme was scored at Level 2. For the short-term, since levels of service must be established before an enterprise risk framework can be adopted, the maturity is expected to remain at Level 3 with an increase to Level 4 by the end of the medium-term.

2.2.5.4 Optimized Asset Intervention Planning (Theme 21)

Organizations adopting asset management principles must change the paradigm for selecting asset maintenance and capital investments from focusing on initial cost to focusing on lifecycle cost, also known as whole life cost (WLC). This also means performing business case evaluations (BCEs) that evaluate asset intervention options over a long, but consistent, period of time, with appropriate discount rates that are established enterprise-wide.

When planning for capital asset interventions, the Alliance is incorporating WLC in evaluations and decision-making. During the workshop, examples were provided where lowest capital cost options were looked at, but discarded in favor of an option determined to have a lower lifecycle cost. Participants correctly mentioned that other criteria, such as health and safety, must also factor into asset intervention planning. As with the Risk Framework – Asset Level theme, this theme received a current and short-term maturity score of Level 3, with an increase to Level 4 in the medium-term.

2.2.5.5 Asset Management Plans (Theme 22)

AMPs link the asset management strategy to work on-the-ground by defining the activities to be implemented and the resources needed to meet the asset management objectives, and, consequently, the organizational objectives. AMPs identify planned actions and activities to ensure assets are providing the expected level of service, and to support funding and long-term financial planning. AMPs can be

developed for the entire asset portfolio (e.g., all assets of the Alliance), asset systems (e.g., the Salmon Creek Treatment Plant [SCTP]), asset groups (e.g., all pump stations), asset classes/groups (e.g., pumps or centrifugal pumps), or individual assets (e.g., SCTP chiller). AMPs must be reviewed and updated on a periodic basis, usually every 3 to 5 years.

The Alliance has yet to embark on preparing AMPs. Thus, the current maturity is Level 1. And, because of the numerous prerequisites (e.g., Asset Management Policy, SAMP, levels of service, risk framework), the maturity level of this theme is expected to remain at a Level 1 through the short-term. However, resources are expected to be provided in the medium- and long-term to increase the maturity to Level 2 by 2022, and to Level 3 by 2024.

2.2.5.6 Capital Improvement Plan Development and Governance (Theme 23)

The sheer size of most capital improvement projects, their likely impact on the community, political oversight, and the typically high costs, which frequently affect customer rates and fees, requires utilities to develop robust processes and procedures for developing capital improvement plans (CIPs). This theme provides the elements of good CIP development and governance, covering identification of projects through a risk-based approach and use of BCEs with WLC, prioritization of projects based on clearly stated criteria, and well documented rationales.

While the Alliance has in place a comprehensive CIP, the processes and procedures followed during its development was deemed to be at a maturity Level 2 by the workshop participants. In the short-term, this theme is expected to remain at Level 2, but a maturity Level 3 is targeted for the medium-term, and a Level 4 for the long-term.

2.2.6 Operational Planning and Control

The Operational Planning and Control KFA covers nine themes that are focused on the asset lifecycle with specific attention to O&M under normal circumstances and under adverse conditions. Figure 2-11 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the six themes in this KFA.

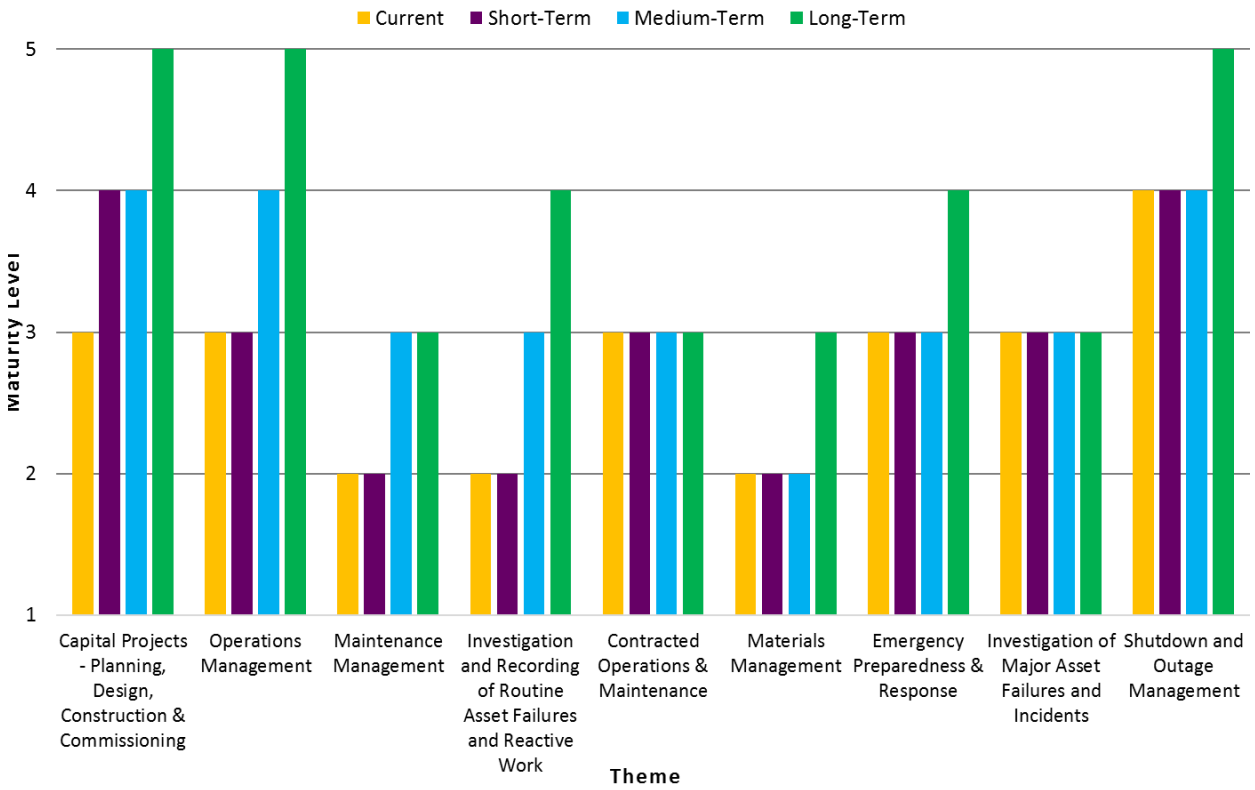


Figure 2-11. CAMRA Results for the *Operational Planning and Control* KFA

2.2.6.1 Capital Projects – Planning, Design, Construction, and Commissioning (Theme 24)

This theme covers the first portion of the asset lifecycle (Figure 2-12), from planning to commissioning an asset. Although this portion of the lifecycle may only amount to 20 to 25 percent of the WLC, its elements will dictate the costs associated with the rest of the asset's lifecycle. In other words, if the planning, design, construction, and/or commissioning of the asset is poor, the cost of O&M, renewal, and decommissioning may very well be adversely impacted. Good asset management practice requires documented processes and procedures for all stages of a project, ensuring that the asset is fit-for-purpose, and delivered within budget and on-time with considerations for optimized O&M.

Figure 2-12. The Asset Lifecycle

The Alliance has a governance structure and has developed and documented processes and procedures for planning, design and construction of assets. However, there are some gaps in the commissioning of new assets. The Alliance is aware of these gaps and is in the midst of developing procedures to close the gaps. Consequently, the current maturity of this theme is Level 3, with work underway to achieve Level 4 in the short-term, and Level 5 in the long-term.

2.2.6.2 Operations Management (Theme 25)

The Operations Management theme addresses the operation of all assets within the Alliance's portfolio. The maturity level is determined by assessing the extent that SOPs or unit process control procedures are documented, available, and followed by staff. Also, it is determined by assessing the extent that

automated systems are used to optimize operations and that asset performance consistently meets functional needs and regulatory requirements, and further, by the extent that operations staff members are trained and appropriately engaged in determining asset risk and in planning of new assets.

The workshop participants scored the current maturity at Level 3. The Alliance has an excellent record of regulatory compliance. There was confirmation that written asset objectives and SOPs are available for each unit process and piece of equipment. However, these are not yet integrated into the CMMS, MPulse™. It was noted that MPulse™ resides on a remote County server and O&M manuals for the SCTP resides on a different County server, also offsite. As such, the maturity level in the short-term is expected to remain at Level 3, although a Level 4 is targeted for the medium-term, and a Level 5 is targeted for the long-term.

2.2.6.3 Maintenance Management (Theme 26)

This theme covers the maturity of maintenance of all assets in the Alliance portfolio. Some of the aspects of maintenance management include proactive maintenance (e.g., preventive maintenance and predictive maintenance) based on asset criticality, written maintenance job plans (SOPs) that are on the CMMS and printed out with work orders with the tools and supplies needed to perform the work, optimized maintenance based on preventing failures rather than being based on original equipment manufacturer requirements and O&M manuals, and assignment of all maintenance costs to the appropriate asset.

Currently, the maturity was scored at Level 2. Maintenance staff currently bases maintenance tasks on the O&M manual even for those assets that are beyond their warranty, rather than developing specific maintenance job plans for assets based on their failure modes. Maintenance work orders are generated from the CMMS, but contain minimal information; the work orders do not include instructions, job safety analyses, or lists of equipment or supplies. Considerable resources will be needed to establish a more robust maintenance operation that has clearly written job plans for each asset with materials and supplies listed. A maintenance job plan validation program will also need to be established to ensure proactive maintenance, as well as establishment of a process to evaluate maintenance analysis methods to determine the most effective maintenance strategy for asset classes or individual assets. Due to the appreciable level of effort required to improve maintenance management, the maturity of this theme is expected to remain a Level 2 for the short-term, but a target of Level 3 was established for the medium-term and long-term.

2.2.6.4 Investigation and Recording of Routine Asset Failures and Reactive Work (Theme 27)

Reliability can be improved, levels of service can be consistently maintained, and lifecycle costs can be minimized by limiting the amount of asset failures and the reactive maintenance necessary to place an asset back in service. Thus, investigating the mode of failure, the root cause of failure, and the tracking and analysis of asset failure is an important tenet of asset management, even for “routine” asset failures. This theme focuses on these aspects.

The participants in the workshop stated that investigation and recording of routine failures and reactive work is not being done in any uniform fashion. Documentation of failure mode, cause of failure, and analysis on how to prevent future failures are frequently missing from the CMMS or paper records. So, the current maturity of this theme was established at Level 2, with a Level 3 targeted in the medium-term and Level 4 targeted for the long-term.

2.2.6.5 Contracted Operations and Maintenance (Theme 28)

This theme focuses on the coordination and oversight of companies that the utility may contract with for O&M. It covers the processes used to determine which activities should be performed by outside contractors, the controls in place to appropriately manage outsourced activities, and the knowledge and information shared with contractors so that performance of their tasks is efficient and effective.

The Alliance contracts-out very few services, and is satisfied with the current maturity Level of 3. Therefore, a Level 3 will be maintained through the long-term.

2.2.6.6 Materials Management (Theme 29)

Effective materials management is crucial to maintaining reliability of service, minimizing costs, and securing a good public image. Materials management includes the ability to quickly acquire critical spare parts needed in case of an asset failure by storing them onsite or having 24-hour on-call suppliers. It also includes having long-term contracts with manufacturers and suppliers to keep the cost of parts, materials and supplies as low as possible. Further, having a robust process for tracking parts, materials and supplies in a warehouse that will pass the scrutiny of an audit will assure customers that the utility is a good custodian of the services for which they pay. In addition, good materials management will assign parts and materials to assets as they are used to provide an accounting of asset lifecycle costs.

The Alliance relies on the County and the City of Ridgefield to manage materials. There is no documented inventory or warehouse, but according to staff, spare parts inventory is available for a number of assets. Purchasing agreements exist for ultraviolet disinfection process bulbs, calcium nitrate (for liquid phase odor control applications), and polymer (for biosolids thickening and dewatering). There is no automated materials management system, spare parts and materials are not assigned to assets, and the current financial systems do not have inventory modules. According to staff, audits of inventory performed done by the County are limited to ad hoc visual inspections. This theme was considered to be at a maturity Level 2, with no anticipated improvement through the medium-term. A target maturity of Level 3 was decided for the long-term but achieving it will depend on human and financial resources.

2.2.6.7 Emergency Preparedness and Response (Theme 30)

This theme focuses on the organization's resilience in the case of an emergency situation, which may be caused by a natural disaster, an asset failure, or a human-caused factor such as a security breach, whether physical or cyber. Utilities should be well prepared for such situations by having up-to-date, written emergency preparedness and response plans to address incidents described above that are available to all employees. These plans should be reviewed and updated on a periodic basis, and importantly, training, desk-top exercises, and possibly field exercises should be held with staff on an annual or biennial basis in coordination with Clark Regional Emergency Services Agency, Member agencies of the Alliance, and other appropriate agencies.

The Alliance had a Vulnerability Assessment performed on the SCTP in January 2017. Otherwise, there appears to be no emergency preparedness and response plan for the Alliance, no training and no exercises held. Workshop participants scored the current maturity at Level 3, meaning that the Alliance has identified key threats and allocated appropriate roles and responsibilities, and that plans are being developed although untested. The Level 3 maturity is anticipated to remain through the medium-term, with expectations of reaching a Level 4 maturity in the long-term.

2.2.6.8 Investigation of Major Asset Failures and Incidents (Theme 31)

Failures of major assets can have significant adverse impacts on the utility, the environment, and its customers and other stakeholders. Having a process to investigate root causes of major failures, defining roles and responsibilities for performing such investigations, and analyzing the findings, as well as communicating the findings are crucial to developing mitigation measures. These mitigation measures can include increased frequency of inspections, increased levels of maintenance analysis, instituting predictive maintenance technologies, changing specifications or manufacturers, or installing/constructing a redundant asset.

The current maturity of this theme was scored at Level 3, with a maturity Level 3 kept through the long-term. There was a discussion about the failure of the chiller at SCTP as a good example of an asset failure requiring a thorough investigation and a plan to prevent such a failure in the future.

2.2.6.9 Shutdown and Outage Management (Theme 32)

Utilities frequently have to shut down equipment or take assets out of service for various reasons. To maintain reliability of service to customers, and reduce downtime while still following the activities defined in AMPs efficiently and safely, having a shutdown and outage management process is crucial. The process typically includes an analysis of the trade-off between the efficiencies of fewer-but-longer shutdowns or outages against more-but-shorter shutdowns or outages, evaluation of impacts and identification of mitigation actions during shutdowns and outages, and specifying the scope of work, materials, labor level of effort, contractors, and other resources required. The process for each asset should involve operations, maintenance, engineering, and possibly public relations staff should service levels be effected.

Workshop participants scored the current maturity at Level 4. There was agreement that there is now good planning for shutdown and outages as exemplified by experience with capital projects requiring the operation of existing assets to be temporarily ceased. A maturity Level 4 is planned to stay in place through the medium-term, with an improvement to Level 5 in the long-term.

2.2.7 Asset Management Enablers and Support

This KFA includes six themes that do what the title of the KFA says: enable and support organizations to more effectively enable the implementation of asset management principles and practices. Several of the themes in the KFA were difficult to score on a consensus basis since the Alliance Members are at varying maturity levels. So, the scores reported are those that the workshop participants felt reflected the average maturity level among the entities. Figure 2-13 shows the current maturity level, and the short-, medium-, and long-term maturity level targets for the six themes in this KFA.

2.2.7.1 Asset Information Systems Implementation Plan (Theme 33)

This theme addresses the availability of a formal IT implementation plan, which details how the functional requirements developed under the Prioritized Plan for Information Technology Functional Requirements (see Section 2.2.2.6) will be achieved. It includes how software and hardware will be assessed and acquired, how applications will be linked and synchronized, and the source of funding to accomplish the plan.

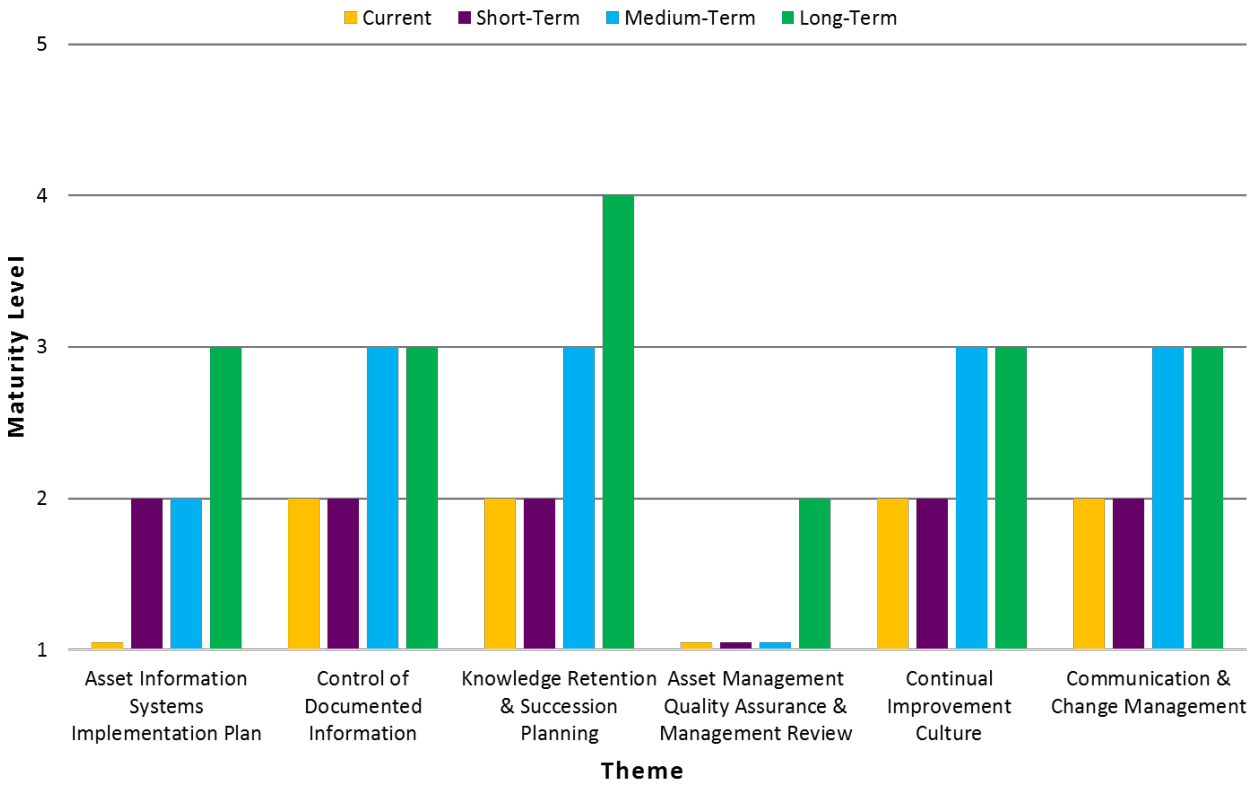


Figure 2-13. CAMRA Results for the *Asset Management Enablers and Support* KFA

As the Alliance has not yet produced a Prioritized Plan for Information Technology Functional Requirements, there is currently no basis on which to have a current maturity for this theme other than Level 1. In the short-term, the Alliance aims to reach a Level 2 maturity and by the long-term a Level 3 maturity.

2.2.7.2 Control of Documented Information (Theme 34)

Efficiency in performing asset management practices depends on the ability to access accurate and timely information and data. As such, it is imperative to ensure that information and data are controlled and kept secure. This includes defining protocols for document referencing access and protection from access by unauthorized persons either through physical breach or cyber hacking.

Workshop participants scored the current maturity for this theme at Level 2, citing documents such as the electronic process O&M manual for the SCTP, and that board meeting minutes are protected, backed up, and locked down. The maturity is slated to remain at Level 2 for the short-term, increasing to Level 3 in the medium-term.

2.2.7.3 Knowledge Retention and Succession Planning (Theme 35)

With changing workforce demographics, retaining institutional knowledge within the organization as older employers retire, and planning for succession in key roles is essential. This theme includes identifying potential retirees, considering who may fill vacancies as they arrive, and ensuring institutional knowledge is documented and passed along as new employees come on-board.

One Member of the Alliance, the District, has a succession plan looking 10 years into the future. Many SOPs have been documented, and a career development pathway for staff is being developed. However, the County and City of Ridgefield have not put such plans in place. Workshop participants selected a

Level 2 for the current maturity level of this theme, with an increase to a Level 3 in the medium-term and Level 4 in the long-term.

2.2.7.4 Asset Management Quality Assurance and Management Review (Theme 36)

This theme addresses the need for a process to audit the asset management practices and procedures, and that the results of the audit are properly communicated and adjustments are made where gaps have been identified.

As the Alliance has not yet embarked on a formal program to implement asset management practices and procedures, the current maturity of this theme was a Level 1. The maturity level is expected to remain at Level 1 through the medium-term, but increase to a Level 2 in the long-term as Alliance adopts asset management across the organization.

2.2.7.5 Continual Improvement Culture (Theme 37)

Review of the efficacy of asset management practices and procedures, and continual improvement are important elements of successful asset management. Establishing a continual improvement culture among employees will facilitate knowledge of new asset management technology and practices, foster a better understanding of changing circumstances that may impact service levels and functional requirements from assets, and enable adjustments to be made to improve decision-making for asset investments.

There was a wide range of maturity levels for this theme among Alliance Members. Workshop participants settled upon a current maturity Level 2, which will continue in the short-term, with an increase to Level 3 in the medium-term.

2.2.7.6 Communications and Change Management (Theme 38)

Successful asset management requires proactive communications and organizational change management. Adopting asset management principles and practices require employees to alter many of the way they do their jobs. It requires new ways of thinking about assets and new approaches to making decisions about assets. Communication from, and visibility from organizational leaders promoting asset management is critical to minimizing resistance from staff as new processes are put into place. Formal change management programs are also crucial to mitigate the fear that is typically felt by staff members.

This is another theme where there was wide variance in maturity among the Alliance Members. Nevertheless, consensus was reached with a current maturity scored at Level 2, with an increase to Level 3 in the medium-term.

SECTION 3

Analysis of CAMRA Results

Opportunities are available for the Alliance to become more effective and efficient in the way assets are managed. These opportunities are presented in this section of the report. However, the current structure of the Alliance presents a significant challenge to implementing and sustaining initiatives that will improve the management and O&M of infrastructure assets.

Three of the four Members of the Alliance (the District, Clark County, and the City of Ridgefield) are separately responsible for the management and O&M of portions of the Alliance's assets. These entities have different governance structures and management structures, human resource policies, budgeting processes, information technology systems, organizational cultures, and financial capabilities. As such, even if representatives from all four Members agree to initiate an asset management improvements initiative, their executive management and governing boards may not support, fund, or approve of moving forward with implementation.

With this major challenge identified, this section presents the basis for developing a roadmap for improving the management and O&M of the Alliance's infrastructure assets.

3.1 Criteria for Prioritizing Improvement Initiatives

The intent of CAMRA is to identify the current state of maturity for the 38 themes of the seven KFAs, and design a roadmap of initiatives for the Alliance to implement so that the organization achieves a higher level of maturity over time. The target time periods for achieving a higher level of maturity for each theme were selected by the staff members participating in the workshop, as shown in Section 2.2.1 and repeated below:

- Short-term – achieved by the end of 2020
- Medium-term – achieved by the end of 2022
- Long-term – achieved by the end of 2024

Table 3-1 shows the complete results from the CAMRA tool.

While the development of the improvement roadmap will attempt to meet the targeted time periods, initiatives to improve one theme, may have another theme or two that are prerequisites to commencing or completing the identified theme. This issue was recognized by workshop participants and taken into consideration, to some extent, when scoring future maturity level targets. Additional consideration for prerequisites are included in the criteria for selecting improvement initiatives as shown below. No improvement initiatives are proposed for themes having a current maturity of Level 4 or Level 5.

3.1.1 Criterion No. 1 – Priority by Target Increase in Maturity

The 38 themes were reviewed for the targeted increase in maturity from the current level. The highest priority scores were given to the largest targeted increases in the maturity level within the shortest timeframe as follows:

- Priority 1: Current Level 1 maturity with a two-level increase in short-term
- Priority 2: Current Level 1 maturity with a single-level increase in short-term
- Priority 3: Current Level 2 maturity with a one level increase in short-term
- Priority 4: Current Level 3 maturity with a single level increase in short-term

- Priority 5: Short-term Level 1 maturity with a single level increase in the medium-term
- Priority 6: Short-term Level 2 or 3 maturity with a single level increase in the medium-term
- Priority 7: Medium-term Level 1 or 2 maturity with a maturity level increase in the long-term
- Priority 8: Medium-term Level 3 maturity with a maturity level increase in the long-term
- Priority 9: Medium-term Level 4 maturity with a maturity level increase in the long-term

3.1.2 Criterion No. 2 – Priority by Prerequisite

This criterion determines the priority depending on whether an improvement to a theme requires that another theme be underway or completed. The priorities are as follows:

- Priority 1: No prerequisite
- Priority 2: Theme improvement can be started as long as prerequisite theme(s) have begun
- Priority 3: Theme improvement can be started only after prerequisite theme(s) have been completed

3.1.3 Criterion No. 3 – Priority by Perceived Level of Resources Required

This is a very subjective criterion that includes both staff resources and contracted resources, as well as financial resources. The priorities are as follows:

- Priority 1: Relatively low level of resources required to improve theme maturity
- Priority 2: Relatively moderate level of resources required to improve theme maturity
- Priority 3: Relatively high level of resources required to improve theme maturity

3.2 Results of Prioritization

Thirty-four of the 38 themes were ranked by overall priority score using the criteria presented in Section 3.1, with the overall priority equal to the product of the three criteria scores. The four themes that were not ranked are those that had a current maturity Level 4 or Level 5, and those that were determined to stay at their current maturity level through the long-term. These four themes are as follows:

- Theme 10: Future Trends Impact of Growth (current maturity at Level 4)
- Theme 11: Legal, Regulatory, and Statutory Requirements (current maturity at Level 5)
- Theme 28: Contracted Operations & Maintenance (no change to maturity level through the long-term)
- Theme 31: Investigation of Major Asset Failures and Incidents (no change to maturity level through the long-term)

The initial priority of themes to be considered for improvement for the remaining 34 themes is shown in Table 3-4. The themes are also preliminarily allocated to four “priority tiers” based on their overall priority score. However, when identifying themes that provide prerequisites, and addressing other issues such as health and safety, some themes are redistributed among the tiers as noted in Table 3-2.

Table 3-1. Results from CAMRA Workshop

Key Focus Area		Theme		Asset Maturity Level			
				Current	Short-Term	Medium-Term	Long-Term
1	Organizational Context	1	Organizational Strategic Plan and Organizational Objectives	1	2	3	4
		2	Understanding the Needs of Stakeholders	2	3	4	4
2	Asset Management Vision & Leadership	3	Asset Management Policy and Strategic Asset Management Plan (SAMP)	1	3	4	4
		4	Asset Management Leadership and Governance	2	3	4	5
		5	Asset Management Roles and Responsibilities	2	3	4	4
		6	Prioritized Plan for the Development of Asset Management Business Processes and Procedures	1	3	4	4
		7	Prioritized Plan for the Development of Asset Management Skills & Competences	1	2	3	3
		8	Prioritized Plan for Information Technology Functional Requirements	1	2	3	3
3	Asset Management Objectives & Targets	9	Asset Management Objectives - Performance Metrics/Levels of Service	2	2	3	4
		10	Future Trends (Impact of Growth)	4	4	4	5
		11	Legal, Regulatory and Statutory Requirements	5	5	5	5
4	Asset Management Information Requirements	12	Asset Information Strategy and Asset Information Improvement Plan	1	2	3	4
		13	Asset Inventory	2	3	4	4
		14	Asset Information Standards	2	3	4	5
		15	Asset Information	2	2	3	4
		16	Information Management	2	3	3	4
		17	Asset Knowledge/Analysis of Data	2	2	3	4
5	Planning to Achieve Asset Management Objectives	18	Asset Strategies	2	2	2	3
		19	Risk Framework - Strategic Level	2	2	2	3
		20	Risk Framework - Asset Level	2	3	4	4
		21	Optimized Asset Intervention Planning	3	3	4	4
		22	Asset Management Plans	1	1	2	3
		23	Capital Improvement Plan Development and Governance	2	2	3	4
6	Operational Planning & Control	24	Capital Projects - Planning, Design, Construction and Commissioning	3	4	4	5
		25	Operations Management	3	3	4	5
		26	Maintenance Management	2	2	3	3
		27	Investigation and Recording of Routine Asset Failures and Reactive Work	2	2	3	4
		28	Contracted Operations & Maintenance	3	3	3	3
		29	Materials Management	2	2	2	3
		30	Emergency Preparedness and Response	3	3	3	4
		31	Investigation of Major Asset Failures and Incidents	3	3	3	3
		32	Shutdown and Outage Management	4	4	4	5
7	AM Enablers & Support	33	Asset Information Systems Implementation Plan	1	2	2	3
		34	Control of Documented Information	2	2	3	3
		35	Knowledge Retention and Succession Planning	2	2	3	4
		36	Asset Management Quality Assurance and Management Review	1	1	1	2
		37	Continual Improvement Culture	2	2	3	3
		38	Communication and Change Management	2	2	3	3

Notes:

Maturity Levels:
1 - Innocence
2 - Awareness
3 - Development
4- Competence
5 – Excellence

Timeframes:
- Short-term – by the end of 2020
- Medium-term – by the end of 2022
- Long-term – buy the end of 2024

Table 3-2. Themes in Order of Initial Priority for Improvement
Prior to Considering Prerequisites and Other Qualitative Issues

	Theme	Priority Score: Criterion No. 1	Criterion No. 2	Criterion No. 3	Overall Priority	Initial Priority Tier	Comments
1	Organizational Strategic Plan and Organizational Objectives	2	1	1	2		
3	Asset Management Policy and Strategic Asset Management Plan (SAMP)	1	2	1	2		Dependent on Themes 2, 9, and 20
2	Understanding the Needs of Stakeholders	3	1	1	3		
6	Prioritized Plan for the Development of Asset Management Business Processes and Procedures	1	1	3	3	1	
7	Prioritized Plan for the Development of Asset Management Skills & Competences	2	1	2	4		
4	Asset Management Leadership and Governance	3	2	1	6		Dependent on Themes 1 and 2
13	Asset Inventory	3	1	3	9		
20	Risk Framework - Asset Level	3	2	2	12		Dependent on Theme 9 Moved from Tier 2 to support SAMP (Theme 3)
9	Asset Management Objectives - Performance Metrics/ Levels of Service	6	2	2	24		Moved from Tier 3 to support Risk Framework at the Asset Level (Theme 2)
5	Asset Management Roles and Responsibilities	3	2	2	12		Dependent on Theme 3
8	Prioritized Plan for Information Technology Functional Requirements	2	2	3	12		Dependent on Theme 3
12	Asset Information Strategy and Asset Information Improvement Plan	2	2	3	12		Dependent on Theme 3
14	Asset Information Standards	3	2	2	12		Dependent on Theme 3
23	Capital Improvement Plan Development and Governance	6	1	2	12	2	
35	Knowledge Retention and Succession Planning	7	1	2	14		
24	Capital Projects - Planning, Design, Construction, and Commissioning	4	2	2	16		Dependent on Theme 3
16	Information Management	3	2	3	18		Dependent on Themes 12 and 14
38	Communication and Change Management	6	1	3	18		
30	Emergency Preparedness and Response	8	1	3	24		
32	Shutdown and Outage Management	9	1	3	27		
18	Asset Strategies	7	2	2	28		Dependent on Theme 3
19	Risk Framework - Strategic Level	7	2	2	28		Dependent on Theme 1
22	Asset Management Plans	5	2	3	30		Dependent on Theme 3
27	Investigation and Recording of Routine Asset Failures and Reactive Work	8	2	2	32		Dependent on Theme 1
15	Asset Information	6	2	3	36	3	Dependent on Theme 13
17	Asset Knowledge/Analysis of Data	6	2	3	36		Dependent on Theme 15
25	Operations Management	6	2	3	36		Dependent on Theme 3
26	Maintenance Management	6	2	3	36		Dependent on Theme 3
34	Control of Documented Information	6	2	3	36		Dependent on Themes 8 and 12
37	Continual Improvement Culture	6	2	3	36		Dependent on Theme 3 and others
29	Materials Management	7	2	3	42		Dependent on Theme 13 and others
21	Optimized Asset Intervention Planning	6	3	3	54		Dependent on Themes 18, 25, and others
33	Asset Information Systems Implementation Plan	6	3	3	54	4	Dependent on Theme 8
36	Asset Management Quality Assurance and Management Review	7	3	3	63		Dependent on all of the above

Notes:

Criteria
- No. 1 - Priority by Target Increase in Maturity
- No. 2 - Priority by Prerequisite
- No. 3 - Priority by Perceived Level of Resources Required

SECTION 4

Recommended Improvement Initiatives

The Alliance faces a staff resource barrier to immediate implementation of initiatives intended to advance the Alliance along the path toward asset management maturity. Recognizing this, an Initial Criticality and Condition Assessment Initiative is recommended for immediate implementation, to identify and program critical capital projects to improve or replace assets with high risk of failure in the 2019/2020 Capital Plan. This effort is described in more detail below. Following this initial assessment, additional initiatives are recommended for implementation.

Additional recommended asset management improvement initiatives for Tier 1 and Tier 2 themes are presented in this section, along with suggested tasks to complete the initiative, task timeframes, task durations, and task outcomes. The tasks and associated details for Tier 3 and Tier 4 themes should be established after substantial progress is made on Tier 1 themes, or in approximately the second quarter of 2021.

For each improvement initiative, it is suggested that Alliance leadership establish a cross-functional team with a team leader, to carry out the tasks necessary to complete the initiative within the established timeframe. Periodically, the team leader should provide a "report card" to Alliance leadership on the status of the initiative, including progress made, and schedule compliance.

4.1 Initial Criticality and Condition Assessment Initiative

The recommended Initial Criticality and Condition Assessment is intended to allow the Alliance Member agencies to provide specific, qualitative O&M feedback in a structured format on a comprehensive list of assets at each of the Alliance's nine regional assets. Based on existing drawings, and knowledge of the facilities, the comprehensive list of assets should be created in a hierarchical format to provide a clear relationship between assets, and allow for an efficient top-down risk analysis. Typically, the hierarchy for a utility system is based on ISO standard 14224, as shown with a wastewater treatment example, in Figure 4-1. Following initial development, a quality assurance step to validate the asset lists is recommended.

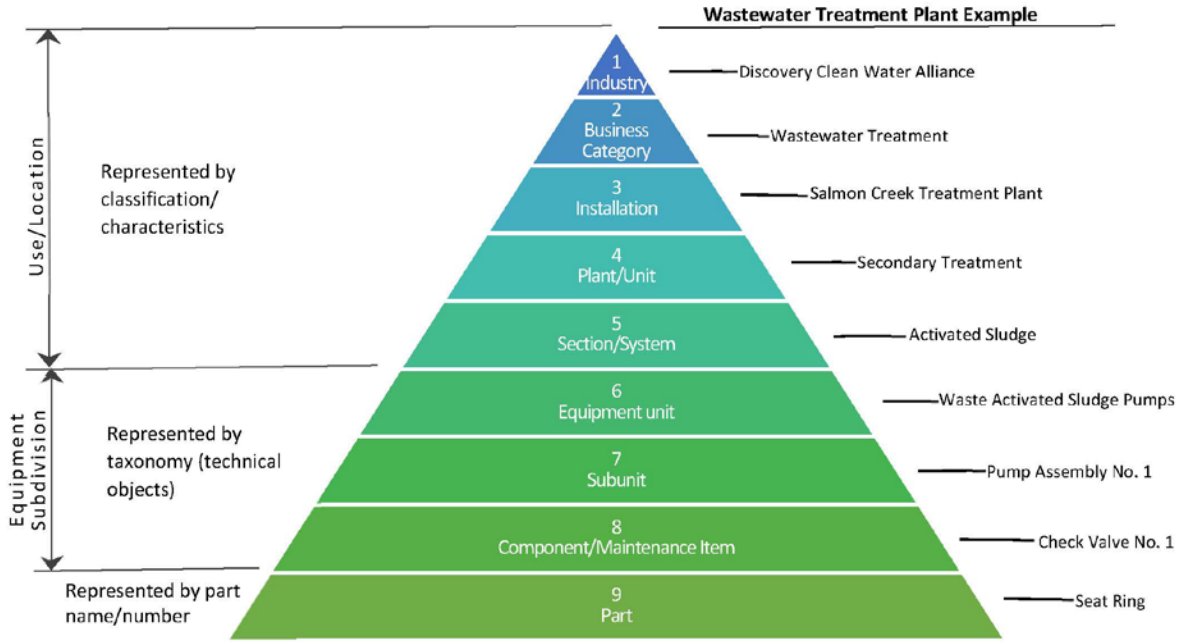


Figure 4-1. Example of Asset Hierarchy Structure Based on ISO 14224

The qualitative review of assets is recommended to be gathered in site visits, and a series of workshops with Member agencies' O&M staff responsible for the facilities. At the workshops, participants should determine the criticality of assets by scoring the apparent consequences of their failure (COF); that is, the significance of an impact on the Alliance's levels of service delivery and regulatory compliance. The participants should then score the likelihood of failure (LOF) of the assets primarily based upon an asset's physical condition and possibly its performance. A COF matrix and an LOF matrix should be prepared to guide the participants in scoring both consequence and likelihood. Although asset condition should be scored in accordance with industry standards on a scale of 1 (very good) to 5 (very poor), it is recommended that both COF and LOF scores range from 1 to 10, with 1 a negligible consequence and a very low likelihood, respectively, and 10 being a very high consequence and very high likelihood, respectively. Calculating the product of COF and LOF will provide a quantification of the relative risk of asset failure in a range of 1 to 100, with 1 being the lowest risk and 100 being the highest risk.

Once the risk of failure of the assets is determined, an acceptable level of risk should be determined. Assets having risks above the acceptable level should be slated for risk mitigation either through changes in O&M or through capital renewal (rehabilitation or replacement) depending on whether COF or LOF is driving the risk. Typically, the COF can only be reduced by redundancy and improved O&M, while LOF can be reduced by rehabilitation or replacement. Further, critical assets can be determined by ranking the assets' COF scores, and selecting those that have the highest scores.

This approach is intended to facilitate the already-planned biennial capital planning effort. Like any capital planning effort, judgment is involved in determining priorities for implementation. The structured approach is intended to provide equal consideration of all assets and to document input received from staff in a transparent manner, which can be referred to in future analyses.

4.2 Tier 1 Improvement Initiatives

Tier 1 initiatives that require relatively limited resources should be started as soon as possible to set the foundation for improved asset investment decision-making in the upcoming budget process. At a minimum, needed resources to complete Tier 1 initiatives should be requested in the upcoming Fiscal Year 2019–2020 budget.

Table 4-1 lists the nine themes recommended for Tier 1 improvement initiatives.

Table 4-1. Tier 1 Themes Recommended for Improvement Initiatives

Theme No.	Theme Title
1	Organizational Strategic Plan and Organizational Objectives
2	Understanding the Needs of Stakeholders
3	Asset Management Policy and Strategic Asset Management Plan (SAMP)
4	Asset Management Leadership and Governance
6	Prioritized Plan for the Development of Asset Management Business Processes and Procedures
7	Prioritized Plan for the Development of Asset Management Skills & Competences
9	Asset Management Objectives - Performance Metrics/ Levels of Service
13	Asset Inventory
20	Risk Framework - Asset Level

4.2.1 Organizational Strategic Plan and Organizational Objectives (Theme 1 Initiative)

It is generally agreed that developing a Board-approved strategic plan for the Alliance is unlikely in the foreseeable future. Nevertheless, since the organizational strategic plan and its organizational objectives are the backbone of asset management, staff members should take it upon themselves to draft a strategic plan and organizational objectives by the end of the third quarter of 2017. There are numerous strategic plans from wastewater utilities available, and most utilities will be eager to share their work. Staff can use these strategic plans, including District's mission and vision statements, as a wireframe upon which to build the Alliance's strategic plan and organizational objectives.

Participation from representatives of the Alliance's Members is crucial. The extensive customer outreach and the ongoing communications with regulatory agencies should provide sufficient information on the needs and expectations of stakeholders that is important in organizational strategic planning. To mitigate political influences, the Alliance should eventually consider formally adopting the strategic plan and organizational objectives by consensus at a meeting of the representatives of the Members. Table 4-2 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-2. Suggested Tasks Theme 1 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Obtain and review copies of strategic plans from other water and wastewater sector utilities, and review, at a minimum, the following: – Alliance's Core Values – Authorizing statute for creation of the Alliance – Interlocal Formation Agreement as amended and restated – Resolutions – Current budget documents – Treatment plant operating permits and other applicable permits – Comprehensive Annual Financial Reports	Q1 2019	2 months	Understanding of the content of a strategic plan in the context of the Alliance
2	Conduct a workshop to: (1) review the Alliance's current mission statement and affirm or restate; and (2) create the Alliance's vision statement.	Q1 2019	1 month	Mission and vision statements
3	Conduct a workshop using the Ten Attributes of Effective Utility Management to focus and select organizational goals/objectives; develop goal statements; develop organizational objectives.	Q2 2019	1 month	Goal statements and organizational objectives
4	Prepare a draft organizational strategic plan to be circulated to Alliance leadership (including member entity representatives) for comment.	Q2 2019	2 months	Draft strategic plan and organizational objectives
5	Prepare a final draft incorporating comments and circulate to Alliance leadership (including member entity representatives) and key staff members for final comments.	Q3 2019	1 month	Final draft strategic plan
6	Incorporate any final comments and prepare a final document for consideration and approval by Member agency representatives at a formal meeting.	Q3 2019	2 months	Final strategic plan approved by member entity representatives
7	Communicate strategic plan throughout the Alliance.	2020	Ongoing	Staff awareness and understanding
8	Review ongoing AM activities with strategic plan to ensure alignment.	2021	Ongoing	

Table 4-2. Suggested Tasks Theme 1 Improvement Initiative

	Task	Time-frame	Duration	Outcome
9	Develop formal process to monitor and track progress with the Alliance's mission, vision, goals, and strategic objectives.	Q1 2021	2 months	Alignment of AM activities with strategic plan
10	Continually track progress of AM activities with the Alliance's mission, vision, goals, and strategic objectives.	2023	Ongoing	

4.2.2 Understanding the Needs of Stakeholders (Theme 2 Initiative)

The Alliance has actively engaged stakeholders through meetings, tours, and surveys. The District also has distributed bimonthly *Connections* newsletters to customers for several years. There is a good level of confidence that the Alliance is aware of the needs and expectations of its customers and stakeholders, but an exercise to refresh the identity of stakeholders, their needs, expectations, and influence is recommended as part of developing the organizational strategic plan and objectives, as well as preparing the SAMP. Table 4-3 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-3. Suggested Tasks for Theme 2 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Brainstorm stakeholders and use a matrix to capture the following: – Identify stakeholders by name of organization, agency, group, or individual – Their attitude/view toward the Alliance and its services (positive, neutral, or negative) and why – Their level of influence (high, medium, or low) and how their influence is applied – Their needs and expectations from the Alliance – Strategy to engage the stakeholder, if necessary – Is the Alliance meeting their needs and expectations; how or why not?	Q1 2019	1 month	Draft stakeholder matrix with list of stakeholders with aligned attributes
2	Distribute stakeholder matrix to Alliance leadership and other appropriate members of management for comments, and meet to finalize matrix.	Q1 2019	2 months	Final stakeholder matrix
3	Use the results of the stakeholder analysis to help prepare the organizational strategic plan and organizational objectives, the SAMP, and the asset management objectives, and levels of service.	Q2 2019	1 month	See Initiative Tier 1-A
4	Develop a communications plan to ensure appropriate stakeholders are kept aware of developments in the asset management program.	Q2 2019	3 months	Communications plan for stakeholders
5	Actively engage appropriate stakeholders on a periodic basis regarding their needs and expectations with respect to asset management.	2020	Ongoing	Stakeholder understanding
6	Incorporate stakeholder needs and expectations, as appropriate, into asset investment decision-making.	2022	Ongoing	Improved customer levels of service

4.2.3 Asset Management Policy and Strategic Asset Management Plan (Theme 3 Initiative)

There are many examples of asset management policies that can be found on the internet, through other utilities, and consultants. While there is no page limit to an asset management policy, it is suggested that it is best if it can be kept to a single page of letter, legal, or tabloid size. This facilitates its distribution to staff and stakeholders, as well as having it posted at Alliance facilities. Along with gathering samples of asset management policies, guidance can be found in several publications such as the International Infrastructure Asset Management Manual (IIMM)[3], the Asset Management Anatomy[4], the Asset Management Landscape[5], and ISO 55000[6].

It can be more difficult to find examples of SAMPs for water and wastewater sector utilities. Some more progressive utilities might have a SAMP and be willing to provide a copy to the Alliance. It is more likely that a utility in Australia, New Zealand, or Canada will have developed a SAMP, although a few utilities in the United States have done so. Examples of SAMPs prepared for other public sector agencies can be found on the internet. The best guidance for developing a SAMP can be found in the IIMM. A slide presentation focusing on SAMPs that was made at the 2015 American Water Works Association Infrastructure Management Conference is provided in Appendix B. Table 4-4 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-4. Suggested Tasks for the Theme 3 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Obtain copies and review Asset Management Policies from other water and wastewater sector organizations, along with Alliance's strategic plan (1-A initiative) and stakeholder matrix (1-B initiative) and decide on format and outline of Asset Management Policy.	Q2 2019	2 months	Understanding of the content of an Asset Management Policy
2	Develop a Draft Asset Management Policy ensuring its alignment with the strategic plan and distribute draft policy to Alliance leadership and other appropriate members of management for review and comment.	Q3 2019	3 months	Draft Asset Management Policy
3	Incorporate comments and prepare a final Asset Management Policy for consideration and approval by Member representatives at a formal meeting; subsequently distribute to appropriate Member agency employees, and post at Alliance facilities.	Q4 2019	3 months	Final Asset Management Policy approved by Member representatives
4	Obtain copies and review SAMPs from other water and wastewater sector organizations and other agencies.	Q4 2019	1 month	Understanding of the content of a SAMP
5	Prepare a draft annotated outline of the SAMP referring to other SAMPs and guidance publications and distribute to appropriate staff for comment.	Q1 2020	2 months	Draft SAMP annotated outline
6	Prepare final annotated outline of the SAMP considering any comments received.	Q1 2020	1 month	Final SAMP annotated outline
7	Create draft of SAMP based on the final annotated outline and circulate to appropriate staff for comments.	Q2/Q3 2020	5 months	Draft SAMP

[3] *International infrastructure management manual* (5th ed.). (2015). Wellington, N.Z.: National Asset Management Steering (NAMS) Group.

[4] *Asset management – an anatomy* (Ver. 2). (2014). Bristol, U.K.: The Institute of Asset Management.

[5] The *asset management landscape* (2nd ed.). (2014), Zurich.: The Global Forum on Maintenance and Asset Management.

[6] Asset management: BS ISO 55000:2014, BS ISO 55001:2014 and BS ISO 55002:2014. (2014). London: BSI Standards Ltd.

Table 4-4. Suggested Tasks for the Theme 3 Improvement Initiative

	Task	Time-frame	Duration	Outcome
8	Prepare final SAMP considering comments received.	Q3 2020	1 month	Final SAMP
9	Receive endorsement of SAMP from Alliance leadership.	Q4 2020	1 month	Endorsed SAMP
10	Develop process to ensure Asset Management Policy and SAMP remain aligned with organizational strategic plan and staff of Member agencies are kept abreast of any updates and changes.	2021	Ongoing	Written process to maintain SAMP over time

4.2.4 Asset Management Leadership and Governance (Theme 4 Initiative)

It is imperative for executive management of the utility to be actively and enthusiastically involved in promoting asset management to enable imbedding new practices in the organization, and mitigating resistance of employees to change the way they work. For the Alliance, ensuring the alignment of the leadership from the Member agencies, makes this initiative more of challenge and therefore more important to success of asset management.

It is strongly recommended that the public works directors of Clark County, the City of Ridgefield, and the City of Battle Ground, work closely with the District's General Manager (as the Alliance's Administrative Lead) to carry a consistent message to all employees who plan, operate, and maintain the Alliance's infrastructure. In addition, the leadership of the Member agencies must agree on a governance structure for asset management, and provide the necessary human and financial resources to improve the maturity level, and needed infrastructure investments to sustain the delivery of established levels of service into the future. Table 4-5 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-5. Suggested Tasks for Theme 4 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Alliance Member representatives meet to establish a governance structure for asset management.	Q2 2019	1 month	Asset management governance structure
2	Governance structure with roles and responsibilities is put into place, and communicated to Alliance and Member staff.	Q2 2019	2 months	Active governance structure
3	Governance policies and procedures are developed and put into place.	Q3 2019	3 months	Governance policies and procedures
4	Importance of adopting asset management principles and practices is starting to be communicated throughout the Alliance.	Q1 2019	Ongoing	Employees gaining understanding of asset management
5	Clear and consistent messages about asset management are communicated to all staff both verbally and in writing, as well as in everyday work activities.	2021	Ongoing	Employees using asset management principles and processes
6	Process for periodic review of the governance structure, policies and procedures, and communications approach is developed and implemented.	2023	Ongoing	Process for updating governance and communications

4.2.5 Prioritized Plan for Development of Asset Management Business Processes and Procedures (Theme 6 Initiative)

The Alliance and its Member agencies have some business processes in various states of completion, and currency. Most, if not all, are being used on an ad hoc or sporadic basis. In addition, there is currently no agreed-to or documented approach among Alliance Members for the further development of new processes or the updating of existing ones.

This initiative is aimed at identifying the existing processes used and needed for the management, planning, operation, and maintenance of Alliance assets. It will also create a prioritized plan, recognizing limited resources, for developing and documenting business processes and procedures following a standard template. This initiative will not create the processes and procedures, but rather identify and prioritize what is needed for effective and efficient management of the Alliance's infrastructure assets. Table 4-6 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-6. Suggested Tasks for Theme 6 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Develop a generic process flow diagram for asset management.	Q2 2019	1 month	Asset management governance structure
2	Engage in a business processes and procedures review, documenting current processes and procedures including information on their current usage.	Q3/Q4 2019	6 months	Understanding of current processes and procedures
3	Identify business processes and procedures missing for current needs and those that will be necessary for future asset management practices.	Q1/Q2 2020	6 months	Understanding of processes and procedures that will be needed
4	Develop a rubric for prioritizing business processes and procedures for mapping and for development of SOPs, and prioritize.	Q3 2020	1 month	Process/procedure prioritization approach
5	Create a plan for documenting business processes and procedures through process maps and through written record; include timeframe and individuals responsible.	Q3/Q4 2020	5 months	Prioritized plan for developing asset management business processes and procedures
6	Document an approach to review and update business processes and procedures, as well as incorporating new processes and procedures.	Q3 2021	3 months	Plan to review and update and create new business processes and procedures

4.2.6 Prioritized Plan for Development of Asset Management Skills and Competencies (Theme 7 Initiative)

People "do" asset management, so ensuring that the staff who plan, manage, operate, and maintain the Alliance's assets have the needed skills and competencies is a crucial component of the asset management journey. While some skills and competencies may be unique to the utility and the assets it owns, there are many skills and competencies associated with asset management principles and practices that are comment to all. An excellent reference for identifying what knowledge and abilities are necessary for the Alliance Members' employees is *The IAM Asset Management Competences*

Framework.[7] The Framework specifies 7 key roles and a total of 28 individual skills and competencies. This initiative will produce a plan to guide the Alliance in ensuring the staff will have the skills and competencies necessary to implement and sustain effective asset management practices. Table 4-7 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-7. Suggested Tasks for Theme 7 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Review the IAM Competences Framework and identify additional specific additional skills and competencies required for embedding asset management in the Alliance.	Q2 2019	1 month	Asset management governance structure
2	Score/rank skills and competencies by their importance to the Alliance and the current ability level of Alliance Member staff; this may be done by a questionnaire to all employees associated with the Alliance.	Q3/Q4 2019	5 months	Understanding of skills and competencies of current staff
3	Identify gaps in the skills and competencies, and decide which gaps can be closed by training staff, and which need to be closed by hiring.	Q1/Q2 2020	5 months	Skills and competency gaps that need closing
4	Identify needed training and availability of training over the next several years, as well as needed hires, and estimate associated costs for budgeting purposes by Member agencies.	Q2 2020	1 month	Resource needs to close gaps
5	Create a plan for documenting the findings, decisions, and recommendations from the tasks above.	Q3 2022	3 months	Prioritized Plan for Development of Asset Management Skills and Competencies

4.2.7 Asset Management Objectives –Levels of Service/Performance Metrics (Theme 9 Initiative)

Although this theme was initially assigned to Tier 2, it is a prerequisite to developing the SAMP and the asset level risk framework, which are both Tier 1 initiatives. Consequently, establishing asset management objectives, levels of service, and performance metrics is an initiative that needs to start at the beginning of the asset management implementation.

Asset management objectives are set by the organization, consistent with the organizational strategic plan, organizational objectives, and the Asset Management Policy, to achieve intended outcomes from adopting asset management principles and practices. Levels of service are the quantitative and sometimes qualitative measures of desired performance from assets and to delivery of services to clients. Performance metrics are established to measure activities and functions that impact levels of service. Table 4-8 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-8. Suggested Tasks for Theme 9 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Review the strategic plan, organizational objectives, and Asset Management Policy, and develop a draft set of asset management objectives for review and comment by appropriate Member staff.	Q1 2020	1 month	Draft asset management objectives

[7] *Asset management competences framework* (Ver. 3.0). (2014). Bristol, U.K.: The Institute of Asset Management.

Table 4-8. Suggested Tasks for Theme 9 Improvement Initiative

	Task	Time-frame	Duration	Outcome
2	Incorporate comments received, as appropriate, and finalize asset management objectives.	Q1/Q2 2020	5 months	Final asset management objectives
3	Brainstorm possible level of service (LOS) categories that maintain a "line of sight" to the asset management objectives along with the organizational objectives and strategic plan. Reach consensus on selecting no more than 6 categories, and decide on target levels for each LOS category. Circulate to Alliance leadership for review and comment.	Q3/Q4 2020	5 months	Draft LOS categories and targets
4	Incorporate comments received, as appropriate, and finalize LOS and LOS targets.	Q4 2020	1 month	Final LOS categories and targets
5	Review the more than 100 typical performance measures used in the water and wastewater sector references and select those that support the established LOS and that meet the "SMART" requirements. (Maximum of 10 KPIs, all others should be PIs).	Q1 2021	3 months	KPIs and PIs to support and monitor LOS delivered

KPI = key performance indicator

LOS = levels of service

PI = performance indicator

4.2.8 Asset Inventory (Theme 13 Initiative)

Individual vertical and linear assets owned by the Alliance need to be included in a formal asset register that is accessible to appropriate staff. Typically, the asset register for vertical assets is maintained in a CMMS, and for linear assets in GIS. For the assets owned by the Alliance, it is crucial that all of the vertical assets reside on one software application, and linear assets reside on one GIS application, regardless of which Member agency operates and maintains the asset.

The asset register should be set up in a hierarchical manner that follows ISO 14224 in order to support operational and strategic decision making. Each asset in the register must have a unique asset identifier to accurately track location, parts, and costs, as well as to assess and manage the asset. Asset attribute data, such as manufacturer, date of construction/ installation, size/capacity, material, location, etc., must be accurate and kept current. When populating the asset register with attribute data, the data should be time-stamped. Similarly, the accuracy of the data should be identified as to the staff's confidence level in the data. The end goal of a well-established asset inventory is to fully support financial reporting requirements and support investment decision making. Table 4-9 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-9. Suggested Tasks for the Theme 13 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Establish an asset hierarchy framework in accordance with ISO 14224, and select the software application that will be used for Alliance asset register.	Q1 2019	2 months	Agreement on asset hierarchy
2	Establish the asset hierarchy in the CMMS (and GIS if appropriate).	Q1 2019	1 months	Hierarchy in CMMS/GIS

Table 4-9. Suggested Tasks for the Theme 13 Improvement Initiative

	Task	Time-frame	Duration	Outcome
3	Review asset inventory data existing in MPulse™, Excel spreadsheets, and other known locations/sources, and determine the confidence level and currency of the data.	Q2 2019	3 months	Understanding existing asset data
4	Populate the asset register(s), in accordance with the established asset hierarchy, with existing asset inventory data from all known data sources, marking the confidence level of the data for each asset.	Q3/Q4 2019	6 months	Initial asset register
5	Identify assets that exist, but not in the existing inventory sources, and add those assets, in accordance with the established asset hierarchy, to the asset register(s).	Q1 2020	3 months	Gaps in asset inventory
6	Develop prioritized plan to capture missing assets and missing asset data, along with updating attribute data that were determined to have a low confidence level. Priority should be given to critical assets (i.e., those determined to have a high consequence of failure).	Q3 2020	3 months	Prioritized plan to capture missing asset data
7	Execute plan to capture missing assets in the asset inventory.	2021 to 2023	2 years	Up-to-date and accurate asset inventory

4.2.9 Risk Framework – Asset Level (Theme 20 Initiative)

Creating and adopting an asset-level enterprise-wide risk framework is crucial to making informed decisions for investing in assets, whether it be for maintenance, rehabilitation, or replacement. The risk framework leads to a quantification of the consequences asset failure, thus enabling the Alliance to identify which assets are "critical." To be of value to the Alliance, a minimum of a maturity Level 3 for this theme is necessary, and a Level 4 is preferable. Since the risk framework should be incorporated into the SAMP, this initiative is aimed at raising the Alliance's maturity to Level 3 in the short-term and Level 4 in the medium-term. The risk framework is based upon the selected LOS categories and targets, and therefore retains the "line of sight" back to the organizational strategic plan and organizational objectives. Table 4-10 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-10. Suggested Tasks for the Theme 20 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Establish a draft risk framework, including scoring system, using the LOS categories for the consequence of failure matrix, and asset condition and asset performance for the likelihood of failure (plus surrogate categories if needed). LOS categories may be weighted by importance to the Alliance and its customers and other stakeholders. Circulate draft framework to Alliance Members' management for review and comment.	Q1 2019	2 months	Draft risk framework
2	Finalize risk framework system considering comments received, and incorporate into SAMP.	Q1 2019	1 month	Final risk framework
3	Decide on software (e.g., Excel, VBA model(s), proprietary applications) to be used for applying the risk framework to assets.	Q2 2019	3 months	Software/models to be used for assessing asset risk
4	Engage staff in risk assessment of assets, using top-down approach for vertical assets, and, if possible, bottom-up, GIS-based approach for linear assets.	Q3/Q4 2019	6 months	Risk assessment of existing assets

Table 4-10. Suggested Tasks for the Theme 20 Improvement Initiative

	Task	Time-frame	Duration	Outcome
5	Establish risk mitigation analysis process (e.g., BCEs, cost per risk-unit reduction)	Q1 2020	3 months	Risk mitigation analysis process
6	Standardize risk assessment process, software, and provide guidance on updating risk assessments periodically.	Q2 2020	3 months	Standard risk assessment process
7	Assess asset risk as new assets are added, and re-assess assets periodically in accordance with Task 5, above.	Q3 2020	Ongoing	Up-to-date risk of asset failure

4.3 Tier 2 Improvement Initiatives

In general, Tier 2 improvement initiatives take a slightly lower priority than Tier 1 initiatives. However, progress in several of Tier 2 initiatives are necessary to advance Tier 1 initiatives, and all are crucial to improve the management of the Alliance's infrastructure assets. Consequently, Tier 2 initiatives should begin as soon as resources are available. Table 4-11 lists the nine themes recommended for Tier 2 improvement initiatives.

Table 4-11. Tier 2 Themes Recommended for Improvement Initiatives

Theme No.	Theme Title
5	Asset Management Roles and Responsibilities
8	Prioritized Plan for Information Technology Functional Requirements
12	Asset Information Strategy and Asset Information Improvement Plan
14	Asset Information Standards
16	Information Management
23	Capital Improvement Plan Development and Governance
24	Capital Projects - Planning, Design, Construction, and Commissioning
35	Knowledge Retention and Succession Planning
38	Communication and Change Management

4.3.1 Asset Management Roles and Responsibilities (Theme 5 Initiative)

Incorporating asset management into an organization may very well alter the way staff members do their jobs, require new ways of thinking, create new tasks for employees, and result in altered communication paths. Therefore, it is important to identify key asset management functions along with the interfaces between the functions, and clearly assign roles and responsibilities to staff members. An effective method of designating staff to roles is developing a Responsible, Accountable, Consulted, and Informed (RACI) matrix. The RACI matrix lists all key asset management functions and identifies the staff member who is responsible to perform the function and who is accountable for the success of that function. It also identifies which staff member(s) should be consulted with regard to the function, and which staff member(s) should be kept informed (e.g., receiving progress reports, performance metrics). Importantly, when creating the RACI matrix, it is important to consider the staff member's experience and competence, the ability to demonstrate an understanding of the role, support that will be available through training and mentoring, and other workload requirements that may impact the individual's

ability to succeed. Table 4-12 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-12. Suggested Tasks for the Theme 5 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Identify key asset management functions, referring to institutional knowledge, asset management references, and other wastewater utilities that have adopted asset management principles and practices.	Q2 2021	3 months	Key asset management functions
2	Prepare a RACI matrix with the identified key asset management functions and assign organizational departments, groups, sections, etc., for those who should be responsible, accountable, consulted, and informed for each key function.	Q3/Q4 2021	6 month	RACI matrix with organizational subdivisions assigned to key functions
3	Finalize RACI matrix by working with the departments, groups, sections, etc., to select the appropriate individuals for each role in each function, as well as identifying new staffing needs where existing staff does not have the skills or competencies necessary.	Q1/Q2 2022	6 months	RACI matrix with individuals assigned and staffing needs identified
4	Work with Alliance Members to assign the roles to individuals and make appropriate modifications to formal job descriptions and duties contained within those job descriptions; also, modify employee evaluation forms to reflect new roles.	Q3/Q4 2022 and 2023	18 months	Revised job descriptions and evaluation forms

4.3.2 Prioritized Plan for Information Technology Functional Requirements (Theme 8 Initiative)

Effective asset management requires reliable, up-to-date, and accurate information and data. Efficient asset management requires that the information and data be readily retrievable to staff when needed, and be in a format that is readily understandable and useful. To accomplish both effective and efficient asset management, selected IT systems must have the functional requirements needed, be user friendly and customizable, be interfaced with other IT systems as necessary, and not be overloaded with features neither currently used nor needed in the future.

With Alliance Member agencies having different IT systems for similar functions, it is critically important that a prioritized IT functional requirements plan be developed soon. Such a plan will mitigate the cost and confusion of having multiple asset management IT platforms that cannot “talk to each other,” require multiple hardware configurations, and staff training on several software applications that are slated to perform similar functions. Table 4-13 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-13. Suggested Tasks for the Theme 8 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Identify what asset management related functionality is desired currently and for the future. This should include asset register(s), work order management, capital planning, predictive modeling, mobile computing, etc. Also, identify needed linkages and synchronizations with other applications such as financial information systems, human resource management systems, inventory management systems.	Q3/Q4 2019	6 months	Current and desired asset management functionality of IT systems and linkages to other IT systems
2	Meet with IT administrators of the Member agencies to learn of existing IT systems and functionalities, versions of applications, and	Q1 2020	3 month	Understanding of Members’ IT systems

Table 4-13. Suggested Tasks for the Theme 8 Improvement Initiative

	Task	Time-frame	Duration	Outcome
	plans/schedules for updating hardware and software, as well as incorporating new technology and functionality.			and plans for the future
3	Understanding the functional needs of the Alliance, and the existing and planned functionality of existing and future hardware and software of Member agencies, prioritize IT functional needs using both monetary and non-monetary criteria.	Q2/Q3 2020	6 months	Prioritized list of IT functional requirements
4	Prepare a draft plan that includes current IT hardware/software and functionality, and needed functionality in the foreseeable future, by priority. Estimate cost and incorporate into planning expenditures. Circulate draft plan to users and other appropriate staff for comment.	Q4 2020	2 months	Draft prioritized plan for IT functional requirements
5	Considering comments, finalize plan and make available to staff.	Q4 2020	1 month	Draft prioritized plan for IT functional requirements
6	Develop a process to obtain feedback from users on current hardware and software, and future needs, including review and update of the plan on a periodic basis.	Q1 2021	2 months	Process for eliciting feedback from users and review and updating of plan

4.3.3 Asset Information Strategy and Asset Information Improvement Plan (Theme 12 Initiative)

To effectively manage infrastructure assets, it is crucial to capture asset data that are useful and meaningful, and to maintain data that are up-to-date and accurate. The asset information strategy sets the foundation for what asset information and data will be collected and maintained, how often they will be updated, and how they will be collected and transferred to the asset register. The asset information strategy will also include a timeline to achieve milestones for having asset information and data populated in the asset register. As the strategy is implemented, input from staff will be helpful in developing refinements to the strategy; this approach will be included in an asset information improvement plan. Table 4-14 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-14. Suggested Tasks for the Theme 12 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
1	Identify what asset information and data are required to effectively manage assets and make informed decisions. and document. This should include both linear and vertical assets.	Q2 2019	2 months	Needed asset information and data
2	Identify who will be responsible for collecting asset information and data, and how it will be recorded and loaded into the asset register(s). Address both existing assets (with and without data already in the CMMS/GIS) and new assets. Decide on how asset information and data will be maintained and by whom, and how data related to decommissioned assets will be handled.	Q2 2019	1 month	Responsibilities and logistics of capturing asset information and data
3	Decide the approach for assessing the efficacy of the strategy over time and how refinements will be handled.	Q3 2019	2 months	Approach for assessing information strategy

Table 4-14. Suggested Tasks for the Theme 12 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
4	Prepare a draft asset information strategy and improvement plan and circulate to appropriate staff for comment. Include Member agencies.	Q1 2022	3 months	Draft asset information strategy and improvement plan
5	Finalize asset information strategy and improvement plan considering comments received.	Q2 2022	1 month	Final asset information strategy and improvement plan
6	Periodically assess information strategy and refine as needed, considering input from users.	Q2 2022	Ongoing	Updated asset information and strategy

4.3.4 Asset Information Standards (Theme 14 Initiative)

Consistency in the collection and storage of asset information and data is as important as its currency and accuracy. Asset information standards are the requirements for what the data format should be, what units should the data have, how asset identifiers are assigned and assets tagged, how the information in the asset register is updated when new components are added to a vertical asset or a section of pipe is replaced in a force main. These standards also specify how maintenance activities, labors, and costs will be assigned to an asset, as well as what fields will be used in the CMMS and GIS for asset information and data, and how fields will be added if needed. Table 4-15 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-15. Suggested Tasks for the Theme 13 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
1	Define information and data requirements for all asset types, what format the information and data should have, including a structure for asset identifiers (e.g., intelligent IDs., semi-intelligent IDs, random IDs); consistency in terminology for asset systems, asset classes, and asset components; definition of the lowest level of the hierarchy that will be considered an asset; how assets information and data will be modified to accommodate changes to components and sections of pipe added, etc.	Q2/Q3 2019	6 months	Information and data requirements
2	Develop a draft asset information standards manual and circulate to appropriate staff for comment.	Q4 2019	3 months	Draft asset information standards
3	Finalize the asset information standards manual considering comments from staff, and make available to all staff members.	Q1 2020	2 months	Final asset information standards
4	Hold workshops to train staff on the standards.	Q2/Q3 2020	6 months	Staff trained on asset information standards
5	Periodically review asset registers to ensure standards are being followed.	Q4 2020	Ongoing	Level of conformance with standards

4.3.5 Information Management (Theme 16 Initiative)

This theme focuses on the process of information and data maintenance. It includes the processes and procedures associated with the upkeep, maintenance of data integrity, archiving of data no longer current, and appropriate scenarios for deletion of asset information and data. To some extent, the

management of information and data will be dependent upon the software application chosen. There are many commercial software systems available to manage asset data; however, the first step is to establish the information management requirements before deciding on which software system to utilize. Some utilities utilize simple Microsoft Excel for their asset inventory and data repository. The decision on which system to use should be made after the organization's information management requirements are defined. Working from the asset data requirements, strategy, and standards, the processes and procedures for managing all asset data should be defined. Once defined, CH2M recommends the organization pilot the processes and procedures to ensure they provide the desired results before rolling them out to the entire organization. Any adjustments needed can be made based on the pilot results, thus, setting the organization up for success in providing accurate, reliable, and relevant asset data when needed. Table 4-16 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-16. Suggested Tasks for the Theme 16 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
1	Develop process and procedures for asset information and data management, and maintenance of information and data to maintain its integrity and currency.	Q3/Q4 2019	4 months	Process and procedures for information and data management
2	Review process with data owners and users, and make adjustments as needed, and document information management process and procedures.	Q4 2019 Q1 2020	3 months	Refined process and procedures based on staff input
3	Pilot process and procedures for various asset lifecycle stages with several different asset types.	Q1/Q2 2020	4 months	Understanding of the viability of process and procedures
4	Adjust information management process and procedures based on pilot results, document, and make available to appropriate staff.	Q3 2020	3 months	Updated process and procedures for use
5	Establish an approach for periodic review of data accuracy and currency, and adjust process and procedures as necessary	Q1 2021	3 months	Formal approach to periodically review data

4.3.6 Capital Improvement Plan Development and Governance (Theme 23 Initiative)

Adopting asset management principles and practices will provide the Alliance with the methodologies and tools to improve capital investment decision-making. The organizational strategic plan and SAMP will provide the guidance for the Alliance to establish criteria by which to identify projects needed to achieve the organizational and asset management objectives. Using the risk framework to assess the risk of asset failure will provide a defensible basis for identifying rehabilitation and replacement projects. Adopting a formal BCE process will focus investment on high value projects, and a formal prioritization process will enable limited capital funds to be allocated where they can provide the most benefit for their cost.

To codify the application of the methodologies and tools in capital planning, a governance structure should be established. The governance structure should define the milestones to be achieved before a project can be placed on the CIP. For example, the governance structure should specify the criteria for projects to go through a rigorous BCE, rather than just be validated through a more informal process. Additionally, the governance should establish a "stage-gating" process, requiring identified projects to meet certain criteria before they go from planning to design, from design to construction, and from construction to commissioning. This initiative should be completed in time to allow its use in developing

the 2022-2023 capital budget. Table 4-17 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-17. Suggested Tasks for the Theme 23 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
1	Define criteria to be used in establishing the need for a capital improvement project. Such criteria should include risk of failure, as well as non-risk drivers such as capacity demand and service area expansion, energy efficiency, new and anticipated regulations, security enhancements, contractual obligations, coordination with other projects, new service offerings, etc.	Q1 2020	3 months	Criteria for identifying capital projects
2	Develop a CIP prioritization model that provides for scoring of established criteria that is based on organizational and asset management objectives, the Asset Management Policy, and risk mitigation.	Q2 2020	3 months	CIP prioritization model
3	Develop rigorous BCE process and tool(s) to provide a rigorous and documented approach to compare project options to meet a need or address an opportunity, based on benefits and WLC analysis.	Q3/Q4 2020	4 months	BCE process and model
4	Develop a stage-gating process that specifies criteria that need to be satisfied before an identified project can move from planning to the CIP.	Q4 2020	2 months	Stage-gating process for capital projects
5	Prepare a draft governance structure document that stipulates the thresholds (e.g., estimated cost, project location) for identified projects to go through the processes developed in Tasks 1 through 4. Include authorization levels by staff position title. Circulate for comments.	Q1 2021	3 months	Draft governance structure for capital plan development
6	Finalize governance structure document considering comments received.	Q2 2021	1 month	Final governance structure for capital plan development

4.3.7 Capital Projects — Planning, Design, Construction and Commissioning (Theme 24 Initiative)

This theme covers the first portion of the asset lifecycle (Figure 2-12), from planning to commissioning an asset. Although this portion of the lifecycle may only amount to 20 to 25 percent of an asset's WLC, its elements will dictate the costs associated with the rest of the asset's lifecycle. In other words, if the planning, design, construction, and/or commissioning of the asset is poor, the cost of O&M, rehabilitation, and decommissioning may very well be adversely impacted. Good asset management practice requires documented processes and procedures for all stages of a project, ensuring that the asset is fit-for-purpose, and delivered within budget and on-time with considerations for optimized O&M.

The Alliance has a governance structure and has developed and documented processes and procedures for planning, design, and construction of assets. However, there are some gaps in the commissioning of new assets. The Alliance is aware of these gaps and is in the midst of developing procedures to close the gaps. Nevertheless, it is recommended that the Alliance adopt a formal stage-gating process to ensure all stages of a project's lifecycle, from planning to commissioning, is controlled as it goes through each stage. Stage-gating imposes a discipline on capital planners, designers, project and construction managers, and O&M staff so that the project adequately delivers its original objectives. Table 4-18 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-18. Suggested Tasks for the Theme 24 Improvement Initiative

	Task	Time-frame	Time (months)	Outcome
1	Review current processes and procedures that address the lifecycle of capital projects. Compare these processes and procedures with best practice stage-gating and identify gaps.	Q1 2021	3 months	Understanding of how capital projects are managed
2	Amend current processes and procedures to include stage-gating elements, and close existing gaps.	Q2 2021	3 months	Amended processes and procedures including stage-gating
3	Draft an updated set of processes and procedures for capital project governance, incorporating the output of Tasks 1 and 2 and circulate to appropriate staff for comments.	Q3 2021	3 month	Draft updated processes and procedures for capital project governance
4	Finalize the set of processes and procedures considering comments received and make available to Alliance staff.	Q4 2021	1 month	Final updated processes and procedures for capital project governance
5	Establish a review process to ensure planning, design, construction and commissioning processes and procedures are being followed on all projects and report compliance status.	Q2 2023	2 months	Review process for CIP governance
6	Periodically review planning, design, construction and commissioning processes and procedures to make improvements as needed.	Ongoing	Ongoing	Updated processes and procedures for capital project governance

4.3.8 Knowledge Retention and Succession Planning (Theme 35 Initiative)

With changing workforce demographics, retaining institutional knowledge with an organization, and planning for succession of key positions has become a priority for most businesses. When it comes to managing assets, the transfer of knowledge and avoidance of vacant key positions is crucial, as most utilities do not have reliable asset information documented in either paper or electronic form. Instead, asset information resides in employees' minds. The same goes for the hands-on knowledge of the assets gained from years of operating and maintaining equipment and pipelines, and the tacit knowledge gained from longevity in the organization. It is therefore important to have a plan to "download" information from long-time employees, discover paper records that have long been forgotten, and be prepared to have new staff learn critical skills and an understanding of organizational processes from potential retirees.

As with many of the initiatives, this initiative requires close coordination with Member agencies to ensure there is a common plan for knowledge transfer and succession planning. However, it must be recognized that counties, cities, and other public agencies, cannot designate a successor, and budget restraints may make it difficult to hire a replacement to shadow an employee if a position is currently filled, regardless of current employee plans to retire or otherwise leave the agency. With this barrier in mind, Table 4-19 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-19. Suggested Tasks for the Theme 35 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	Identify what, if any, knowledge transfer and succession planning processes are in place, either formally or informally within each	Q4 2022	3 months	Understanding of how knowledge is

Table 4-19. Suggested Tasks for the Theme 35 Improvement Initiative

	Task	Time-frame	Duration	Outcome
	Member agency, and the extent to which the processes apply to staff working on Alliance assets.			transferred and succession planned in the Member agencies
2	Research what other public agencies have done to capture institutional knowledge from employees and plan for succession for key positions.	Q1 2023	3 months	Understanding how other public agencies retain knowledge and plan for succession
3	Develop a framework for long-term employees to relate both explicit and tacit knowledge for documentation. This may include interviews, shadowing, presentations, written summaries, etc.	Q2 2023	3 months	Framework for capturing of information from long-term employees
4	Develop a framework for early identification of employees in key positions that are at-risk of leaving due to retirement or other reasons, and investigate the option of having a period during which another employee or new hire can work with the pending retiree.	Q3 2023	3 months	Framework for having existing or new staff learn from those planning to retire
5	For highly skilled positions, work with community colleges and the Pacific Northwest Clean Water Association (PNCWA) to attract and train interested individuals to build a pool of potential hires.	Q4 2023	3 months	Understanding of how community colleges and the PNCWA can train future Alliance employees
6	Prepare a draft plan for knowledge retention and succession planning for the Alliance, recognizing that the plan may need to include different processes for the different Member agencies. Circulate to Member agencies and Alliance leadership for comments.	Q1/Q2 2024	6 months	Draft plan for knowledge retention and succession planning
7	Finalize plan considering comments received, and implement.	Q3 2024	2 months	Final plan

4.3.9 Communications and Change Management (Theme 38 Initiative)

Asset management is as much about people as it is about assets. Asset management principles and practices bring new roles and responsibilities, different ways of doing work, learning new skills, more documentation and more transparency, increased accountability, new technology, and new business processes. Such change can cause stress, confusion, and, most importantly, resistance. Having a robust communications and change management plan can help the utility transition from its current state to a desired future state by minimizing resistance through understanding and realization of personal improvement, and thereby obtain employee buy-in over time.

The communications plan must include commitment from leadership that must be articulated frequently, and at every opportunity. All levels of management must have a unified vision, and communicate a shared genuine shared purpose for adopting asset management principles and practices. The communications plan must identify effective communications channels and key messages that will resonate with staff.

Change management must take into account the various organizational cultures and the staff's readiness to change. The process must be a structured approach, such as the ADKAR® method, which begins with making employees aware of the need to change, then helps them create the desire to change, followed by providing the knowledge and ability needed to be part of the change, and offers

reinforcement for successful change. Effective communications, engagement by employee sponsors/champions, coaching, and training can help facilitate organizational change.

Once again it is recognized that this improvement initiative will be challenging due to the staff being employees of different Member agencies. Significant cooperation from the Member agencies will be necessary to establish both a viable communications process and institute a successful change management program. With the challenges considered, Table 4-20 presents suggested tasks, timeframes, and outcomes to accomplish this initiative.

Table 4-20. Suggested Tasks for the Theme 38 Improvement Initiative

	Task	Time-frame	Duration	Outcome
1	After consulting with Member agencies, have employees engage in an organizational culture assessment and a readiness to change assessment, and use results to structure asset management communications and organizational change management approach.	Q3 2019	3 months	Organizational culture profile and an understanding of employees' readiness to accept change
2	Identify audience, communications channels, and key messages that will be the foundation of asset management communications. This will need to include conversations and agreement with Member agencies.	Q4 2019	2 months	Communication channels, key messages, and receiving audience
3	Develop a draft communications plan that includes purpose, key messages, communication channels, and tactical steps for getting the key messages out and reinforcing the messages over time. Circulate draft plan to Member agencies and other staff, as appropriate, for comments.	Q4 2019 Q1 2020	3 months	Draft communications plan
4	Finalize the plan considering comments received and implement plan.	Q1 2020	1 month	Final communications plan and information provided to staff
5	Decide on structured approach for managing change, and develop a draft plan for implementation. Circulate to Member agencies and other staff, as appropriate for comments.	Q2 2020	3 months	Draft change management plan
6	Finalize plan considering comments received, and implement change management approach.	Q3 2020	Ongoing	Final plan and change management underway
7	Develop process for assessment and refinement of communications and change management approach on a periodic basis.	Q3 2020	2 months	Process for assessing and refining communications and change management

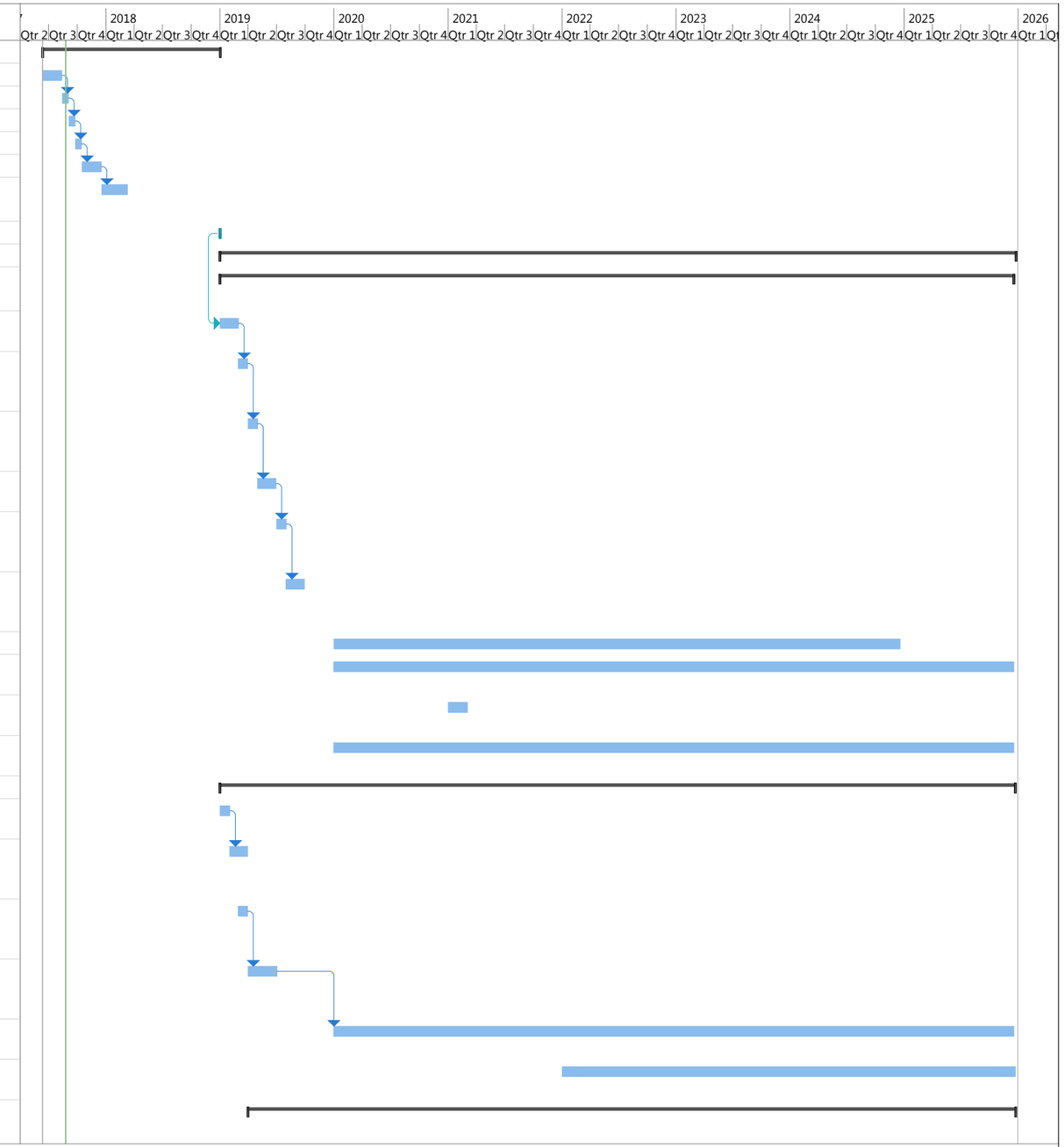
SECTION 5

Provisional Implementation Schedule (Roadmap)

The proposed schedule for implementation of the recommended asset management improvement initiatives is summarized in Figure 5-1. This serves as a roadmap for implementation the initial Criticality and Condition Assessments, followed by implementation of the Tier 1 and 2 themes discussed in Section 4.

The tasks and associated details for Tier 3 and Tier 4 themes should be established after substantial progress is made on Tier 1 themes, or in approximately the second quarter of 2020.

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Initial Criticality and Condition Assessment**	**408 days**	**Mon 6/12/17**	**Tue 1/1/19**	
2	Prepare comprehensive asset list	45 days	Mon 6/12/17	Fri 8/11/17	
3	Quality assurance of asset list	15 days	Mon 8/14/17	Fri 9/1/17	2
4	Workshops with Member Agency O&M staff to score assets	15 days	Mon 9/4/17	Fri 9/22/17	3
5	Summarize results	15 days	Mon 9/25/17	Fri 10/13/17	4
6	Prioritize results	45 days	Mon 10/16/17	Fri 12/15/17	5
7	Prepare project descriptions and estimates to inform 2019/2020 budget cycle	60 days	Mon 12/18/17	Fri 3/9/18	6
8	Initial Tier 1 Work	1 day?	Tue 1/1/19	Tue 1/1/19	
9	**Tier 1 Improvement Initiatives**	**1836 days**	**Tue 1/1/19**	**Thu 12/25/25**	
10	**Theme 1 Initiative: Organizational Strategic Plan and Organizational Objectives**	**1830 days**	**Tue 1/1/19**	**Wed 12/17/25**	
11	Task 1 - Obtain and review copies of strategic plans from other utilities and internal documents.	43 days	Tue 1/1/19	Thu 2/28/19	8SS
12	Task 2 - Conduct a workshop to: (1) review the Alliance's current mission statement and affirm or restate; and (2) create the Alliance's vision statement.	21 days	Fri 3/1/19	Fri 3/29/19	11
13	Task 3 - Conduct a workshop using the Ten Attributes of Effective Utility Management to focus and select organizational goals/objectives; develop goal statements; develop organizational objectives.	22 days	Mon 4/1/19	Tue 4/30/19	12
14	Task 4 - Prepare a draft organizational strategic plan to be circulated to Alliance leadership (including member entity representatives) for comment.	44 days	Wed 5/1/19	Fri 6/28/19	13
15	Task 5 - Prepare a final draft incorporating comments and circulate to Alliance leadership (including member entity representatives) and key staff members for final comments.	23 days	Mon 7/1/19	Wed 7/31/19	14
16	Task 6 - Incorporate any final comments and prepare a final document for consideration and approval by Member agency representatives at a formal meeting.	43 days	Thu 8/1/19	Fri 9/27/19	15
17	Task 7 - Communicate strategic plan throughout the Alliance.	1305 days	Wed 1/1/20	Tue 12/17/24	
18	Task 8 - Review ongoing AM activities with strategic plan to ensure alignment.	1566 days	Wed 1/1/20	Wed 12/17/25	
19	Task 9 - Develop formal process to monitor and track progress with the Alliance's mission, vision, goals, and strategic objectives.	43 days	Fri 1/1/21	Tue 3/2/21	
20	Task 10 - Continually track progress of AM activities with the Alliance's mission, vision, goals, and strategic objectives.	1566 days	Wed 1/1/20	Wed 12/17/25	
21	**Theme 2 Initiative: Understanding the Needs of Stakeholders**	**1833 days**	**Tue 1/1/19**	**Mon 12/22/25**	
22	Task 1 - Brainstorm stakeholders and use a matrix to capture stakeholder information, needs, influence, etc.	23 days	Tue 1/1/19	Thu 1/31/19	
23	Task 2 - Distribute stakeholder matrix to Alliance leadership and other appropriate members of management for comments, and meet to finalize matrix.	41 days	Fri 2/1/19	Fri 3/29/19	22
24	Task 3 - Use the results of the stakeholder analysis to help prepare the organizational strategic plan and organizational objectives, the SAMP, and the asset management objectives, and levels of service.	21 days	Fri 3/1/19	Fri 3/29/19	
25	Task 4 - Develop a communications plan to ensure appropriate stakeholders are kept aware of developments in the asset management program.	67 days	Mon 4/1/19	Mon 7/1/19	24
26	Task 5 - Actively engage appropriate stakeholders on a periodic basis regarding their needs and expectations with respect to asset management.	1566 days	Wed 1/1/20	Wed 12/17/25	25
27	Task 6 - Incorporate stakeholder needs and expectations, as appropriate, into asset investment decision-making.	1043 days	Sat 1/1/22	Mon 12/22/25	
28	**Theme 3 Initiative: Asset Management Policy and Strategic Asset Management Plan (SAMP)**	**1770 days**	**Mon 4/1/19**	**Tue 12/23/25**	



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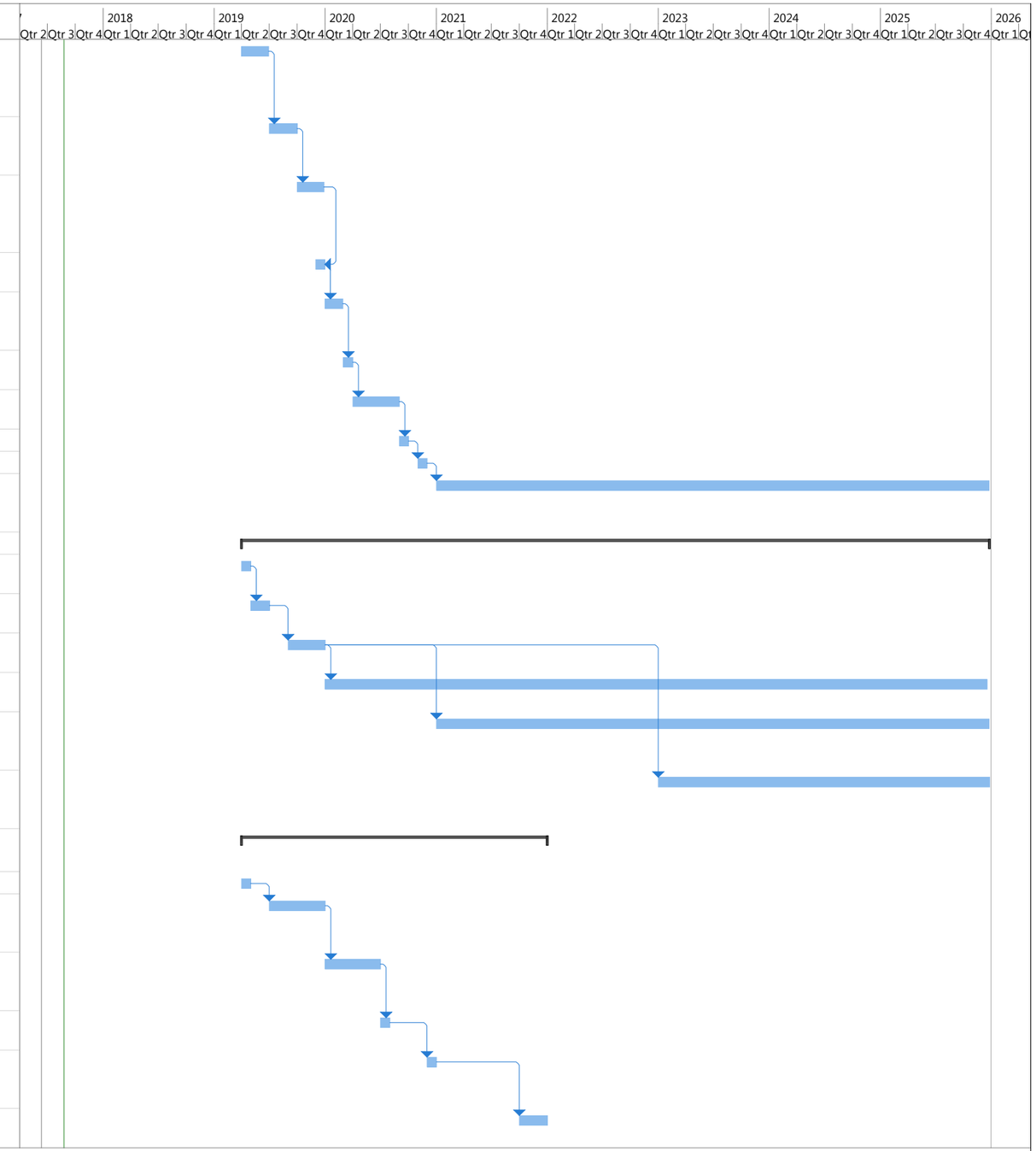
Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

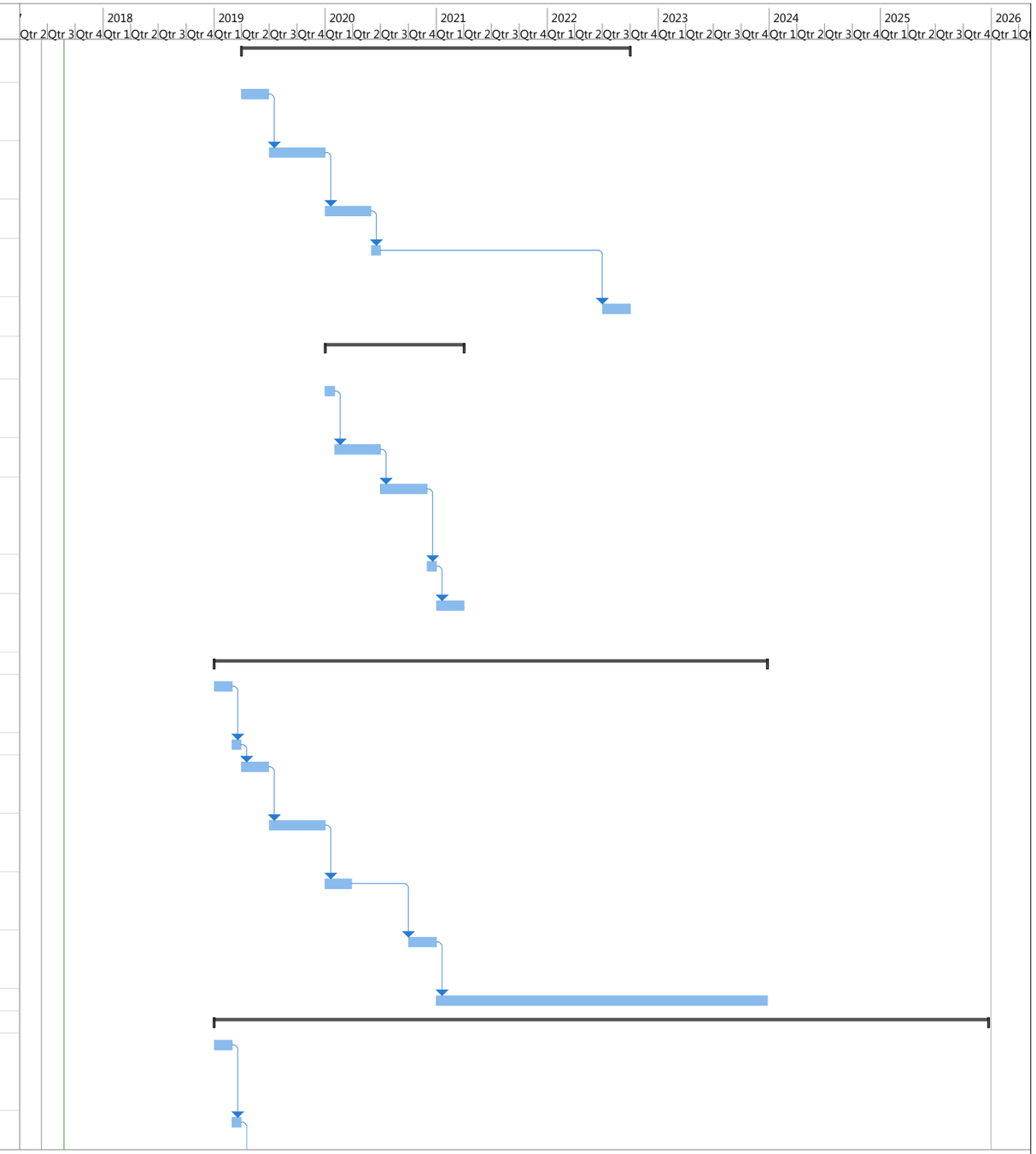
ID	Task Name	Duration	Start	Finish	Predecessors
29	Task 1 - Obtain copies and review Asset Management Policies from other water and wastewater sector organizations, along with Alliance's strategic plan and stakeholder matrix and decide on format and outline of Asset Management Policy.	66 days	Mon 4/1/19	Fri 6/28/19	
30	Task 2 - Develop a Draft Asset Management Policy ensuring its alignment with the strategic plan and distribute draft policy to Alliance leadership and other appropriate members of management for review and comment.	67 days	Mon 7/1/19	Mon 9/30/19	29
31	Task 3 - Incorporate comments and prepare a final Asset Management Policy for consideration and approval by Member representatives at a formal meeting; subsequently distribute to appropriate Member agency employees, and post at Alliance facilities.	65 days	Tue 10/1/19	Fri 12/27/19	30
32	Task 4 - Obtain copies and review SAMPs from other water and wastewater sector organizations and other agencies.	22 days	Sun 12/1/19	Mon 12/30/19	31FF
33	Task 5 - Prepare a draft annotated outline of the SAMP referring to other SAMPs and guidance publications and distribute to appropriate staff for comment.	43 days	Wed 1/1/20	Thu 2/27/20	32FS+1 day
34	Task 6 - Prepare final annotated outline of the SAMP considering any comments received.	23 days	Sun 3/1/20	Tue 3/31/20	33
35	Task 7 - Create draft of SAMP based on the final annotated outline and circulate to appropriate staff for comments.	109 days	Wed 4/1/20	Mon 8/31/20	34
36	Task 8 - Prepare final SAMP considering comments received.	22 days	Tue 9/1/20	Wed 9/30/20	35
37	Task 9 - Receive endorsement of SAMP from Alliance leadership.	22 days	Sun 11/1/20	Mon 11/30/20	36
38	Task 10 - Develop process to ensure Asset Management Policy and SAMP remain aligned with organizational strategic plan and staff of Member agencies are kept abreast of any updates and changes.	1305 days	Fri 1/1/21	Tue 12/23/25	37
39	**Theme 4 Initiative: Asset Management Leadership and Governance**	**1772 days**	**Mon 4/1/19**	**Thu 12/25/25**	
40	Task 1 - Alliance Member representatives meet to establish a governance structure for asset management.	22 days	Mon 4/1/19	Tue 4/30/19	
41	Task 2 - Governance structure with roles and responsibilities is put into place, and communicated to Alliance and Member staff.	45 days	Wed 5/1/19	Mon 7/1/19	40
42	Task 3 - Governance policies and procedures are developed and put into-place.	89 days	Sun 9/1/19	Tue 12/31/19	41
43	Task 4 - Importance of adopting asset management principles and practices is starting to be communicated throughout the Alliance.	1566 days	Wed 1/1/20	Wed 12/17/25	42
44	Task 5 - Clear and consistent messages about asset management are communicated to all staff both verbally and in writing, as well as in everyday work activities.	1305 days	Fri 1/1/21	Tue 12/23/25	42
45	Task 6 - Process for periodic review of the governance structure, policies and procedures, and communications approach is developed and implemented.	783 days	Sun 1/1/23	Thu 12/25/25	42
46	**Theme 6 Initiative: Prioritized Plan for the Development of Asset Management Business Processes and Procedures**	**726 days**	**Mon 4/1/19**	**Fri 12/31/21**	
47	Task 1 - Develop a generic process flow diagram for asset management.	22 days	Mon 4/1/19	Tue 4/30/19	
48	Task 2 - Engage in a business processes and procedures review, documenting current processes and procedures including information on their current usage.	134 days	Mon 7/1/19	Tue 12/31/19	47
49	Task 3 - Identify business processes and procedures missing for current needs and those that will be necessary for future asset management practices.	132 days	Wed 1/1/20	Tue 6/30/20	48
50	Task 4 - Develop a rubric for prioritizing business processes and procedures for mapping and for development of SOPs, and prioritize.	23 days	Wed 7/1/20	Fri 7/31/20	49
51	Task 5 - Create a plan for documenting business processes and procedures through process maps and through written record; include timeframe and individuals responsible.	23 days	Tue 12/1/20	Thu 12/31/20	50
52	Task 6 - Document an approach to review and update business processes and procedures, as well as incorporating new processes and procedures.	66 days	Fri 10/1/21	Fri 12/31/21	51



Project: CAMRA Report - Sched
Date: Fri 8/25/17

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

ID	Task Name	Duration	Start	Finish	Predecessors
53	**Theme 7 Initiative: Prioritized Plan for the Development of Asset Management Skills & Competences**	**923 days**	**Mon 4/1/19**	**Fri 9/30/22**	
54	Task 1 - Review the IAM Competences Framework and identify additional specific additional skills and competencies required for embedding asset management in the Alliance.	66 days	Mon 4/1/19	Fri 6/28/19	
55	Task 2 - Score/rank skills and competencies by their importance to the Alliance and the current ability level of Alliance Member staff; this may be done by a questionnaire to all employees associated with the Alliance.	134 days	Mon 7/1/19	Tue 12/31/19	54
56	Task 3 - Identify gaps in the skills and competencies, and decide which gaps can be closed by training staff, and which need to be closed by hiring.	110 days	Wed 1/1/20	Fri 5/29/20	55
57	Task 4 - Identify needed training and availability of training over the next several years, as well as needed hires, and estimate associated costs for budgeting purposes by Member agencies.	22 days	Mon 6/1/20	Tue 6/30/20	56
58	Task 5 - Create a plan for documenting the findings, decisions, and recommendations from the tasks above.	66 days	Fri 7/1/22	Fri 9/30/22	57
59	**Theme 9 Initiative: Asset Management Objectives- Performance Metrics/ Levels of Service**	**330 days**	**Wed 1/1/20**	**Thu 4/1/21**	
60	Task 1 - Review the strategic plan, organizational objectives, and Asset Management Policy, and develop a draft set of asset management objectives for review and comment by appropriate Member staff.	23 days	Wed 1/1/20	Fri 1/31/20	
61	Task 2 - Incorporate comments received, as appropriate, and finalize asset management objectives.	109 days	Sat 2/1/20	Tue 6/30/20	60
62	Task 3 - Brainstorm possible level of service (LOS) categories that maintain a "line of sight" to the asset management objectives, organizational objectives and strategic plan. Select up to 6 categories, decide on target levels, and circulate.	110 days	Wed 7/1/20	Mon 11/30/20	61
63	Task 4 - Incorporate comments received, as appropriate, and finalize LOS and LOS targets.	23 days	Tue 12/1/20	Thu 12/31/20	62
64	Task 5 - Review the more than 100 typical performance measures used in the water and wastewater sector references and select those that support the established LOS and that meet the "SMART" requirements.	65 days	Fri 1/1/21	Thu 4/1/21	63
65	**Theme 13 Initiative: Asset Inventory**	**1313 days**	**Tue 1/1/19**	**Mon 12/25/23**	
66	Task 1 - Establish an asset hierarchy framework in accordance with ISO 14224, and select the software application that will be used for Alliance asset register.	43 days	Tue 1/1/19	Thu 2/28/19	
67	Task 2 - Establish the asset hierarchy in the CMMS (and GIS if appropriate).	21 days	Fri 3/1/19	Fri 3/29/19	66
68	Task 3 - Review asset inventory data existing in Mpulse™, Excel spreadsheets, and other known locations/sources, and determine the confidence level and currency of the data.	66 days	Mon 4/1/19	Fri 6/28/19	67
69	Task 4 - Populate the asset register(s), in accordance with the established asset hierarchy, with existing asset inventory data from all known data sources, marking the confidence level of the data for each asset.	134 days	Mon 7/1/19	Tue 12/31/19	68
70	Task 5 - Identify assets that exist, but not in the existing inventory sources, and add those assets, in accordance with the established asset hierarchy, to the asset register(s).	65 days	Wed 1/1/20	Fri 3/27/20	69
71	Task 6 - Develop prioritized plan to capture missing assets and missing asset data, along with updating attribute data that were determined to have a low confidence level. Priority should be given to critical assets.	67 days	Thu 10/1/20	Thu 12/31/20	70
72	Task 7 - Execute plan to capture missing assets in the asset inventory.	784 days	Fri 1/1/21	Mon 12/25/23	71
73	**Theme 20 Initiative: Risk Framework- Asset Level**	**1833 days**	**Tue 1/1/19**	**Mon 12/22/25**	
74	Task 1 - Establish a draft risk framework, including scoring system, using the LOS categories for the consequence of failure matrix, and asset condition and asset performance for the likelihood of failure; circulate draft for review and comment.	43 days	Tue 1/1/19	Thu 2/28/19	
75	Task 2 - Finalize risk framework considering comments received, and incorporate into SAMP.	21 days	Fri 3/1/19	Fri 3/29/19	74



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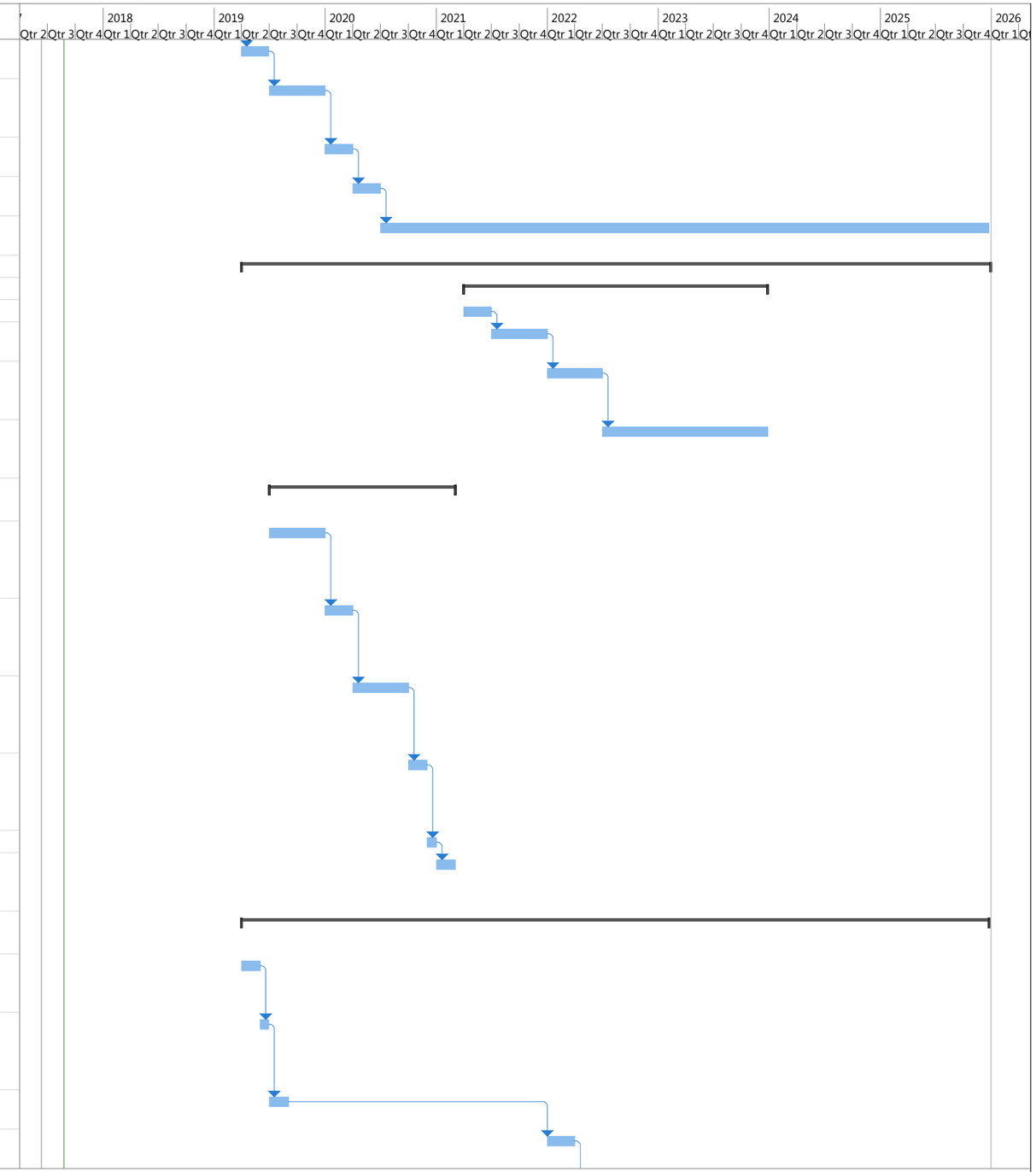
Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

ID	Task Name	Duration	Start	Finish	Predecessors
76	Task 3 - Decide on software (e.g., Excel, VBA model(s), proprietary applications) to be used for applying the risk framework to assets.	66 days	Mon 4/1/19	Fri 6/28/19	75
77	Task 4 - Engage staff in risk assessment of assets, using top-down approach for vertical assets, and, if possible, bottom-up, GIS-based approach for linear assets.	134 days	Mon 7/1/19	Tue 12/31/19	76
78	Task 5 - Establish risk mitigation analysis process (e.g., BCEs, cost per risk-unit reduction).	67 days	Wed 1/1/20	Tue 3/31/20	77
79	Task 6 - Standardize risk assessment process, software, and provide guidance on updating risk assessments periodically.	65 days	Wed 4/1/20	Tue 6/30/20	78
80	Task 7 - Assess asset risk as new assets are added, and re-assess assets periodically in accordance with Task 6, above.	1437 days	Wed 7/1/20	Mon 12/22/25	79
81	**Tier 2 Improvement Initiatives**	**1774 days**	**Mon 4/1/19**	**Mon 12/29/25**	
82	**Theme 5 Initiative: Asset Management Roles and Responsibilities**	**721 days**	**Thu 4/1/21**	**Tue 12/26/23**	
83	Task 1 - Identify key asset management functions.	65 days	Thu 4/1/21	Wed 6/30/21	
84	Task 2 - Prepare a RACI matrix with the identified key asset management functions and make assignments.	132 days	Thu 7/1/21	Fri 12/31/21	83
85	Task 3 - Finalize RACI matrix by working with the departments, groups, sections, etc., to select the appropriate individuals for each role in each function, as well as identifying new staffing needs.	131 days	Sat 1/1/22	Thu 6/30/22	84
86	Task 4 - Work with Alliance Members to assign the roles to individuals, make modifications to job descriptions and duties; also, modify employee evaluation.	393 days	Fri 7/1/22	Tue 12/26/23	85
87	**Theme 8 Initiative: Prioritized Plan for Information Technology Functional Requirements**	**443 days**	**Mon 7/1/19**	**Wed 3/3/21**	
88	Task 1 - Identify what AM functionality is desired currently and future; consider asset register(s), work order management, capital planning, predictive modeling, mobile computing, etc.; identify linkages and synchronizations with other applications.	134 days	Mon 7/1/19	Tue 12/31/19	
89	Task 2 - Meet with IT administrators of the Member agencies to learn of existing IT systems and functionalities, versions of applications, and plans/schedules for updating hardware and software, as well as incorporating new technology and functionality.	67 days	Wed 1/1/20	Tue 3/31/20	88
90	Task 3 - Understanding the functional needs of the Alliance, and the existing and planned functionality of existing and future hardware and software of Member agencies, prioritize IT functional needs using both monetary and non-monetary criteria.	131 days	Wed 4/1/20	Wed 9/30/20	89
91	Task 4 - Prepare a draft plan that includes current IT hardware/software and functionality, and needed functionality in the foreseeable future, by priority. Estimate cost and incorporate into planning expenditures. Circulate draft plan for comment.	44 days	Thu 10/1/20	Mon 11/30/20	90
92	Task 5 - Considering comments, finalize plan and make available to staff.	23 days	Tue 12/1/20	Thu 12/31/20	91
93	Task 6 - Develop a process to obtain feedback from users on current hardware and software, and future needs, including review and update of the plan on a periodic basis.	44 days	Fri 1/1/21	Wed 3/3/21	92
94	**Theme 12 Initiative: Asset Information Strategy and Asset Information Improvement Plan**	**1770 days**	**Mon 4/1/19**	**Tue 12/23/25**	
95	Task 1 - Identify what asset information and data are required to effectively manage assets and make informed decisions. And document. This should include both linear and vertical assets.	45 days	Mon 4/1/19	Fri 5/31/19	
96	Task 2 - Identify who will be responsible for collecting asset information and data, and how it will be recorded and loaded into the asset register(s); address existing and new assets. Decide on how and whom will maintain asset information and data.	21 days	Sat 6/1/19	Fri 6/28/19	95
97	Task 3 - Decide the approach for assessing the efficacy of the strategy over time and how refinements will be handled.	46 days	Mon 7/1/19	Sun 9/1/19	96
98	Task 4 - Prepare a draft asset information strategy and improvement plan and circulate to appropriate staff for comment. Include Member agencies.	65 days	Sat 1/1/22	Thu 3/31/22	97



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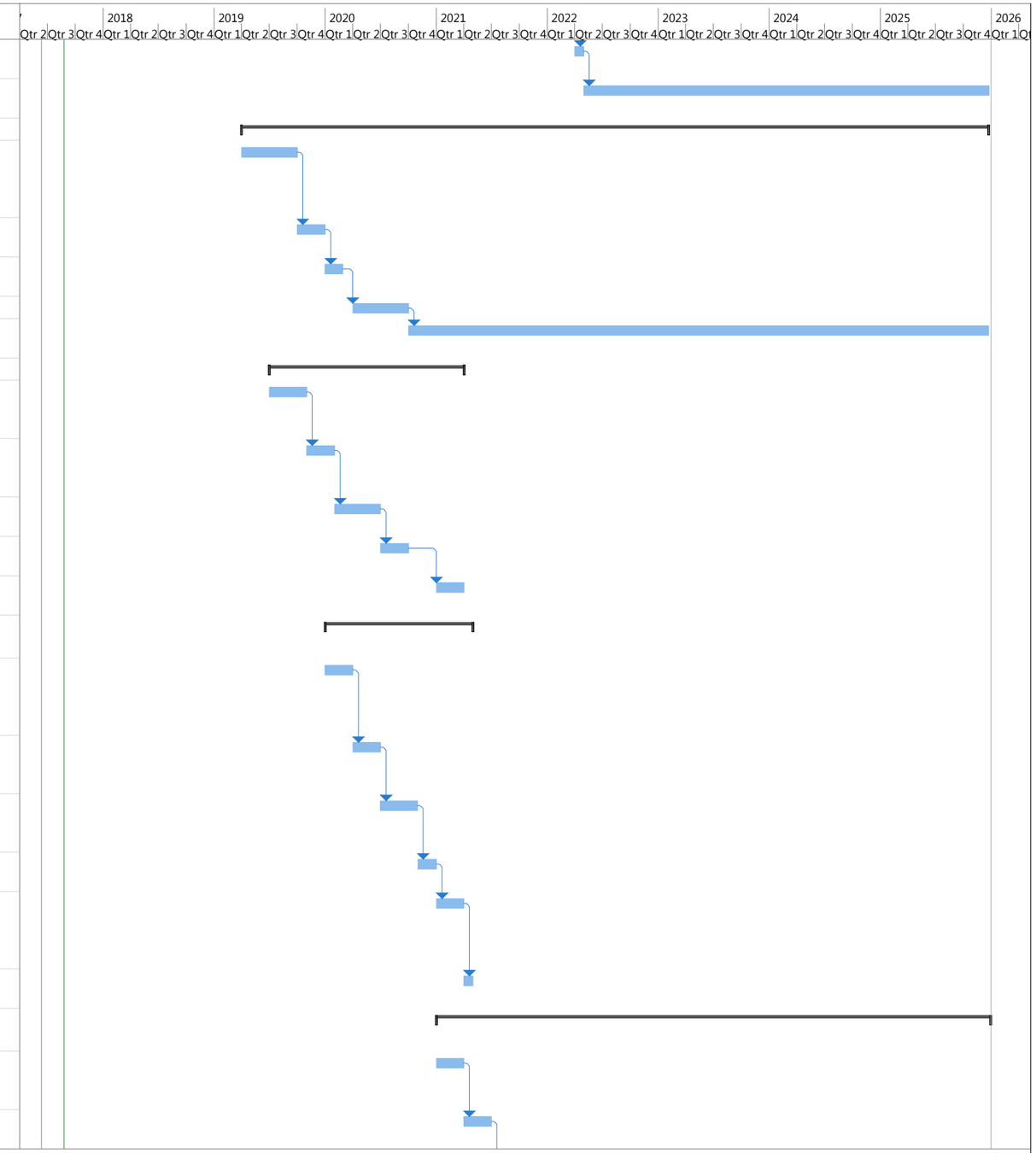
Task		Summary		Inactive Milestone		Duration-only		Start-only		External Milestone		Manual Progress	
Split		Project Summary		Inactive Summary		Manual Summary Rollup		Finish-only		Deadline			
Milestone		Inactive Task		Manual Task		Manual Summary		External Tasks		Progress			

ID	Task Name	Duration	Start	Finish	Predecessors
99	Task 5 - Finalize asset information strategy and improvement plan considering comments received.	21 days	Fri 4/1/22	Fri 4/29/22	98
100	Task 6 - Periodically assess information strategy and refine as needed, considering input from users.	958 days	Sun 5/1/22	Tue 12/23/25	99
101	**Theme 14 Initiative: Asset Information Standards**	**1769 days**	**Mon 4/1/19**	**Mon 12/22/25**	
102	Task 1 - Define information and data requirements for all asset types; what format, including a structure for asset identifiers; consistency in asset systems, asset classes, and asset components; definition of the lowest level of the hierarchy, etc.	133 days	Mon 4/1/19	Mon 9/30/19	
103	Task 2 - Develop a draft asset information standards manual and circulate to appropriate staff for comment.	67 days	Tue 10/1/19	Tue 12/31/19	102
104	Task 3 - Finalize the asset information standards manual considering comments from staff, and make available to all staff members.	43 days	Wed 1/1/20	Thu 2/27/20	103
105	Task 4 - Hold workshops to train staff on the standards.	131 days	Wed 4/1/20	Wed 9/30/20	104
106	Task 5 - Periodically review asset registers to ensure standards are being followed.	1371 days	Thu 10/1/20	Mon 12/22/25	105
107	**Theme 16 Initiative: Information Management**	**464 days**	**Mon 7/1/19**	**Thu 4/1/21**	
108	Task 1 - Develop process and procedures for asset information and data management, and maintenance of information and data to maintain its integrity and currency.	90 days	Mon 7/1/19	Thu 10/31/19	
109	Task 2 - Review process with data owners and users, and make adjustments as needed, and document information management process and procedures.	67 days	Fri 11/1/19	Fri 1/31/20	108
110	Task 3 - Pilot process and procedures for various asset lifecycle stages with several different asset types.	109 days	Sat 2/1/20	Tue 6/30/20	109
111	Task 4 - Adjust information management process and procedures based on pilot results, document, and make available to appropriate staff.	66 days	Wed 7/1/20	Wed 9/30/20	110
112	Task 5 - Establish an approach for periodic review of data accuracy and currency, and adjust process and procedures as necessary.	65 days	Fri 1/1/21	Thu 4/1/21	111
113	**Theme 23 Initiative: Capital Improvement Plan Development and Governance**	**351 days**	**Wed 1/1/20**	**Fri 4/30/21**	
114	Task 1 - Define criteria to be used in establishing the need for a capital improvement project. Such criteria should include risk of failure, as well as non-risk drivers such as capacity demand and service area expansion, energy efficiency, etc.	67 days	Wed 1/1/20	Tue 3/31/20	
115	Task 2 - Develop a CIP prioritization model that provides for scoring of established criteria that is based on organizational and asset management objectives, the Asset Management Policy, and risk mitigation.	65 days	Wed 4/1/20	Tue 6/30/20	114
116	Task 3 - Develop rigorous BCE process and tool(s) to provide a rigorous and documented approach to compare project options to meet a need or address an opportunity, based on benefits and WLC analysis.	88 days	Wed 7/1/20	Fri 10/30/20	115
117	Task 4 - Develop a stage-gating process that specifies criteria that need to be satisfied before an identified project can move from planning to the CIP.	45 days	Sun 11/1/20	Thu 12/31/20	116
118	Task 5 - Prepare a draft governance structure document that stipulates the thresholds for identified projects to go through the processes developed in Tasks 1 through 4. Include authorization levels by staff position title. Circulate for comments.	64 days	Fri 1/1/21	Wed 3/31/21	117
119	Task 6 - Finalize governance structure document considering comments received.	22 days	Thu 4/1/21	Fri 4/30/21	118
120	**Theme 24 Initiative: Capital Projects- Planning, Design, Construction and Commissioning**	**1309 days**	**Fri 1/1/21**	**Mon 12/29/25**	
121	Task 1 - Review current processes and procedures that address the lifecycle of capital projects. Compare these processes and procedures with best practice stage-gating and identify gaps.	64 days	Fri 1/1/21	Wed 3/31/21	
122	Task 2 - Amend current processes and procedures to include stage-gating elements, and close existing gaps.	65 days	Thu 4/1/21	Wed 6/30/21	121



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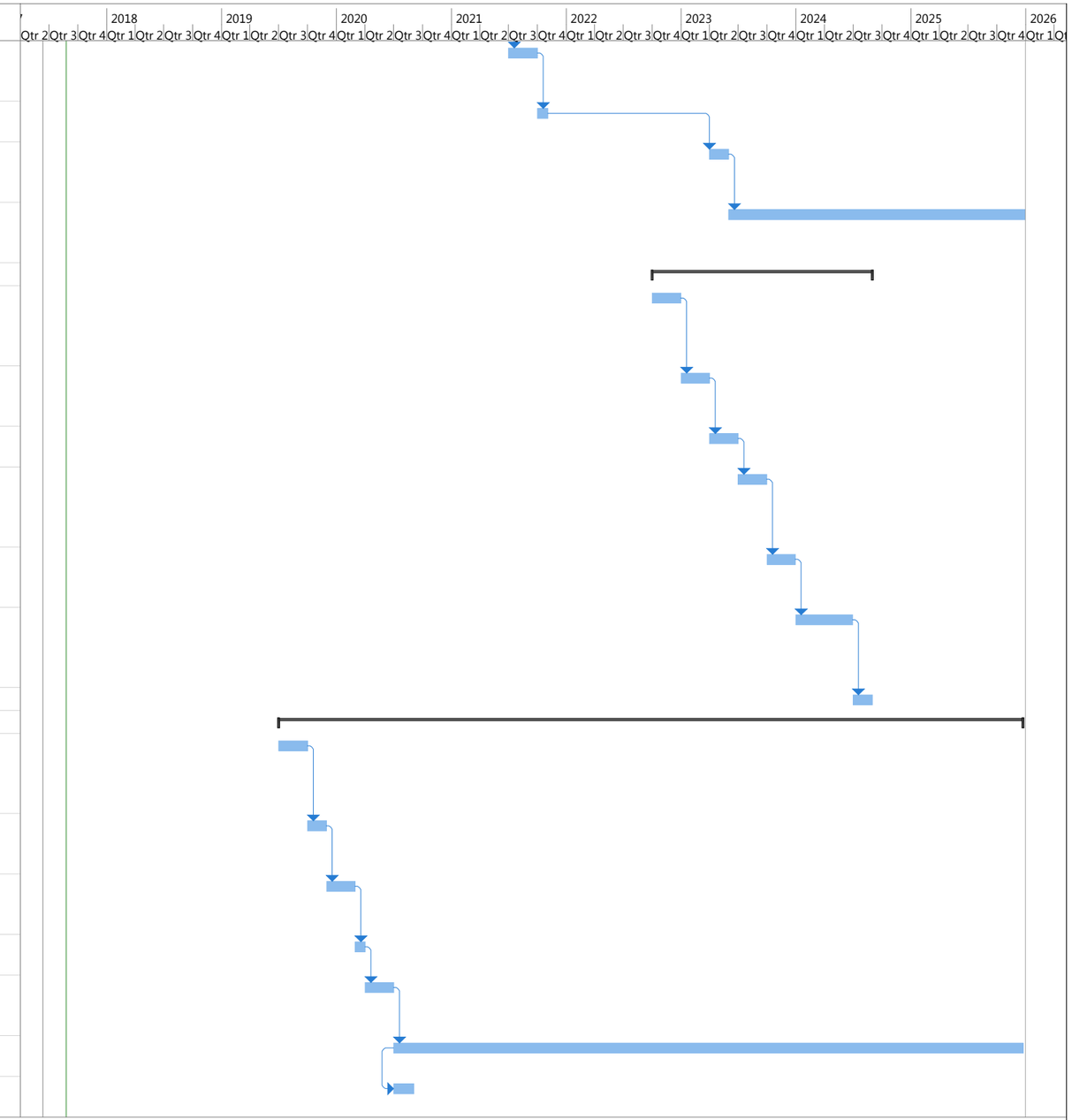
ID	Task Name	Duration	Start	Finish	Predecessors
123	Task 3 - Draft an updated set of processes and procedures for capital project governance, incorporating the output of Tasks 1 and 2 and circulate to appropriate staff for comments.	66 days	Thu 7/1/21	Thu 9/30/21	122
124	Task 4 - Finalize the set of processes and procedures considering comments received and make available to Alliance staff.	23 days	Fri 10/1/21	Tue 11/2/21	123
125	Task 5 - Establish a review process to ensure planning, design, construction and commissioning processes and procedures are being followed on all projects and report compliance status.	44 days	Sat 4/1/23	Wed 5/31/23	124
126	Task 6 - Periodically review planning, design, construction and commissioning processes and procedures to make improvements as needed.	675 days	Thu 6/1/23	Mon 12/29/25	125
127	**Theme 35 Initiative: Knowledge Retention and Succession Planning**	**505 days**	**Sat 10/1/22**	**Fri 8/30/24**	
128	Task 1 - Identify what, if any, knowledge transfer and succession planning processes are in place, either formally or informally within each Member agency, and the extent to which the processes apply to staff working on Alliance assets.	66 days	Sat 10/1/22	Fri 12/30/22	
129	Task 2 - Research what other public agencies have done to capture institutional knowledge from employees and plan for succession for key positions.	66 days	Sun 1/1/23	Fri 3/31/23	128
130	Task 3 - Develop a framework for long-term employees to relate both explicit and tacit knowledge for documentation.	66 days	Sat 4/1/23	Fri 6/30/23	129
131	Task 4 - Develop a framework for early identification of employees in key positions that are at-risk of leaving, and investigate the option of having a period during which another employee or new hire can work with the pending retiree.	66 days	Sat 7/1/23	Fri 9/29/23	130
132	Task 5 - For highly skilled positions, work with community colleges and the Pacific Northwest Clean Water Association (PNCWA) to attract and train interested individuals to build a pool of potential hires.	66 days	Sun 10/1/23	Fri 12/29/23	131
133	Task 6 - Prepare a draft plan for knowledge retention and succession planning for the Alliance, include different processes for the different Member agencies if needed. Circulate to Member agencies and Alliance leadership for comments.	130 days	Mon 1/1/24	Fri 6/28/24	132
134	Task 7 - Finalize plan considering comments received, and implement.	45 days	Mon 7/1/24	Fri 8/30/24	133
135	**Theme 38 Initiative: Communication and Change Management**	**1703 days**	**Mon 7/1/19**	**Mon 12/22/25**	
136	Task 1 - After consulting with Member agencies, have employees engage in an organizational culture assessment and a readiness to change assessment, and use results to structure asset management communications and organizational change management approach.	67 days	Mon 7/1/19	Mon 9/30/19	
137	Task 2 - Identify audience, communications channels, and key messages that will be the foundation of asset management communications. This will need to include conversations and agreement with Member agencies.	44 days	Tue 10/1/19	Fri 11/29/19	136
138	Task 3 - Develop a draft communications plan for getting the key messages out and reinforcing the messages over time. Circulate draft plan to Member agencies and other staff, as appropriate, for comments.	67 days	Sun 12/1/19	Fri 2/28/20	137
139	Task 4 - Finalize the plan considering comments received and implement plan.	23 days	Sun 3/1/20	Tue 3/31/20	138
140	Task 5 - Decide on structured approach for managing change, and develop a draft plan for implementation. Circulate to Member agencies and other staff, as appropriate for comments.	65 days	Wed 4/1/20	Tue 6/30/20	139
141	Task 6 - Finalize plan considering comments received, and implement change management approach.	1437 days	Wed 7/1/20	Mon 12/22/25	140
142	Task 7 - Develop process for assessment and refinement of communications and change management approach on a periodic basis.	46 days	Wed 7/1/20	Wed 9/2/20	141SS



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SECTION 6

Conclusion

The Alliance has taken an important first step in the asset management journey. Understanding the current level of maturity in the 7 KFAs and the 38 themes of asset management provides the foundation for planning improvement over time. Incorporating asset management principles and practices is truly a journey that takes years, but the benefits will begin to be realized in a much shorter timeframe.

Starting with the Tier 1 and Tier 2 initiatives will begin the asset management maturation for the Alliance. However, while all organizations face challenges when adopting asset management's new approaches and ways of doing business, the Alliance faces additional barriers due to its unique governance and organizational structure. With four individual public agencies, establishing uniformity and consistency within several of the themes will likely be difficult and time consuming. Varying human resource polices, different IT systems, and employees responsible for Alliance assets reporting to different agencies can slow down the institutionalizing of asset management. Differing organizational cultures will also burden the goal of change management.

Recognizing the challenges, it is imperative that the Alliance Members work closely together and also work within their agencies to reach consensus on tangible and intangible matters that must be unified for the Alliance to achieve effective and sustainable management of the infrastructure. The alternative is to consolidate all employees who "touch" Alliance assets into one agency, likely the District, which already has the administrative and engineering role for the Alliance. This alternative may, in fact, be the best way to ensure the assets of the Alliance deliver high quality services to customers and other stakeholders, and continue to protect the environment while minimizing WLCs.

Regardless of the future governance structure of the Alliance, asset management itself must be managed. Therefore, the Alliance should hire, or appoint from within, an Asset Manager to be delegated the responsibility and authority to instill asset management principles and practices into the organization. The Asset Manager should also be tasked to guide and oversee the improvement initiatives for each theme. Additionally, the Alliance should establish an Asset Management Advisory Team, chaired by the Asset Manager. The Advisory Team should be made up of management or supervisory level employees from engineering, IT, finance, operations, maintenance, and human resources. Each Member agency should be represented on the Advisory Team. The Advisory Team should provide operational guidance during the planning and incorporation of asset management practices throughout the Alliance, and facilitate communications with leadership of the Alliance's Members.

Appendix A
CAMRA Workshop Materials

COMPREHENSIVE ASSET MANAGEMENT REVIEW AND ASSESSMENT

Key Focus Area	Theme	Score Descriptions				
		1	2	3	4	5
Organizational Context	1 Organizational Strategic Plan and Organizational Objectives	• The Alliance does not have documented short- or long-term Organizational Strategic Plan. • Associated organizational objectives, if in existence, are not documented and/or not communicated.	• The Alliance is in the process of developing a short- or long- term Organizational Strategic Plan, but staff provides only limited input. • There is a general awareness of organizational objectives at senior management level but these are not well documented and/or not well communicated to staff.	• The Alliance has a short- or long-term Organizational Strategic Plan in place. • Certain staff were provided the opportunity to be involved in the development of the Plan and the Plan is now in use. • Associated organizational objectives have been mostly documented and are consistent with the Strategic Plan; however, there remains a gap between these objectives and AM activities; documentation and communication could be improved.	• An Organizational Strategic Plan is in place. • There is a clear process to monitor and track progress against the objectives and the plan. • There is a clear 'line of sight' between the Strategic Plan and AM activities. • Staff has been given the opportunity to provide input to the Strategic Plan, and the Plan has been communicated to all staff.	• The Organizational Strategic Planning process and the AM planning processes are undertaken in an iterative way combining top-down direction with bottom-up asset needs. • Associated organizational objectives are fully documented and communicated appropriately. • Staff has been given the opportunity to provide input to the Strategic Plan, and everyone understands how their roles contribute to the achievement of the strategic objectives.
Organizational Context	2 Understanding the needs of Stakeholders	The Alliance has not considered the need for consultation with relevant internal or external stakeholders regarding their service level expectations relating to AM decision making.	• The Alliance is in the process of determining relevant stakeholders and engaging regarding service level expectations and AM related needs. • Some ad-hoc stakeholder engagement takes place but typically it is not related back to AM requirements. • A framework is in development which, when complete, will ensure that these expectations influence the Strategic Plan and the AM system.	• The Alliance has defined relevant internal and external stakeholders and is actively engaging them regarding service level expectations and AM needs. • The expectations and needs are influencing the scope of the AM system but they may have not yet been fully documented or translated into formal decision-making criteria and reporting requirements. • There is a process to ensure that stakeholders are kept aware of ongoing AM developments.	• The Alliance has defined external and internal stakeholders and is actively engaging them regarding AM expectations and needs. • The expectations and needs have been translated into AM requirements, and clearly documented AM system scope. • Decision-making criteria have been established fully reflecting stakeholder expectations and needs; reporting processes are in place, keeping stakeholders abreast of AM development.	• The Alliance proactively engages stakeholders to demonstrate that the AM system meets their expectations and needs (e.g. review of decision-making criteria). • Relevant AM system outputs (e.g. service levels and investment projections) proactively employed to influence stakeholders' perceptions and to moderate needs and expectations where appropriate.
AM Vision and Leadership	3 Asset Management Policy and Strategic Asset Management Plan	The Alliance has not considered the need for a documented AM Policy and associated Strategic Asset Management Plan (SAMP)	The Alliance has an AM Policy and SAMP in draft form, or the documents are under development, but they do not align with the Organizational Strategic Plan and/or have not been formally endorsed by executive management.	The AM Policy and SAMP are documented and formally endorsed by executive management; however, (1) the documents are not readily accessible or widely known, or (2) the AM policy and SAMP are not fully aligned or (3) elements may be out of date or inconsistent with other policies and strategies, or (4) the documents may have been developed by individuals or a small team without wider consultation with asset management system stakeholders.	• The AM Policy and SAMP are endorsed by executive management, are fully aligned, and developed with input from a range of staff. • They are consistent with other organizational policies and strategies and include a commitment to continual improvement. • The documents have been communicated to staff at all levels and to relevant stakeholders. • Processes are in place for periodic review and update.	• The approved AM Policy and SAMP are regularly reviewed and updated to ensure continued alignment with the Organizational Strategic Plan and organizational objectives. • The documents are shared with all appropriate stakeholders, feedback is sought on a periodic basis, and any relevant updates are made and communicated. • The Alliance regularly looks externally to gauge its AM Policy with peers and other industry sectors.

Key Focus Area	Theme	Score Descriptions				
		1	2	3	4	5
AM Vision and Leadership	**4** Asset Management Leadership and Governance	• Executive management has not considered the need to formally promote an AM approach from the top down. • No consideration has been given to nominating staff and making resources available to develop and implement an AM approach, or to communicate the importance of AM principles or good AM practices.	• Executive management understands the need to move toward adopting AM principles and good AM practices, but resource limitations are restricting progress. • Similarly, the need to communicate the importance of adopting AM principles and good AM practices are understood, but this is not currently done. • No formal governance procedures or organizational structure is in place regarding AM.	• Executive management is intent on moving toward adopting AM principles and good AM practices. • The importance of adopting AM principles and implementing good AM practices is somewhat communicated but the message is not consistently or clearly transmitted. • Governance procedures, the appropriate organizational structure, and resourcing requirements are in development to enable AM principles and good AM practices.	• Executive management actively encourages and supports a move toward adoption of AM principles and good AM practices. • The importance of AM is clearly and consistently communicated to all staff in the organization. • Funding and resources are made available for sustaining existing AM practices and for the adoption of new practices. • Governance, the appropriate organizational design, and resources are in place and operational.	• Executive management is actively engaging all staff in the adoption and implementation of AM principles and good AM practices, along with encouraging engagement with external stakeholders. • A culture of continual improvement is in-place. • Processes are in place for the periodic review by executive management of the approach to AM, AM principles and practices, and the organizational design.
AM Vision and Leadership	**5** Asset Management Roles and Responsibilities	• AM roles and responsibilities have not been defined. • Any changes to roles are not fully communicated to staff and therefore are not known or understood, resulting in them being neither accepted nor not performed. • No assessment of organizational effectiveness for AM has been carried out.	• AM roles are generally known and their nature understood but due to communication, bargaining unit, or organizational cultural issues, are often not fully accepted and not fully performed. • Duplication of roles exists in different job descriptions. • There is only a limited understanding of AM organizational effectiveness and this may have only been considered for specific sub-organizations.	• AM roles are typically known, understood and accepted, and plans are in place which actively address communication, bargaining unit, and cultural issues. • Some areas of responsibility are still not fully defined or staff has insufficient delegated levels of authority to efficiently carry out work. • An assessment of AM organizational effectiveness has been carried out across the Alliance.	• A RACI (Responsible, Accountable, Consulted, Informed) analysis (or similar) has been completed, results accepted and roles documented and understood by both employees and other stakeholders (as appropriate). • Recommendations from the organizational effectiveness review have been implemented resulting in no/minimal duplication of roles or responsibilities. • Staff has the necessary authority to progress towards good/best practice AM.	• AM roles are understood, accepted and performed by all staff. • Teams are empowered to make decisions and are fully accountable for work. • Organizational design is fully effective regarding AM, and allows staff to specialize in specific AM competencies. • The organizational design is periodically reviewed against other high-performing AM organizations.
AM Vision and Leadership	**6** Prioritized Plan for The Development of Asset Management Business Processes and Procedures	The Alliance does not have a planned approach to AM business process mapping and the production of Standard Operating Procedures (SOPs). There is no documented plan in place for the completion or review and updating of AM business processes and procedures.	The need to create a prioritized plan for the development/ production of AM business process mapping and SOPs is understood and agreed, but there has been limited progress in this area.	A plan is being developed for carrying out AM business process mapping and for producing SOPs for all key activities and responsibilities for has been identified; however, the plan has not yet involved all relevant staff and has not been widely communicated.	• A plan is in place which sets out the justification, detail and timeline for AM business process mapping and developing SOPs. • The plan involved a wide range of staff and has been communicated to the relevant staff, and roles and responsibilities have been agreed to for implementation. • Where process maps and SOPs have been completed, the relevant end users are given appropriate training and support, and compliance with the process/SOP is monitored.	• A plan is in place identifying the need for revised or new AM business process mapping and SOPs, and is under regular review. • Staff is aware of the need to optimize processes and highlight where change is needed, thereby enabling business process mapping and SOP development/revisions to be driven both top-down and bottom-up. • The plan is fully integrated into an Alliance-wide business process master plan covering all business activities.

Key Focus Area	Theme	Score Descriptions				
		1	2	3	4	5
AM Vision and Leadership	**7** Prioritized Plan for the Development of Asset Management Skills and Competences	The Alliance has not considered the need for an AM People Skills and Competences Plan aimed at setting out the short-, medium- and long-term AM skills and competency requirements, and has no means in place to identify AM competency requirements.	The Alliance has identified relevant AM skills and competences for some key positions, and has associated plans, but this is generally ad hoc and focuses on short-term needs and/or on formal requirements for regulatory/legal compliance and safety.	• The Alliance is in the process of creating an AM People Skills and Competences Master Plan covering the short-, medium- and long- term requirements for its staff (considering new technologies and changing skill sets) although there may be limited staff involvement. • Work is underway on an AM Skills and Competency Framework that sets out the required competency for each staff position, but is either incomplete or inconsistently applied.	• An AM People Skills and Competences Master Plan has been developed with Alliance staff, is readily available, and has been communicated to all staff. • An AM Skills and Competency Framework is in place and all relevant staff have been assessed against it, with any gaps and actions needed to close the gaps, identified. • Executive management is clear on long-term structures, roles, responsibilities, AM competencies and staffing levels.	• Executive management actively incorporates the AM People Skills and Competences Master Plan in Organizational Strategic Planning activities and regularly reviews the Master Plan to ensure it is in-line with changing needs. • Staff are engaged to determine potential impacts to needed skills and competencies, and identify appropriate actions. • The Alliance can actively plan for new and/or changes to staff training requirements.
AM Vision and Leadership	**8** Prioritized Plan for Information Technology Functional Requirements	• No documented AM IT Functional Requirements Plan in place. • There is a disjointed and/or reactive approach to hardware and software needs.	An AM IT Functional Requirements Plan is under development, but is not widely publicized and does not have input from end users.	A documented AM IT Functional Requirements Plan is in place, but has involved only a limited number of staff, has not been widely communicated, and is not readily available.	• A documented AM IT Functional Requirements Plan is in place. • The Plan has involved a wide-range of staff in its development and has been communicated to all relevant end users. • Processes are in place for implementation and review of the plan, both on a periodic basis and based on feedback from end users.	• A documented and widely communicated AM IT Functional Requirements Plan is in place and fully integrated into the overall enterprise IT master plan. • The plan is updated periodically, or as required, to ensure the most appropriate mix of technology assets and interfaces are in place to optimize AM practices. • End users are actively engaged in providing feedback and improvement suggestions which enable IT system to be continually improved.
Asset Management Objectives and Targets	**9** Asset Management Objectives - Performance Metrics/Levels of Service	No documentation of either customer or technical Levels of Service (LOS) exists, and therefore there is little or no consistent understanding of any gap between required level of service and provided level of service.	• Customer LOS are understood but not well documented. • Customer LOS have not been taken for comment/ agreement to the public or Board. • Some technical LOS exist, but are not all documented or monitored on a regular basis and there is not always an obvious link between customer and technical LOS.	• Customer LOS have been established, are well documented and are described in the Organizational Strategic Plan, but true costs (capital and operational) of maintaining or improving LOS is not understood. • The linkage between customer and technical LOS is not well understood for all asset groups.	• Customer LOS are fully documented, have been approved by the Board and are publicly available. • Technical LOS are documented for internal use and the link to customer LOS is largely understood, but may require further development. • The Alliance understands the costs behind current LOS, and while detailed costs for modifying the LOS are not always available, there is sufficient information to evaluate the implications of significant investment decisions.	• Periodic willingness to pay surveys are used to engage customers in the process of setting customer LOS targets. • Historic cost and LOS data are available to demonstrate the true cost of maintaining LOS or improving LOS with this data for developing organizational goals and objectives and justification of funding. • The Alliance can demonstrate managing the technical LOS with the optimum mix of capital and operational interventions to meet the customer LOS.

Key Focus Area	Theme	Score Descriptions				
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Asset Management Objectives and Targets	**10** Future Trends (Impact of Growth)	The Alliance has no understanding of how future growth and population movement will affect the asset base and associated service levels.	The Alliance has some understanding of the effects of growth and population movement trends but this is not fully documented and may exist only for certain asset groups.	• Growth related projections are carried out and documented by the Alliance, showing long-term forecasts to a time frame appropriate to the asset base, and the associated impact on assets. • Options and cost estimates exist for closing any gap. • Only limited cross-referencing of projections has been carried out across asset groups or with relevant agencies/stakeholders.	• Long-term projections have been carried out and costed. • Internal and external stakeholders are consulted in the assessment process and final assessments are reviewed to ensure consistency. • Sensitivity analysis has been included for key asset groups including pessimistic and optimistic growth scenarios. • Plans have been shared with appropriate staff.	• Detailed modeling has been undertaken to assess the impact of projected demand changes and population movement, and an accurate assessment of the impact at asset levels can be made. • The Alliance actively engages other agencies and stakeholders to foster an integrated and shared approach to growth with information used for the updating of the Organizational Strategic Plan.
Asset Management Objectives and Targets	**11** Legal, Regulatory and Statutory Requirements	The Alliance has not considered the need to identify and monitor its current legal, regulatory or statutory requirements.	The Alliance identifies and monitors its current legal, regulatory and statutory requirements but this is done in an ad hoc manner in the absence of a process/procedure, and the information is not always communicated in a timely manner or to the right people.	• The Alliance has procedures and assigned accountabilities for the identification and monitoring of its current legal, regulatory and statutory requirements, but information is not kept up to date. • An ad hoc approach exists identifying future legislation/regulation which may impact the asset base.	• The Alliance has procedures and assigned accountabilities for the identification and monitoring of its current and future legal, regulatory and statutory requirements, and the information is kept up to date and communicated to relevant people, and acted upon. • Asset investments consider pending, and potential legislation/regulation where appropriate.	The Alliance is proactive in considering and possibly influencing/challenging emerging laws and regulations, and their consequential impacts on operations, based on a robust understanding of factors associated with full compliance.
Asset Management Information Requirements	**12** Asset Information Strategy and Asset Information Improvement Plan	• The Alliance has not considered what AM information is required. • No Asset Information Strategy or Data Improvement Plan exists.	• The Alliance is aware of the need to define what AM information is required. • Staff have been identified to develop the Asset Information Strategy and Data Improvement Plan.	• The Alliance has documented the majority of its key asset information requirements and determined how these should be addressed. • An Asset Information Strategy and a Data Improvement Plan are under way and cover all key data requirements, but are not complete and may have not been communicated widely.	• The Alliance has clearly defined its AM information requirements. • An approved Asset Information Strategy and a Data Improvement Plan are in place, and have been developed with input from staff and have been communicated to relevant staff.	• Evidence exists that both the Asset Information Strategy and the Data Improvement Plan are being implemented. • The approved Asset Information Strategy and Data Improvement Plan are regularly reviewed for sufficiency and updated as necessary.

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Asset Management Information Requirements	**13** Asset Inventory	There is no documented asset inventory in place and therefore it is not clear what assets are owned by the Alliance.	• The Alliance has some asset records although these may not be formally structured, located in different databases and have significant gaps in coverage or accuracy. • Records are created and maintained in an ad hoc manner. • Asset information is only captured at a high level (e.g. facility/site level) with little or no associated attributes. • Coverage and currency of assets in the inventory would generally be poor.	• The Alliance has developed a formal asset inventory which is only accessible by a limited number of staff. • There is a defined asset hierarchy in place, although the hierarchy is not consistently populated to the level that would be considered fully accurate or complete. • Coverage and currency of assets in the inventory would generally be considered fair.	• The Alliance has comprehensive asset inventory that has been reviewed to ensure it meets AM needs. • Access to the asset inventory is easily available and accessible to all appropriate staff. • The asset inventory is structured to capture assets at the appropriate level in the asset hierarchy and coverage and currency is considered good. • The asset inventory fully supports financial reporting requirements.	• The Alliance's asset inventory is fully integrated with other relevant information systems to enable data to be easily accessed, shared and leveraged for improving O&M and capital decision-making. • The updating of asset inventory data is monitored and actions are consistently taken to ensure that data accuracy and coverage is kept to a high standard. • Coverage and currency is considered excellent.
Asset Management Information Requirements	**14** Asset Information Standards	The Alliance has not considered developing Asset Information Standards.	• The Alliance is aware of the need to define the Standards for its asset information and staff has been identified to develop the Asset Information Standards. • Some Asset Information Standards may exist for certain data, but are out of date, or not adhered to.	The Alliance has documented the majority of its Asset Information Standards for all key data, but the Standards are not complete and may have not been communicated widely.	An approved suite of Asset Information Standards is in place, and have been developed with input from staff and have been communicated to relevant staff.	• The approved Asset Information Standards are in place and are regularly reviewed regarding AM planning requirements. • Evidence exists that both the Standards are being adhered to and are subject to continual improvement.
Asset Management Information Requirements	**15** Asset Information	• Very little asset attribute information exists - some of which is of unknown quality. • No documented condition assessments are in place. • Costs are typically not attributed to assets correctly and no failure data is recorded.	• Asset attribute information exists for only a portion of the asset base (e.g., some critical assets), but there is little confidence in its accuracy and currency. • Asset condition grades appear to be subjective as no formal condition assessments has been conducted. • Asset attribute information collection is generally ad hoc or inconsistent. • A limited amount of cost, performance and failure data has been captured.	• Asset attribute information exists for most assets, although some may be of questionable quality and currency. • Asset attribute information is collected and managed to the maintenance managed item for larger value assets only. • Condition grades are recorded for all critical assets and most of non-critical assets. • Some costs are captured at high level for asset groups. • Improved data collection processes are being developed.	• The asset register, for the most part, contains current and reliable asset attribute information, including condition grades and risk scores for critical assets. • Information is collected and managed down to the maintenance managed item for all assets. • Performance and failure data capture procedures are in place to allow comparisons across the asset base and enable correct targeting of capital or O&M interventions.	• Asset attribute information is of high quality and current down to the maintenance managed component. • Cost, performance and failure data is captured for AM decision-making and can fully support lifecycle cost analysis. • Failure modes and root cause data are captured at the appropriate level for AM decision-making. • A process is in place to ensure asset attribute information/data is accurate and updated periodically.

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Asset Management Information Requirements	**16** Information Management	• Data is not maintained and cannot be relied upon. • No processes are in place for reviewing or updating data.	• Processes for data maintenance are being developed. • Data maintenance is typically ad hoc and inconsistent although there may be some good practices ongoing in certain areas of the organization. • Accuracy and currency of information is generally regarded as poor.	• The process for asset data maintenance has been developed but is not always consistently applied (e.g., only being applied to certain asset groups, or only applied within certain parts of the Alliance). • Communication of data capture and maintenance requirements could be improved. • Accuracy and currency of asset data is generally regarded as fair.	• The Alliance has effective controls in place to ensure data is accurate, and the controls are regularly reviewed and improved where necessary. • Processes are in place for the periodic review and updating of data and these are consistently applied and communicated. • Accuracy and currency of information is generally regarded as good.	• Assets are resurveyed and data updated on a pre-defined periodic basis. • Action plans for continual data improvement are well established and are being tracked. • A process in place for the archiving of relevant AM data, and information is retained for legal and/or knowledge preservation purposes. • Accuracy and currency of information is generally regarded as excellent.
Asset Management Information Requirements	**17** Asset Knowledge/ Analysis of Data	• There is no or very limited proactive analysis of collected asset data. • Any analysis that is done is typically ad hoc or reactive, and not subject to any quality control procedures.	• Some attempts have been made to conduct a proactive analysis of existing asset data for the purposes of AM decision-making although these are typically incomplete or disjointed. • Few, if any, documented processes exist for the analysis of data.	• The Alliance is in the process of defining key data analysis requirements and some key analyses may already be underway. • Responsibilities and documentation of processes for the proactive analysis of key asset information and for the subsequent dissemination of results to the appropriate the staff are in development.	• Robust analysis processes are in place for all key aspects of asset information required for AM decision-making (e.g., there is an understanding and communication of failure modes, cost and other relevant performance profiles and trends for key assets or asset groups). • In addition to analyzing historical failure data, processes are in place for predicting expected failure via modelling where appropriate. • Asset information is readily available to relevant staff.	• Plans are in place to improve existing data analysis capabilities to meet future AM decision-making requirements and to support optimized AM. • Analysis procedures and associated asset information are regularly reviewed for accuracy and benchmarked against external sources where appropriate.
Planning to Achieve Asset Management Objectives	**18** Asset Strategies	The Alliance has not considered the need for long-term asset strategies	The Alliance has sufficient information to start to create long-term asset strategies and/or asset strategies are in the process of being developed.	• The Alliance has designated the responsibility for creation and implementation of asset strategies and these are well underway, but not yet complete. • The linkages and alignment requirements between the Organizational Strategic Plan, AM Policy, SAMP, Asset Strategies and AM Plans are understood but require further work to fully integrate.	• The asset strategies are in place, and are being implemented and maintained. • The asset strategies relate to the SAMP and guide the development of the AM Plans, and there is a clear line of sight between the Organizational Strategic Plan, SAMP, Asset Strategies and AM Plans. • Progress towards the asset strategies is reviewed at appropriate periods and the document updated when relevant.	• The asset strategies are widely understood and bought into by the Alliance staff. • The asset strategies are fully integrated and aligned to ensure an integrated approach to investment. • These are also reviewed against peer organizations asset strategies and strategic planning approaches to ensure continual improvement.

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Planning to Achieve Asset Management Objectives	**19** Risk Framework - Strategic Level	No documented approach to the identification and management of strategic risks is in place.	• Executive management is aware of key strategic risks that face the Alliance, although these are not documented. • All staff are aware of the need to further develop their risk assessment methodology.	• Executive management has systematically identified key strategic risks and associated mitigations to be implemented within the Alliance. • Some processes exist to ensure that risks are monitored and the risk profile is kept up to date, but these are not consistently applied.	• Executive management has a robust risk identification, prioritization and escalation process in place. • Mitigation measures are communicated to appropriate staff for action, and progress is monitored at regular strategic risk reviews. • Standardized Excel worksheets, or proprietary software is in use. • Processes are in place for the identification of any changes to the risk profile.	• The Alliance continually reviews and assesses its strategic risks and there is an integrated and documented approach to risk management. • Risk profiles are regularly and consistently reported, monitored and updated. • Risk management is the cornerstone of AM and features highly in the language and culture of the organization. • A common risk framework is used throughout the Alliance.
Planning to Achieve Asset Management Objectives	**20** Risk Framework - Asset Level	No documented approach for the identification and management of asset risks is in place.	• Some critical asset risks have been notionally identified and some rudimentary risk assessments may be in place. • All staff are aware of the need to further develop their risk assessment methodology.	• For assets, staff uses only top-down approach and basic Excel worksheets to conduct the system level approach for critical asset groups. • Linkage of these asset risk models to subsequent implementation of capital and operational mitigations is not fully understood or consistently applied. • Some processes exist to ensure that risks are monitored and the risk profile is kept up to date but these are not consistently applied.	• Identification and assessment of asset risk are fully documented. • Mitigations measures are communicated to appropriate staff for action and progress is monitored at periodic risk reviews. • Bottom-up risk assessments are linked to LOS and are sufficiently granular for AM decision-making. • Standardized Excel worksheets, or proprietary software is in use across the organization. • Processes are in place for managing asset risks. re in place for the management of asset risks.	• The Alliance continually assesses its asset risks with a well-defined. documented integrated approach with a common risk framework. • All critical assets have been defined and risk mitigation strategies documented. • Risk profiles are regularly and consistently reported, monitored and updated. • Risk management is the cornerstone of AM and features highly in the language and culture of the organization. • Risk assessment results are linked to skills/training.
Planning to Achieve Asset Management Objectives	**21** Optimized Asset Intervention Planning	• Whole Life Cost (WLC) is not used to determine appropriate asset interventions. • Replacement of assets is predominantly focused upon lowest capital cost.	• Some WLC related issues are considered but this is done in ad hoc manner and is not part of a defined process. • WLC approach may be used for some projects or only major projects but typically there is no assessment of the O&M costs associated with capital costs.	• WLC approaches are utilized for assessment of capital expenditure options on projects greater than a certain value or for complex projects, but assessments of associated O&M costs are typically high level only and no link exists to the O&M budgeting process. • Some documented WLC processes exist but may be inconsistent or not consistently applied. • Discount rates may vary depending on the staff member performing the analysis.	• WLC processes are in place for making optimized asset rehabilitation and replacement decisions, and for operational interventions. • Intervention selection is driven by robust WLC evaluation with all asset lifecycle costs included in the analysis. • Decisions are based the best cost-benefit option at an acceptable level of residual risk. • Decision-making processes promote system thinking and innovation, and like-for-like replacement is not the only option.	• Consistent approach to WLC has been adopted across the Alliance. • Standardized approach to use of discount rates (H, M and L) are in place. • Executive management is fully bought into selecting options based on lowest WLC, even if this results in higher initial capital costs. • Operating budget is adjusted when an operational solution is shown to be the lowest WLC solution. • Asset renewal periods are defined through a consistent/robust approach.

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Planning to Achieve Asset Management Objectives	**22** Asset Management Plans	The Alliance has not considered the need for Asset Management Plans (AMPs).	• The Alliance has sufficient information to begin developing AMPs and plans are place for drafting the AMPs. • Some elements of the AMPs are already in the process of being developed.	• The Alliance has designated the responsibility for creation and management of AMPs and they are well underway, but not complete. • The linkages between the AMPs and Asset Strategies, AM Policy and Organizational Strategic Plan are understood but are not fully reflected in the AMPs.	• The AMPs are in place, and are being implemented and maintained for an optimized approach to asset renewal, and O&M interventions. • Progress is reviewed annually and targets are reviewed periodically. • Key projects are progressing as detailed in the AMPs. The AMPs fully support delivery of Asset Strategies, the AM Policy and the Organizational Strategic Plan, and there is a clear line of sight to justify the proposed asset renewals and interventions	• The AMPs are widely understood and bought into by the Alliance staff. • The AMPs are integrated with other stakeholder AMPs where relevant to ensure an integrated approach to asset improvements. • The AMPs are also reviewed against external peer organization AMPs to ensure continual improvement.
Planning to Achieve Asset Management Objectives	**23** Capital Investment Plan Development and Governance	• There is a reactive and/or ad hoc approach to developing projects for the Capital Investment Plan (CIP). • Projects are not objectively ranked but are predominantly promoted based on subjective representation of short-term needs. • No business case evaluations (BCE) are performed.	• The Alliance's staff provides input. on an annual basis. to the CIP based primarily on subjective judgments of asset condition or other issues. • Projects are typically not objectively ranked. • BCEs are only performed for major projects and only limited numbers of staff are trained in their use. • No cost allocation to purpose categories (e.g., risk reduction, regulatory requirement, enhanced LOS, growth, efficiency) is carried out.	• A risk-based approach is used to identify and prioritize CIP projects, but the CIP is still partly based on a percent dollar spilt between asset groups. • Planning horizon is up to 10 years. • Only high value elements of the CIP are driven by a rigorous understanding of asset need, risk, and root cause analysis. • BCE training is underway and started to be used on all projects greater than a prescribed value. • Cost allocation to purpose categories is limited.	• A consistent approach to the justification and prioritization of competing projects is applied to the CIP and funding requirements adjusted to suit the asset management objectives. • Costs are allocated to the correct purpose categories. • The CIP is driven by a rigorous understanding of asset need including risk reduction and root cause analysis. • The asset need is clearly identified and is subject to optioneering, risk and value analysis. and challenge through the BCE process.	• A well-documented and robust risk-based approach is applied to renewal projects in the CIP. • Renewals are justified rather than prioritized based on a defined funding level. • The CIP is optimized for the best blend of projects to balance service and cost constraints. • Promoted project scopes are continually assessed and WLC are reviewed to assess continued viability. • There is a clear understanding of project need, scope, cost and deliverability for all projects.
Operational Planning and Control	**24** Capital Projects - Planning, Design, Construction and Commissioning	• There are no documented processes or procedures in place for Project Management/ Contract Management covering planning, design, construction and commissioning activities. • Potentially each project/contract could be approached differently.	• The Alliance recognizes the need for processes and procedures for managing projects and contracts, and is in the process of drafting these. • Some processes/procedures may exist but they are not fully documented.	• Processes/procedures exist but are not fully aligned or integrated across the relevant lifecycle stages. • Some projects/contracts are still being initiated/managed, bypassing the processes/procedures.	• Documented processes/ procedures exist covering all stages of a project, from planning to commissioning ensuring that fit-for-purpose assets are delivered within specified standards. • Governance is in place to check projects (time, cost, quality) at all stages. • Processes/procedures cover contract admin, project management, value engineering, etc. • Project forecast updates are accurate and up-to-date, with any needed change identified early to allow for intervention.	• All processes/procedures are fully integrated and are reviewed periodically through a continual improvement process. • Processes ensure that optimum maintainability and operability are considered during project delivery (e.g. health and safety). • Projects are reviewed upon completion and lessons learned are consistently incorporated into subsequent projects. • All appropriate staff make contributions around the asset lifecycle.

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Operational Planning and Control	**25** Operations Management	• No documented standard operating procedures (SOPs), unit process control procedures (UPCPs), O&M manuals or work instructions are available. • Poor operational practices and/or significantly different operational practices between staff members with potential to result in low asset availability, reliability, and performance with high operating costs and/or presenting a safety risk.	• Asset operators are generally qualified for tasks and typically follow common historical operating practices which may not be documented. • Executive management understands the need for SOPs and UPCPs and a plan is being developed to generate these. • Executive management understands the need for an operational risk framework and a plan is being developed to generate this.	• SOPs, UPCPs, work instructions, and schedules (e.g., operator rounds) are being developed and asset operators are being required to follow these when introduced. • Additional training of staff is being planned as necessary • Some automation is in place and this is incorporated into the SOPs, UPCPs, and task schedules. • Processes are in place to ensure key tasks are appropriately documented/ logged.	• SOPs, UPCPs, and schedules have been developed and are being carried out by asset operators to optimize performance and cost. • Asset operators are engaged in planning processes; consideration of risk is embedded in day to day business. • Automated systems are used to optimize operations. • Comprehensive UPCPs exist for all unit processes. • Processes for completing and retaining key documentation are rigorously implemented.	• Best in class operating processes are being carried out by asset operators and there is evidence that these are maximizing performance and quality at lowest WLC. • Asset operators take an active role in managing asset health, are engaged in the wider asset management system, and are undertaking forward projections regarding future changes to the asset lifecycle. • Full use of automated systems where appropriate.
Operational Planning and Control	**26** Maintenance Management	• Maintenance is carried out purely on a reactive basis, with no understanding of asset criticality and the associated risk exposure. • Maintenance work orders are hand written and not tied to an asset • No consideration has been given to developing the overall process for optimizing maintenance practices.	• The Alliance is aware of the need to develop processes for carrying out proactive maintenance and some processes are in development, however, most maintenance remains predominantly reactive. • Maintenance work orders are derived from CMMS, but there is no accurate reporting mechanism in place. • Maintenance job plans (SOPs) are lacking thoroughness and review. • A plan for optimizing maintenance has not been completed or is outdated.	• Processes for defining and implementing proactive maintenance are in place but have not yet been fully implemented. • Maintenance job plans (SOPs) have been developed for assets determined to be critical through a risk assessment. • The ratio of proactive to reactive work is improving, or plans are in place to address the issue. • Mechanisms are in place to track reactive and proactive work and backlog.	• Processes are in place to establish maintenance levels and frequencies based on risk assessments. • Job plans (SOPs) exist for all maintenance activities. • Work is predominantly proactive. • Work performed is included in work order closeout and documented in CMMS. • Reports are generated from CMMS to track work activities, and identify performance trends. • Processes are in place to monitor this and promote corrective actions.	• Proactive work is considered to be at optimal levels. • Maintenance analysis methods (e.g., DE, PMO, FMEA) are used to determine the most cost-effective maintenance strategy. • CMMS is appropriately leveraged and provides all required failure, work and cost information. • Maintenance staff are fully engaged in data capture processes and understand the AM implications. • Advanced maintenance practices are used for assets with very high criticality.

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Operational Planning and Control	**27** Investigation and Recording of Routine Asset Failures and Reactive Work	The Alliance has not considered the need to define appropriate responsibilities and authorities for the investigation of the root cause of routine asset failures, or for recording the corrective actions taken and associated costs of such reactive work.	• Executive management understands the need for defining responsibilities and for developing procedures for investigating causes of routine asset failures. • There is evidence of some root cause investigations but information is typically captured in an ad hoc manner (e.g., free text fields). Work performed and cost information is captured inconsistently.	• The Alliance has defined responsibilities and developed procedures for capturing root causes of routine failures, and details of reactive work carried out; however, there is room for improvement in the processes as they are not consistently applied in the field. • There is some information on root cause of failure and resulting reactive work and costs which enable some analysis but significant improvements can be made.	• The Alliance has defined and documented the responsibilities and procedures for carrying out root cause investigation, documenting reactive work and cost, and evidence is available to show these are being consistently applied. • Root causes and reactive work are consistently classified and recorded at the appropriate level in CMMS to enable meaningful analysis.	• The Alliance periodically reviews and audits the root cause investigation and work recording processes to ensure consistency and identify opportunities for continual improvement. • Evidence exists that demonstrates that planning and operational staff are fully engaged in the process and consult/inform each other as required to ensure that appropriate information is being collected, analyzed and shared for asset-related decision-making.
Operational Planning and Control	**28** Contracted Operations and Maintenance	The Alliance has not considered the need to put controls in place to ensure the delivery of its AM policy, strategy and plans for activities performed by out-sourced service providers.	• The Alliance controls its outsourced activities on an ad hoc basis and no linkage exists between the control of outsourced activities and the Alliance's AM policy, strategy and plans. • There has been limited knowledge and information sharing between the Alliance and its outsourced service providers.	• Controls for outsourced activities are in place, but cover only some aspects of the Alliance's AM policy, strategy and plans, or the controls are not fully documented. • There has been a sharing of knowledge and information with outsourced service providers, but this is done in a loosely coordinated way.	• Evidence exists to demonstrate that all outsourced activities are appropriately controlled to provide services in alignment with the Alliance's AM policy, strategy and plans, and these controls consider all risks posed by the outsourced activities and interfaces. • These controls are documented. • All appropriate knowledge and information is shared between the Alliance and the outsourced service providers to best manage risk, resources and efficiency.	• All controls are reviewed periodically, or as required, and the outsourcing partner is fully engaged in the process. • Documented controls are assessed against comparable controls in place elsewhere in the organization and against similar controls in place in other comparable organizations. • Improvements to the controls are made as appropriate and implemented in contract renewals and future outsourcing contracts.
Operational Planning and Control	**29** Materials Management	• No documented materials management process is in place for parts, materials or supplies stored by the Alliance. • There are none or only a few tailored agreements for purchasing.	• The Alliance recognizes the need for materials management processes. • Availability of critical spares cannot be guaranteed. • Tailored purchasing agreements are in place for only some parts, materials and supplies, and significant gaps remain. • There is no automated materials management system.	• The Alliance is in the process of documenting processes for material management. • Risk-based approach to stock and spares control is being developed. • Contracts are in place for the majority of outsourced components although some may be no longer appropriate. • Inventory balances are considered to be generally accurate. • There is an automated materials management system but it is not integrated with CMMS or other IT systems.	• Robust processes exist for material management. • Inventory balances are considered to be accurate and are tracked. • Critical spares are identified on a risk-based approach and retained in-house. • Up to date purchasing agreements are in place for all relevant parts, materials and supplies. • The automated inventory system is integrated with CMMS, and other appropriate information systems.	• Materials management processes are periodically reviewed and updated. • Materials management system is totally integrated with CMMS and other information systems, and includes generated pick lists and the procurement system ensures all materials are available for scheduled work. • Replenishing inventory is automated, based on completed work orders. • Purchasing agreements are reviewed on a regular basis, involving planning, engineering and O&M staff.

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Operational Planning and Control	**30** Emergency Preparedness and Response	The Alliance has not considered the need to identify critical assets, key risks and vulnerabilities, and to plan for emergencies - either asset related or related to the failure of crucial business processes.	• Executive management is aware of the need to identify critical assets, key risks and vulnerabilities, and plan for emergencies. • The Alliance has some limited capabilities to prepare for and respond to emergencies but they have been developed in an ad hoc manner. • There is no coordinated approach to risk, identification, protection of critical assets or the planning of associated emergency response capabilities.	• The Alliance has identified key threats and has allocated appropriate roles and responsibilities for deploying appropriate security, emergency preparedness and response measures. • Plans are being developed to respond to natural and anthropogenic incidents, although some aspects of the response may be disjointed across different agencies or staff. • Elements of the plans are untested and it is unknown if the plans can be carried out significant problems.	• A structured approach exists to identify key risks, critical assets and vulnerabilities with input from Alliance staff and stakeholders. • Security measures and emergency preparedness and response plans, including trigger levels for action, are in place to respond and manage the continuity of critical activities. • These plans have been communicated to the appropriate staff. • Exercises and tests have been carried out or are planned to test the plans.	• A comprehensive exercise program is in place to test the effectiveness of the emergency preparedness and response plans. • Processes are in place for collection of information and feedback from participants. • Actual incidents and near misses within the Alliance and across the water sector are used for lessons learned. • Plans are revised to reflect feedback from exercises and lessons learned. • Emergency preparedness and response planners are engaged in AM decision-making.
AM Enablers and Support	**31** Investigation of Major Asset Failures and Incidents	The Alliance has not considered the need to define appropriate responsibilities and authorities for the handling, investigation and communication of major asset related failures and incidents, or for defining procedures for dealing with failures or incidents of non-conformances.	• The Alliance understands the need for defining responsibilities and for developing procedures. • Any procedures that are available are used on an ad hoc basis. • Timescales and escalation procedures may be unclear.	• The Alliance is in the process of defining responsibilities and documented processes for investigating major failures and incidents which establish the steps to be taken, in what timeframes and how the results are to be communicated. • Gaps or inconsistencies still exist.	• The Alliance has defined the responsibilities and evidence is available to show these are being applied. • Fully documented process exists which cover the progressive steps to follow for the handling, investigation and communication of major failures or incidents. • There is evidence that these processes are reviewed.	• The Alliance periodically reviews the processes, procedures and associated authorities regarding investigating major failures and incidents, either on a fixed schedule or following an event. • Evidence exists that demonstrates these processes are subject to a continual improvement process.
AM Enablers and Support	**32** Shutdown and Outage Management	The Alliance has not considered the need to develop a shutdown and outage strategy or process, and therefore the consequences associated with shutdowns and outages are not assessed before occurring.	• The Alliance is in the process of developing a shutdown and outage strategy and process. • Certain high consequence shutdowns/outages are assessed, but there is no formal process to assess the impact to the organization's objectives.	The Alliance has a shutdown and outage strategy and process for systematically assessing the consequences associated with shutdowns/ outages; however, some shutdowns/outages are still not being assessed in accordance with the process.	• The Alliance has a strategy and process in place for systematically and consistently assessing the consequences associated with shutdowns and outages. • Changes impacting assets are being identified and assessed before being implemented.	• The Alliance's shutdown and outage strategies and process is periodically reviewed. • There are clear criteria that triggers the review process and these are widely understood and acted upon.

Key Focus Area	Theme	Score Descriptions				
		1	2	3	4	5
AM Enablers and Support	**33** Asset Information Systems Implementation Plan	There is no documented Asset Information Systems Implementation Plan in place, resulting in a disjointed and/or reactive approach to hardware and software needs.	An Asset Information Systems Implementation Plan is under development, but is not widely publicized, does not have input from end users or was not developed based on the AM IT Functional Requirements Plan.	An Asset Information Systems Implementation Plan is in place and has been developed to address the clearly identified needs based on the AM IT Functional Users Requirement Plan, but has not been communicated widely and is only available to a limited number of staff.	• A documented Asset Information Systems Implementation Plan and migration plans (where appropriate) is in place, including the appropriate governance. • The Plan has involved a wide range of staff in its development and has been communicated to all relevant end users. • Processes are in place for implementation and review of the plan, both on a periodic basis and based on feedback from end users.	• A documented and widely communicated Asset Information Systems Implementation Plan is in place. • It is periodically updated as required and ensures that the most appropriate mix of technology assets and appropriate interfaces are in place to optimize AM practices. • End users are actively engaged in providing feedback and suggestions for improvement which enable the system to be continuously improved.
AM Enablers and Support	**34** Control of Documented Information	The Alliance has not considered the need to control documented information aside from any regulated requirements.	• The Alliance understands the need to define document referencing, access and protection protocols. • Any procedures that exist are applied on an ad hoc basis.	• The Alliance is in the process of defining protocols for document referencing, access and protection. • Crucial documents have been identified and controls put in place. • Work is underway to place other relevant documentation under control although gaps or inconsistencies still exist.	• The Alliance has defined controls for referencing, access and protection, and there is evidence available to show these are being applied. • All necessary controls are in place to ensure that information required for AM purposes is adequately protected from loss of integrity, confidentiality, or improper use. and loss of integrity. • There is evidence of consistent application of the protocols, and for ongoing review of the control procedures.	• The Alliance periodically reviews the document control protocols, either on a fixed time period basis, or following a specific event. • Evidence exists that demonstrates these processes are subject to a continual improvement process.
AM Enablers and Support	**35** Knowledge Retention and Succession Planning	The Alliance has not considered the need for a formal, forward looking approach to knowledge management, but rather takes a reactive approach.	• Succession planning is carried out for a limited number of staff; however, no strategies are in place to manage knowledge. • Knowledge management is only carried out at a local level and on an ad hoc basis.	• Potential retirees are identified and the Alliance staff works with HR to identify potential successors and/or fill vacancies as they arise with minimal delay. • A knowledge management strategy is under development.	• A knowledge management strategy and processes are documented and are in use. • Robust succession planning is in place for all key staff and there are processes to ensure continuity of people resources for crucial AM tasks.	• The Alliance maintains a long-term view of resourcing vulnerabilities and adopts appropriate strategies to mitigate these. • Junior staff are actively coached and mentored by senior staff to ensure effective knowledge transfer. • Technology systems are utilized to effectively capture pertinent information and to ensure efficient communication to successors and other relevant staff.

Key Focus Area	Theme	Score Descriptions				
		1	2	3	4	5
AM Enablers and Support	**36** Asset Management Quality Assurance and Management Review	The Alliance has not considered the need for a AM audit program or for executive management review of the AM system.	• The Alliance understands the need for an AM audit program and for a periodic review of the AM system by executive management. • The Alliance is in the process of developing an audit program. • Some informal audits and AM system review is carried out and information communicated to executive management on an ad hoc basis.	• The Alliance has established an audit program but it is not yet fully implemented and does not provide for the results of the audit to be fully communicated. • A procedure for the communication of audit results and for the correction of non-conformities is in place but is not always adhered to. • Executive management is committed to undertaking a periodic review of the AM system although this may not be fully developed or implemented yet.	• The Alliance has documented AM audit program with results communicated to the appropriate staff. • There is evidence that corrective actions are implemented. • Executive management is engaged in the periodic review of the AM system and improvement actions have been implemented and logged. • The priority of what is audited, and the frequency of audits, considers the importance of AM processes and the results of previous audits.	• The Alliance is proactive in seeking input from relevant stakeholders in developing its audit program. • The benefits of the audit process are tracked and can be shown to be adding value and/or minimizing risk. • Executive management is outward looking and open to comparisons with peer organizations and other industry sectors when reviewing the AM system.
AM Enablers and Support	**37** Continual Improvement Culture	• Staff is not encouraged to try new ideas and approaches. • Initiatives are usually limited to those addressing a failure with serious reputational or political consequences, but generally there is a status quo mentality. • Little or no external AM benchmarking takes place.	• The Alliance's executive management is aware of the benefits and recognize the need to encourage a continual improvement culture, and are in the process of developing plans to move towards this goal. • Some limited AM benchmarking has been carried out but is typically not used to develop action plans for improvement.	• A continual improvement culture is generally encouraged by executive management and continual improvement principles are embedded in the AM approach. • Key staff are familiar with the continual improvement process and a few initiatives have been identified and are being worked on. • Periodic AM benchmarking is carried out, and the results is used to develop action plans.	• The Alliance has a continual improvement process from executive management down to frontline staff. • Executive management reinforces the continual improvement culture. • All levels of management encourage the identification of new approaches and demonstrate a commitment to implementation when potential benefit has been established. • The Alliance engages with other asset-intensive organizations, and participates in AM benchmarking.	• Staff are fully engaged in continual improvement, and this is evidenced by the new ideas for improvement that are brought forward. • AM processes act as a catalyst to develop and implement recommendations for the continual improvement of asset performance, reliability and overall cost effectiveness. • The Alliance initiates and is fully engaged in periodic benchmarking activities with a view to identifying potential improvements and implementing improvement actions.
AM Enablers and Support	**38** Communication and Change Management	The Alliance does not engage in proactive change management processes and does not consider impacts to AM activities associated with changes to processes, procedures, organizational structures, roles and responsibilities, new assets, or new technology.	• Proactive communications and change management regarding AM is sporadic, ad hoc and inconsistent. • The Alliance is aware of impacts to AM activities along with potential inefficiencies, but has no process in place for controlling or mitigating these impacts.	• The Alliance encourages a proactive communications and change management approach but this is not always consistently applied. • The Alliance has recognized the need to consider impacts to AM activities and is in the process of putting in place a formal change management approach along with an associated communications plan.	• A formal communications and change management approach is consistently utilized and information is available to and from employees and relevant stakeholders regarding the reasons for change and how it will impact on their individual roles and responsibilities. • The impact of any changes is formally assessed and acted upon prior to changes taking places.	• The Alliance has adopted a recognized best practice for organizational change management. • The management of impacts to AM activities associated with changes to processes, procedures, organizational structures, roles and responsibilities, new assets/technology, is regularly assessed, and adjustments are made to facilitate organizational change and mitigate impacts. • There is open, honest and all-way communication in support AM change initiatives.

Appendix B
SAMPs Slide Presentation, 2015 American Water Works Association Infrastructure Management Conference

American Water Works Association

Dedicated to the World's Most Important Resource®

Strategic Asset Management Plans
(SAMPs)

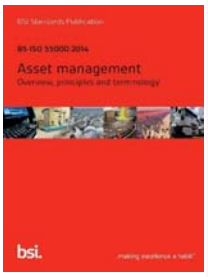
Water Infrastructure Conference

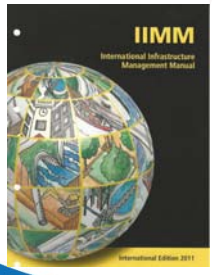
Bethesda, Maryland

October 13, 2015

CH2M

What is an Strategic Asset Management Plan?





Documented information that specifies how organizational objectives are to be converted into asset management objectives, the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives

- No specific definition
- Rather stipulates the importance of an AM strategy and alignment to the organization's strategy

The Asset Management System Hierarchy

Agency's Strategic Plan
- Establishes the organization's vision, mission, goals and objectives
- Communicates its direction, resource priorities and actions needed to achieve its goals and objectives, typically over a 5 to 10 year period

Asset Management Policy
- Articulates leadership's commitment to AM and to continual improvement
- Provides expectations and direction for mandatory requirements for AM
- Defines the key principles that underpin AM within the Utility

Strategic Asset Management Plan
- Sets out the roadmap for implementation of the Policy
- Identifies the AM objectives
- Establishes the AM framework

Asset Management Plans
- Sets out the specific lifecycle activities to deliver the AM objectives
- Outlines the long-term plan for assets, including service expectations, timelines and funding, and resource requirements

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- Sets out the specific lifecycle activities to deliver the AM objectives
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What is the purpose of a SAMP?

- Document the approach to implementing the AM Policy
- Link the organization's strategy and AM Policy to the asset management plans
- Clearly describe the applicability and boundaries of the organization's asset management system
- Set the organization's asset management objectives
- Guide development of decision-making methodologies

"A SAMP can be referred to by other names, e.g., an asset management strategy."
(ISO 55001, 2.5.3.4)

The SAMP provides foundational elements for Asset Management

- Assessing risk
- Engaging stakeholders
- Establishing roles and responsibilities
- Designing competency requirements
- Developing performance management
- Creating O&M strategies for managing asset over their lifecycles
- Managing data and documentation
- Corrective action and risk mitigation
- Ensuring continuous improvement

"The SAMP can have a timeframe that extends beyond the organization's own business planning timeframe, requiring the asset management system to address the complete lifetimes of the assets."
(ISO 55000, 2.5.3.4)

Drafting a SAMP in conformance with ISO

"The organization shall develop a SAMP which includes documentation of the role of the asset management system in supporting achievement of the asset management objectives."

(ISO 55001, 4.4)

- Explicit requirements (ISO 55001):
  - Inclusion of the AM objectives
  - Document the role of the AM system in delivering the AM objectives
- Implied requirements (ISO 55001)
  - Provide the basis for the scope of the AM system
  - Provide the basis for developing AM Plans which will describe how the objectives will be achieved at the asset level

Drafting a SAMP in conformance with ISO

Also, consider the guidance provided in ISO 55002 in developing the SAMP.

- Include a statement of scope for the asset management system
- Include the asset management policy
- Document the approach to implementing the principles of the asset management policy
- Document the relationship between the asset management objectives and the organizational objectives
- Include a statement of stakeholder needs

Other considerations in developing the SAMP

- The SAMP is a high-level plan
- Consider activities that could extend beyond the organization's routine planning timeframe
- Ensure commitment and active engagement from the organization's leadership and cross functional cooperation

"Asset Management tools and technologies may be helpful, but **the engagement of the workforce, the clarity of leadership, and the collaboration between different departments and functions are the real differentiators** of a leading asset management organization."

The Institute of Asset Management

What should the SAMP look like?

- Appropriate to the organization's purpose and should be scaled to match its size/complexity
  - Separate document
  - Combined with other organizational strategic documents
- Contains language and terms that enables its understanding across the organization
- Uses graphics and tables to improve readability
- Includes an executive summary and table of contents
- Includes appendices that contain needed details and therefore keeps the base document relatively short
- Lists, but does not include, references
- Includes glossary

Example contents of a SAMP for a large water, wastewater and stormwater utility

1. Introduction
2. Asset Management within the Context of the Organization
3. Leadership and Organizational Elements of Asset Management
4. Performance Management
5. Asset Management Lifecycle Strategies
6. Key Asset Management Enablers
7. Asset Management Plans
8. Asset Management Improvement Strategies

Acronyms and Abbreviations

Glossary

References

Appendices

Example contents of a SAMP for a large water, wastewater and stormwater utility

1. Introduction

1.1 Objectives of the Strategic Asset Management Plan

1.2 Contents of the Strategic Asset Management Plan

1.3 Assets Included in the Asset Management System

1.4 Current Condition of the Infrastructure Assets

1.5 The Approach to Asset Management

- Includes the list of Asset Management Objectives
- Describes SAMPs sections and the alignment with ISO 55000
- Summary of infrastructure, approximate quantities, value, and high-level hierarchy
- Summary of asset condition based on existing information
- Brief description of how AM is being implemented in the Utility

Example contents of a SAMP for a large water, wastewater and stormwater utility

2. AM within the Context of the Organization

2.1 The Organizational Strategy

Overview of the organization's strategic plan, financial plan and ongoing initiatives

2.2 Stakeholder Analysis

Lists of needs and drivers influenced by external and internal stakeholders

2.3 Aligning AM with the Organizational Context

Graphic showing the alignment of the AM Policy's principles with the organization's strategic goals (Policy is in the appendix)

Example contents of a SAMP for a large water, wastewater and stormwater utility

3. Leadership and Organizational Elements of Asset Management

3.1 AM Governance

Description of the organizational structure, the AM governance structure and roles and responsibilities

3.2 Asset Management Policy

Description of the AM Policy and its principles (Policy is in the appendix)

Example contents of a SAMP for a large water, wastewater and stormwater utility

4. Performance Management

4.1 Levels of Service — Listing of LOS for each utility system and LOS targets

4.2 Performance Measures for Asset Management — Description of KPIs, Pis, workload indicators and metrics

4.3 Selection of Performance Measures — Examples of performance indicators and references

4.4 The Organization's Performance Measures — Listing of performance indicators and metrics currently used by the organization

Example contents of a SAMP for a large water, wastewater and stormwater utility

5. Asset Management Lifecycle Strategies

5.1 Identification and Grouping of Assets — Description of how assets are defined and grouped with focus on linear assets

5.2 Asset Inventory — Criteria for establishing an accurate and uniform asset register

5.3 Asset Hierarchies — Description on the design of asset hierarchies based on ISO 14224

5.4 Asset Identification (IDs) — Approach for asset naming convention

Example contents of a SAMP for a large water, wastewater and stormwater utility

5. Asset Management Lifecycle Strategies (continued)

5.5 Maintenance Strategies

5.6 Condition and Performance Assessments

5.7 Determination of Remaining Useful Life

Presents a range of maintenance strategies and methodologies to determine which strategies to employ

Guidance for conducting condition and performance assessments

Offers examples of methods to forecast the remaining useful life of assets

Example contents of a SAMP for a large water, wastewater and stormwater utility

5. Asset Management Lifecycle Strategies (continued)

5.8 Risk Analysis

5.9 Risk Mitigation

5.10 Business Case Evaluations

5.11 Prioritization of Capital Improvement Projects

Presents a range of maintenance strategies and methodologies to determine which strategies to employ

Guidance for conducting condition and performance assessments

Offers examples of methods to forecast the remaining useful life of assets

Example contents of a SAMP for a large water, wastewater and stormwater utility

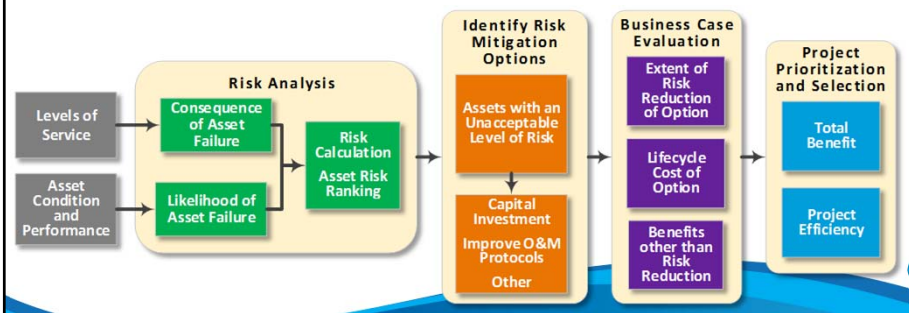
5. Asset Management Lifecycle Strategies (continued)

5.8 Risk Analysis
(risk matrices in appendix)

5.9 Risk Mitigation

5.10 Business Case Evaluations

5.11 Prioritization of Capital Improvement Projects



Example contents of a SAMP for a large water, wastewater and stormwater utility

6. Key Asset Management Enablers

6.1 Workforce and Competencies

Roles and tasks of the IAM's 7 AM competencies, instituting the competencies and the alternative of outsourcing

Example contents of a SAMP for a large water, wastewater and stormwater utility

6. Key Asset Management Enablers (continued)

6.2 Documentation of Processes and Document Management

6.3 Information Management and Technology

6.4 Communications and Change Management

How business processes and documents should be managed with respect to the organization's applications

Description of existing and needed integration of software applications to facilitate management of assets

Goals, messages and approaches for communicating AM principles and practices and embedding into the organization

Example contents of a SAMP for a large water, wastewater and stormwater utility

7. Asset Management Plans

7.1 Asset Management Plans for the Organization

7.2 Contents of an Asset Management Plan

Description of, and description of alternatives to, Asset Management Plans

Annotated outline of an Asset Management Plan

Example contents of a SAMP for a large water, wastewater and stormwater utility

8. Asset Management Improvement Strategies

8.1 Asset Management Progress to Date

8.2 Asset Data and Work Order Management

8.3 Current Asset Management Program

Description of the advances the organization has made over the past several years

Focus on status of enhancement to asset data and work order management

Description of the ongoing AM Program

Thank you

Questions / Comments ?

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