EXHIBIT 3-B

Monterey Water System

Contract Management Plan

Final

Sept 2020

Monterey Peninsula Water Management District

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Executive Summary

The Monterey Peninsula Water Management District (MPWMD) is dedicated to protecting and augmenting water supplies for the benefit of the customers in the Monterey Water System. MPWMD is currently assessing the costs and benefits associated with acquiring ownership of the facilities owned and operated by California American Water in the Monterey region. As part of this effort, MPWMD is developing an Operations Plan and a key related question concerns the feasibility of contracting for future operations of these facilities. Jacobs has conducted an analysis of the contracted operations scenario and is pleased to provide this report to support MPWMD in developing its Operations Plan.

Jacobs has identified the following areas that will be needed to provide the desired services and are described in detail in this report.

1. Level of service
2. Regulatory and compliance
3. Safety
4. Process control
5. Staffing
6. Asset management and maintenance

Each of these areas are essential for the proper delivery of the highest quality of water to the customers of Monterey Peninsula water district and provide both quality services at the most economical life cycle cost.

Defining levels of service (LOS) is a foundational element in building a responsive contract management plan. A cohesive group of LOS measures, set at the appropriate levels with Monterey Peninsula Water Management District (MPWMD), can ensure an integrated approach from the performance vision, down to day-to-day customer response and maintenance management decision making. LOS typically address the overarching goals of the customer's mission. These represent how infrastructure assets and actions will achieve the goals related to customer service, environmental protection and regulatory compliance, economic sustainability, and public and employee health and safety.

Most contract operations providers have expertise in all pertinent areas of environmental regulations including the Clean Water Act, the Clean Air Act, the Emergency Planning and Community Right-to-Know Act, the Resource Conservation and Recovery Act, Biosolids Management, Industrial Pre-treatment, Laboratory Management, and Stormwater Regulations. We actively develop strong working relationships with regulators at the Federal, State, and local levels. We believe in complete transparency in reporting to the regulators and communities should be a must for any contract operator providing serve to the district.

Any Contract operation company should be committed to Health & Safety (H&S) for all their projects and clients. Jacobs aims to strengthen our culture of caring with the goal to consistently deliver an incident and injury free environment for all our people. This should be high in consideration of contract operations.

In addition to classic water system components, the MPWMD system is underway with a project to reuse water from several sources (reclaimed wastewater, stormwater, food processing water, and impaired surface water) for injection into the Seaside Basin. The consideration to select a contract operation company must include the diversity and ability of the company to understand all the aspects of the MPWMD system and have the depth of experience to properly operate and maintain the assets.

Staffing is the key to any properly operated facility. Properly trained and experience staff will allow the system to operate smoothly and ensure that all stakeholders are protected and receive the highest level of service (LOS) possible. The approach to O&M is designed to meet and exceed the scope of work and performance standards for the MPWMD. This approach will not only be cost effective, it will also provide the desired LOS to meet or exceed the needs of customers in the MPWMD service area, as well as any contract performance standards, and will have the flexibility to provide additional services when needed, including the support for continuous improvement and capital projects.

Proper maintenance is only one part of a management plant. In order to ensure that all assets are fully optimized, not only for utilization, but for life expectancy an Asset Management Plan (AMP) is required. The main purpose of the AMP is to ensure that there is a working and living document that is used by the contract operator and agreed by its Partner, MPWMD, to effectively manage the approach to AMP and the Mid Life Capital (MLC) investment for their respective water projects.

The main aims from the implementation of the AMP are that the shareholder, MPWMD, and lenders obligations are recognized, managed, and delivered to meet the requirements of the contract. The document content intends to describe the Asset Management Strategy in a way that gives MPWMD and lenders the confidence in the approach to AMP. The document aims to describe the risk-based approach being applied to the capital and maintenance investment to give confidence in the informed decisions being made, enabling the sanction of future MLC expenditure that complies with the client and contractual obligations set by best practices and the respective contracts. To achieve this good communication, transparency and stakeholder liaison throughout the AMP process is essential and will lead to a greater support for capital investment by increasing stakeholder understanding regarding the value of targeted asset investment to improve water utility performance.

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Acronyms and Abbreviations

5YIP	Five-Year Investment Profile
ACES	Asset Condition Evaluation System
AIP	Annual Investment Plan
AMP	Asset Management Plan
ANSI	American National Standards Institute
APP	Accident Prevention Plan
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
BOP	Best Operations Practice(s)
C&R	Compliance and Reporting
CFR	*Code of Federal Regulations*
CG	Condition Grade
CIP	Capital Investment Plan
DMR	daily monitoring report
DCS	Distributed Control System(s)
EOP	emergency operations plan
EPA	U.S. Environmental Protection Agency
EPP	emergency preparedness plan
H&S	Health & Safety
HACH WIMS	Hach Water Information Management Solution
HSE	Health, Safety and Environment
ISO	International Standards Organization
LCHP	Laboratory and Chemical Hygiene Plan
LOS	Level(s) of Service
MC	Maintenance Connection
MLC	Mid Life Capital
MOR	monthly operating report
MPWMD	Monterey Peninsula Water Management District
MSDS	Material Data Safety Sheet(s)
MUR	Method Update Rule
NSF	National Sanitation Foundation
O&M	Operations and Maintenance
QA	Quality Assurance

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QC	Quality Control
OSHA	Occupational Safety and Health Administration
PM	preventive maintenance
PPE	personal protective equipment
psi	pound(s) per square inch
RCM	Reliability Centered Maintenance
SCADA	Supervisory control and data acquisition
SCN	Screen Number
SOP	standard operating procedure(s)
SOR	safe observation report(s)
SPIP	Service Period Investment Profile
STT	Sample Tracking Tool
WSP	water system process
WTP	water treatment plant

1. Level of Service

Defining levels of service (LOS) is a foundational element in building a responsive contract management plan. A cohesive group of LOS measures, set at the appropriate levels with Monterey Peninsula Water Management District (MPWMD), can ensure an integrated approach from the performance vision, down to day-to-day customer response and maintenance management decision making. LOS typically address the overarching goals of the customer's mission. These represent how infrastructure assets and actions will achieve the goals related to customer service, environmental protection and regulatory compliance, economic sustainability, and public and employee health and safety.

The ultimate goal of the MPWMD is to provide specified LOS to its customers. These LOS should be commensurate with the expectations of the customer, but also be realistic and practical within the budgetary, timing, and external constraints within which the contract is constructed and priced. However, care must be taken to ensure that the definition of the LOS is compatible across all levels of the organization and provides staff with a relevant and tangible objective that can be influenced by their working practices. Establishing these LOS measures will ensure that a clear relationship is identified between customer objectives and asset-focused objectives. This will enable the organization to move toward budgets based on achieving a set of LOS and being able to communicate a reduction or improvement in LOS associated with a reduction or increase in available budgets.

It is inappropriate to identify specific LOS that are applicable to every kind of asset or activity, and certainly not something that can be decided for every utility without direct input for specific needs and circumstances. General goals may include public confidence, health and safety of employees, competitive rate structures, and frequency of repairs. However, vertical and linear assets will require different kinds of LOS. Priorities differ based on the system being addressed, and it is necessary to carefully consider the specific needs of the system.

MPWMD and a contract operations company should jointly establish appropriate LOS for each system in a workshop setting and begin to consider what the consequences of failing to meet the levels may mean. For instance, we expect that in accordance with industry best practice, the response time for the Customer Service Requests will be given the highest priority. A contract operations company would develop the LOS with customer guidance for each of the departments to establish what the minimum LOS should be based on the risk of the request. This can be accomplished utilizing a risk matrix that ensures public safety and optimizes MPWMD resources. Table 1-1 identifies the categories that could be used to establish the desired LOS for any area of operations. Weights and Impact values will be established with input from all areas including but not limited to management, engineering, and operations personnel. The established (Weight x Impact) value can then be used to establish priorities for work assignments.

1.1 Level of Service Prioritization

The priority for repairs or work assignments would work as follows: If the health and safety to the public is determined to be negligible (scoring a "1") but the disruption to the community or public image was high (scoring a "7"), it would have a total risk value of (1 impact x 1 weight) + (7 impact x 0.4 weight), which would produce a total risk score of = 3.8. This can then be compared to other repair tasks or assignments to determine the highest priority to address. Scores can then be categorized to determine the response time as well, such as a score of less than 2 would require a response within 5 days, scores of 2 to 5 within 2 days, and scores of 5 or higher within 24 hours.

1.2 Goals for Level of Service

The goal of the LOS is to improve the operations and maintenance (O&M) services and confidence in the water operations for all stakeholders. Improvements in the level of service will facilitate improvements in areas such as:

- Preparing and maintaining a Regulatory Agency Management Plan

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- Conducting regularly scheduled meetings and communications with Regulatory Agencies
- Preparing and maintaining a Water Quality Monitoring and Reporting Plan
- Preparing a Water Quality Improvement Plan
- Establishing key water quality issues that impact the public
- Developing water quality information materials and fact sheets
- Improving public water sources from impacts associated with the water system O&M
- Adopting customer service policies
- Minimizing customer service complaints
- Minimizing technical service complaints
- Implementing a Customer Service Staff Training Program
- Implementing a public outreach program that routinely informs the stakeholders and customers of ongoing issues, construction improvements, planning, finance, regulations, and other core functions that allow for comments and input from the community
- A MPWMD website that provides current information on the water system, usage, construction projects, master plan/planning activities, and O&M programs/activities
- Adopt a Customer Communication Plan

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Table 1-1. Criticality Levels by Possible Impact

	Impact Category	Weight	Negligible = 1	Low = 4	Moderate = 7	Critical = 10
1	Health & Safety of Employees and Public	1.0	No injuries or adverse health effects.	No lost-time injuries or medical attention necessary.	Lost time injury requires medical attention.	Long-term disability or death.
2	Compliance with Regulations and Permits	0.9	No violations of permits or regulations. No environmental or public health impact.	Technical violation but no enforcement action taken. No environmental or public health impact.	Violation of Permit Condition. Possible short-term environmental impact. Possible public health impact.	Violation of Permit Condition. Enforcement action likely. Long-term environmental impact likely; public health impact likely.
3	Service Reliability	1.0	No service interruption to any clients.	Immediate service interruptions to one or more clients lasting less than 8 hours.	Service interruption to any clients lasting longer than 8 hours and up to 24 hours.	Service interruption to any clients lasting longer than 24 hours.
4	Disruption to the Community/Public Image	0.4	No social or economic impact on the businesses or the community. No disruption to the community. No media coverage.	No social or economic impact on the businesses or the community. Minor disruption to the community (e.g., traffic, dust, noise, spills). No media coverage.	Short-term economic impact on residential customers and/or a few businesses. Minor disruption to the community (e.g., traffic, dust, noise, spills). Local media coverage.	Long-term or area-wide economic impact on numerous businesses or any "high-priority" customer. Major disruption to the community (e.g., traffic, dust, noise, spills). National media coverage.
5	Ability to Return Service	0.8	Less than 8 hours.	Service restored 8 to 16 hours.	Service restored 16 to 24 hours.	Not able to restore service for >24 hours.
6	Financial Impact	0.8	<$1,000	$1,000 to $10,000	$10,000 to $50,000	>$50,000

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2. Regulatory Review/Laboratory

The Environmental Compliance Program is an organized, systematic approach to maintain compliance with environmental, legal, and business requirements. Using a series of quality assurance (QA)/quality control (QC) procedures, the integrity and accuracy of the compliance and facility-performance data gathered and reported to regulators and MPWMD is an effort made to be transparent to all stakeholders. As a result, the contract operator must form positive and beneficial working relationships with the agencies to which it reports on behalf of its customers.

Most contract operations providers have expertise in all pertinent areas of environmental regulations including the Clean Water Act, the Clean Air Act, the Emergency Planning and Community Right-to-Know Act, the Resource Conservation and Recovery Act, Biosolids Management, Industrial Pre-treatment, Laboratory Management, and Stormwater Regulations. The contract operator will actively develop strong working relationships with regulators at the Federal, State, and local levels and believe in complete transparency in reporting to the regulators and communities that it serves.

Water requirements are based on specific regulations that specify what must be tested and reported based on the origination of the source water (surface water, ground water, or ground water under the influence of surface water), the size of the system, and the population served. Although state requirements are usually very similar to federal requirements, there are instances where states are more stringent or require addition testing. Contract operation companies typically use a comprehensive tool that captures the full requirements of federal code and then adds state-by-state requirements as needed.

Environmental Compliance Programs are designed to generate consistent and predictable compliance with all applicable laws, regulations, and standards. The goal is “Perfect Compliance and Perfect Reporting”. The information developed from typical program will:

1) Alert staff to situations that require special attention and possibly require calling on assistance from regional, corporate, or other specialists to support onsite staff.
2) Generate legally defensible data and records. Some contract operations companies will implement a suite of Project Compliance Tools for MPWMD including:

A comprehensive training program including project start-up.

Video modules and ongoing training provided via web-based delivery mechanisms and onsite training.

In-depth monthly operating report (MOR) and air permit evaluation tools to ensure that all permit requirements are identified and fully understood.

Sample Tracking Tool (STT) with multiple layers of oversight to ensure that sampling is performed as required.

Utilization of a SharePoint site entitled “Project Compliance Tools”, which should be available to all associates. The tools described above, as well as other tools and compliance-related information, ensure all information is properly communicated to the required associates.

Use of industry standard data management tools, such as Hach Water Information Management Solution (Hach WIMS), to collect and preserve all process control and compliance data in a secure manner and as required.

2.1 Laboratory Management and Compliance Plan

Contract operations companies should perform all sampling, analysis, and reporting as necessary for compliance with all current state and federal regulations and any permitting or other regulatory requirements. They should implement a comprehensive laboratory program at the facility that is compliant with current and anticipated regulations, including 40 *Code of Federal Regulations* (CFR) Part 136, the U.S. Environmental Protection Agency (EPA) Method Update Rule (MUR), Standard Methods Online Version, Guidelines Establishing Test Procedures for the Analysis of Pollutants, and other industry-accepted standards. A contract operations company should have established and conduct a laboratory start-up that includes onsite training, installation of laboratory programs and policies, a review of regulatory requirements, and a follow-up laboratory review within 6 to 12 months of commencing the services. All resources should be utilized to make the laboratory compliant, efficient, and successful. The main objective would be to operate a fully functional water process control laboratory that will conduct all required sampling and analysis of samples in compliance with federal and state requirements. Compliant laboratory practices should be implemented and maintained along with an approved laboratory safety program.

Routine analyses and procedures for MOR reporting of field parameters such as pH and total residual chlorine would be performed by the laboratory staff at the treatment facility. Additional permit-required analyses would typically be performed using a combination of both the in-house laboratory and commercial laboratories (such as TestAmerica and ALS Laboratories). Samples would be transported to the contract laboratories via courier service to ensure all samples meet hold time requirements.

All samples should be collected, preserved, and analyzed, and the results reported to meet all EPA and regulatory requirements as specified in all permits.

2.2 Regulatory Compliance Methodology

Operating methodology should incorporate all regulatory requirements, covering all elements of compliance.

2.2.1 Treatment and Process Control

A process control plan should be established that includes at a minimum:

- Weekly jar testing to determine optimum chemical dosing for pH, disinfectants, coagulants, and similar
- Production rate seasonal and daily targets
- Setting process control targets, such as when cleaning cycles should happen (and tracked to indicate when replacement may be approaching)
- Supervisory control and data acquisition (SCADA) data logging and trending of all key parameters

Adherence to established targets is through a proprietary statistical control tool built as an “add-on” feature to Hach WIMS, or other control tools. It should monitor how closely the operations team keeps to these targets, rather than simply looking at historical average data, which has been found to allow for wide swings in performance from reacting to the plant and source water quality, rather than steadier operations and dedicated control of the plant. This invariably results in superior regulatory compliance.

2.2.2 Finished Water Storage

The regulatory plan should extend beyond the treatment plant and into the distribution system, including finished water storage tanks. Monitoring of the distribution system is required to ensure compliance with minimum storage per connection, turnover, residual, and security. As discussed further in Operations, Section 5, the plan should include frequent “boots on the ground” inspections to supplement remote monitoring.

2.2.3 Distribution System

Distribution system minimum pressure (to prevent any contamination by intrusion) and disinfection are the primary regulatory and operating parameters, but several other topics have significant regulatory importance and are built into our operating plans.

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2.2.3.1 Bacteriological and Disinfection Residual Sampling

Bacteriological and disinfectant residual sampling is also part of the regulatory plan, and the STT is of particular value when it comes to ensure perfect sampling performance. With thousands of samples to be collected and processed, it can be all too easy for the field sampling team to miss samples and create a regulatory violation. This is a completely preventable violation, and only requires a systematic method to ensure all samples are correctly collected and processed. As noted, a STT can eliminated virtually all missed sample violations.

If not already in place, a contract operations company should further create a standard operating procedure (SOP) to ensure all bacteriological sampling and testing is conducted following any water line repairs in accordance with regulations.

2.2.3.2 Valve Exercising Program

Valve exercising is a procedure that verifies proper location, operation, and material condition of valves, and initiates replacement as necessary. The physical operation of a valve and the documentation of the actions and procedures necessary to do so are equally important. Industry best practice is to follow the recommendations and standards from the American Water Works Association (AWWA), which requires all valves (such as distribution and transmission valves, air valves, and blow-offs) to be inspected and operated on a regular basis.

The main objectives of a comprehensive valve exercise program are to:

- Improve valve reliability
- Reduce water loss
- Identify critical valves on distribution system
- Measure and document valve operation
- Develop trend analysis

According to AWWA, "Each valve must be operated through a full cycle and returned to its normal position on a schedule that is designed to prevent a buildup of tuberculation (rust formation in pipes as a result of corrosion) or other deposits that could render the valve inoperable or prevent a tight shutoff. The interval of time between operations of valves in critical locations or valves subjected to severe operating conditions must be shorter than for other less important installations but can be whatever time period is found to be satisfactory based on local experience. The number of turns required to complete the operation cycle must be recorded and compared with permanent installation records to ensure that full gate travel (i.e., it can be opened and closed) is maintained."

"A recording system must be adopted that provides a written record of valve location, condition, maintenance, and inspections of the valve," AWWA standards continue, "Each valve must be operated through one complete operating cycle. If the stem action is tight as a result of buildup on the stem threads, the operation must be repeated until the opening and closing actions are smooth and free."

A full inspection must be performed, and any problems must be reported immediately to the person responsible for necessary repairs.

"To carry out a meaningful inspection and maintenance program, it is essential that the location, make, type, size, turns, close direction, and installation date of each valve be recorded. Depending on the record-keeping system used, other information may be entered into the permanent record."

Some valve manufacturers simply recommend exercising their valves at frequency based upon local experience. However, consistent with the *Water Distribution Systems Handbook* (AWWA 2000) and Manual M44 (AWWA 2015), isolation valves should be exercised at least once every one or two years.

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2.2.3.3 Flushing and Hydrant Maintenance

Like any other piece of equipment, if not operated and maintained properly, fire hydrants may not work when needed the most (firefighting, line flushing). As with valve exercising, best practice comes from the recommendations and standards from the AWWA for fire hydrant documentation, operation, and maintenance. The AWWA recommends all hydrants be inspected regularly at least once a year. In freezing weather, dry-barrel hydrants may need to be inspected in spring and fall.

A good hydrant O&M program requires good records. A great source for all sorts of record-keeping forms relating to hydrant O&M is *Fire Hydrants: Field Testing, and Maintenance* (AWWA 2016). This is the source of the record-keeping forms that Jacobs will use for the program we will establish for MPWMD.

It is recommended to create a flushing program (and flushing water loss tracking) that meets all requirements for dead end flushing, including dates/times, accurate locations, loss calculation measurement, and written procedures.

2.2.3.4 Cross-Connection or Backflow Records.

Cross-connection control and backflow prevention require a robust program. A critical element of a successful program includes having a plan in place that provides guidance on hazard identification, inspections, testing, a description of the current program (such as staffing, tracking, surveying, testing, training, and fee requirements) and evaluation of the current program, proposed changes, and implementation plans. The plan should also contain a schedule of when facilities are inspected and surveyed; records of all device locations; correspondence, including notices of violation; and a list of devices, and inspections of approved backflow prevention devices.

2.2.3.5 Use of Lead-Free Components for Distribution System Repair

On January 4, 2014, a national law amended the Safe Drinking Water Act that required all products in contact with drinking water to have a 0.25 percent maximum lead content for all wetted components using a surface-based averaging formula. This new rule impacts virtually every component of a water treatment and distribution system from the treatment plant to plumbing fixtures. The lead-free law applies to a wide variety of products used in water distributions systems, including meters, pumps, valves, pipes, fittings, or fixtures that come into contact with potable water. This includes corporation stops, curb stops, service fittings and couplings, meter valves, meter couplings, check valves, and backflow valves. Fire hydrants are exempt from this regulation. Leaded components already installed in distribution systems by January 4, 2014, are grandfathered in. Utilities can make repairs in place, but once a component is removed from the system for any reason, it has to be replaced with a lead-free component. This important consideration is included in our approach to maintenance to ensure regulatory compliance.

2.2.4 Documents, Records, and Reports

Documentation, records, and reporting is sometimes overlooked but must also all be perfect to stay in regulatory compliance, so this gets substantial attention as well.

2.2.4.1 NSF Certification

All chemicals, additives, and any additional or replacement process media used in treatment of water supplied by public water systems must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 60 for direct additives and ANSI/NSF Standard 61 for indirect additives. Conformance with these standards must be obtained by certification of the product by an organization accredited by ANSI. Copies of these certifications must be maintained on file with the water system and available for review upon request. At the time of this review, copies of NSF certifications for treatment chemicals were not available.

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2.2.4.2 Logbooks

Each water treatment plant (WTP) is required keep a reliable logbook where operators record events and data for the site, including water quality and quantity, treatment chemicals used, and incidents that have occurred.

When incidents occur, the logbook is required to record the nature of the incident, as well as any corrective and/or preventive action taken. The logbook should be bound preferably with numbered pages to ensure that information is legally defensible, true to the last entry, and provides an accurate accounting of all activities that have occurred during each shift.

Daily logbook requirements include:

- Daily shift recordings of water quality (raw, process, and final)
- Volume of water produced
- Water loss at the works
- Chemical dosing rates, chemical use, and chemical stock levels
- Equipment failures and repairs
- Incidents

When incidents occur, the following information is required to be recorded in the logbook:

- Date and site of incident
- Staff member who identified the incident
- Details of nonconformance
- Corrective and preventive action taken
- Signature by WTP superintendent Close-out signature by drinking water system manager

2.2.4.3 Standard Operating Procedures

The operations Contractor should create consistency and regulatory excellence at all contract-operated sites by setting high standards, and SOPs are a key means of ensuring this level of quality.

2.2.4.4 Monitoring Plan

Every public water system is required to have a monitoring plan, and contract operator should prepare this during the startup period (typically within 90 days of the start of a contract). This requirement was part of the Federal Stage I Disinfectants and Disinfecting Byproducts Rule. Failure to have an administratively complete monitoring plan and failure to maintain an up-to-date monitoring plan constitutes a monitoring violation and may result in reporting violations. The monitoring plan should include the following:

- Information on the location of all required sampling points in the system.
- The location of each sampling site at a treatment plant or pumping station is designated on a plant schematic.
- An identification of each entry point into the distribution system either by a written description of the physical location of each entry point to the distribution system or by indication on a distribution system or treatment plant schematic.
- The address of each sampling site in the distribution system or the location of each distribution system sampling site is designated on a distribution system schematic.
- A distribution system schematic that clearly indicates the following: (1) the location of all pump stations in the system, (2) the location of all ground and elevated storage tanks in the system, and (3) the location of all chemical feed points in the distribution system.

- A written description of sampling frequency and a schedule with a list of all routine samples required on a daily, weekly, monthly, quarterly, and annual basis and an identification of the location where the samples are located.
- An identification of the analytical procedures that are used to perform the required analyses and identifies all of the laboratory facilities that may be used to analyze samples required by the administrative code and other regulations.
- A written description of the methods used to calculate compliance with all maximum contaminant levels, maximum residual disinfectant levels, and treatment techniques that apply to the system.

2.2.4.5 Emergency Operations Plan / Emergency Preparedness Plan

Every community water system is required to have an emergency operations plan (EOP) that outlines the actions that should be taken during a disruptive event or threatening event that may affect the quantity or quality of water served by a system. This plan must be reviewed and updated every two years or every time there is a change in the system.

A submitted EOP should include one of the following:

1) Auxiliary generators equipped with automatic starting generators and switch over equipment. This equipment must have the ability to detect the failure of normal power from the electric grid; automatically start the generator; isolate necessary water equipment from the normal power grid; and switch the running generators power to power the necessary water equipment to maintain the required minimum pressure.
2) Two or more affected utilities may propose the sharing of auxiliary generator power. Necessary electrical and/or water connections equipped with automatic switch over and opening valves must be presented in the plan to demonstrate how one or more affected utilities will be able to maintain the required minimum pressure. Describe which equipment will share the auxiliary generator power and which equipment, if any, would receive power from only a single affected utility's auxiliary power equipment.
3) Copies of negotiated leasing and contract agreements for emergency power equipment and any necessary fuel. This includes mutual aid agreements with other retail public utilities, exempt utilities, or providers or conveyors of potable or raw water service if the agreements provide for coordination with the division of emergency management in the governor's office. Consideration must be given to the location of where the other water supplier(s) are located as they may also be affected by the same natural disaster. In addition, when entering into a contract for leasing of emergency power equipment and necessary fuel, the contractual commitments of the supplier to other water suppliers and businesses within an area subject to the same natural disaster event must be taken into consideration.
4) Use of portable generators capable of serving multiple facilities. The portable generator(s) and the necessary water equipment must be pre-equipped with quick-connect, mating electrical connectors to facilitate the rapid implementation of the emergency preparedness plan. The plan must address whether there is an adequate number of portable generators to operate all the necessary water equipment in order to maintain the required minimum pressure in multiple pressure plans or at multiple systems, if affected by the same natural disaster event.

An emergency preparedness plan (EPP) must provide for any applicable production, treatment, transfer and service pumps at an adequate flow rate and at a minimum pressure of 35 pounds per square inch (psi) in the far reaches of an affected distribution system, including multiple pressure planes. If applicable, the EPP must provide the following:

- Contact information, including names, emergency telephone numbers, and email addresses.
- All ground, surface, and purchased water sources, with locations and individual capacities.
- All interconnections with other water providers; whether normally open or closed; size; whether wholesale, purchase, or both; available capacity; and any other pertinent information. Include the names of each

interconnection and their contact information, including names, titles, telephone and pager numbers, and email addresses.

- The capacity and power requirements of all treatment equipment.
- The type of storage, volume, and volume required per day for each chemical during emergency operations.
- A copy of all water distribution and transmission piping maps.
- The maximum and average daily demands.
- All primary electrical power sources.
- All equipment necessary to provide water to customers at the required minimum pressure and adequate flow rate, and the power requirements for each piece of equipment.
- The size, location, and fuel requirement in gallons per hour at the load necessary to maintain emergency operations for all onsite manual and automatic auxiliary power equipment and provide information as to how the affected utility determined the necessary fuel quantity.
- Documentation as to how the affected utility will ensure that it maintains an adequate supply of fuel during emergency operations.
- The size, location, fuel requirement in gallons per hour at the load necessary to maintain emergency operations, and the name of the system sharing the equipment for all shared auxiliary power equipment. Include the other system’s contact persons with their emergency telephone and pager numbers and email addresses.
- A copy of any leasing and contracting agreements, including mutual aid agreements with other retail public utilities, exempt utilities, or providers or conveyors of potable or raw water service, if the agreements provide for coordination with the division of emergency management in the governor’s office. If leasing, include the vendor’s name, location, and contact information.
- All portable generators’ power, phase, type of quick-connect, fuel type, and fuel demand in gallons per hour.
- Specifications, a description, and detailed capacity information for all onsite electrical generation or distributive generation equipment. Include all fuel demands for this equipment.
- All direct or right-angle drive emergency power equipment with the name, type of engine, fuel type, and fuel demand in gallons per hour.
- Details for any other proposed alternative.
- The location and volume for each fuel tank, name of fuel suppliers, contact names, titles, telephone and pager numbers, and email addresses.
- All local and state emergency responders and their emergency contact telephone and pager numbers. Include medical facilities.
- All priority water users, such as hospitals and nursing homes, and their emergency contact names, titles, telephone and pager numbers, and email addresses.
- Any bulk water haulers that could be used, including contact names, telephone and pager numbers, and email addresses.
- The system’s designated media spokesperson with a list of local media contact names, titles, type of media, telephone and pager numbers, and email addresses.
- The water restrictions that the system will implement during an emergency response.
- A proposed time frame for full implementation of the EPP.

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2.2.4.6 Sampling Plan

In addition to the STT, a site sampling schedule and plan that specifies the time, place, and method of conducting all permit compliance and process control sampling. Each location is shown in pictures, in tabular form for each day of the week, and in schematic form.

2.2.4.7 Rounds Sheets

Operational rounds sheets should be produced for this site that specify the minimum duties for operators on shift; however, nothing replaces plant staff walking around the project site and first-hand observing operations. Operator rounds sheets may be used to help train new operators, or to organize data recorded from local instrumentation, but these will be highly customized for each facility. Managers are routinely seen making these rounds as well at the best-run plants.

The contract operator should create standard shift rounds sheets to facilitate consistent operations and data collection, as well as providing a standard format for data entry into a plant operational and laboratory data tracking system.

2.2.5 Compliance Training

Regulatory compliance awareness is perhaps taken for granted as just part of the operator's profession, but very few get any formal training in the legal or regulatory complexity of treatment plant permits. Very few operators realize that they are criminally liable for violations of the Safe Drinking Water Act by being negligent in their duties as an operator. And regulators take a very dim view of <u>any</u> permit violations, whether they are for effluent quality or simply reporting errors. Both may be considered equally damaging in terms of violating regulations.

Compliance training is designed to standardize procedures and schedules for regulatory data gathering and reporting, inspection and maintenance of analysis equipment, and staff accountability for compliance-support activities. Course content includes training in proper techniques for data gathering, open and honest communications, and how to avoid common industry practices that are not legal. It also covers report preparation, equipment maintenance and inspection, monitoring regulatory changes, and communication procedures.

2.3 Quality Assurance Protocols

A QA program should be implemented to verify the reliability of the data produced at the in-house laboratory. This will safeguard against errors in data production by implementing the testing system according to industry-approved methods. The objectives of a QA program are as follows:

- Produce reliable and defensible data.
- Documentation that fully complies with state and federal regulations.
- Establish STTs to ensure that all samples are collected to ensure permit compliance.
- Perform daily calibration of all laboratory equipment, 3-point buffer calibrations, weight verification of scales, annual calibrations of certified thermometers, and other actions.
- Provide each laboratory with bound and numbered bench sheets. All bound books are formatted to provide method of analysis, instrument used, dates collected and analyzed, analyst identification, project and location identification, information on the analyses, analytical conditions and results, comments, and an example of calculations (if any).Assure only quantitative and approved methods are used and identify problem areas with analytical methods and results. Correct problems prior to reporting data.
- Perform Performance Evaluations or "Blind Studies" twice per year to include the daily monitoring report (DMR) QA Study if applicable.
- Determine the degree of accuracy and precision of each analytical system by using the QC Stats program.

EXHIBIT 3-B

The QA lab program consists of the following elements:

Methodology – The in-house process laboratory will follow the most current EPA and standard methods of chemical analyses. A Compliance and Reporting (C&R) Team should establish site-specific laboratory procedures and SOPs and train staff on topics including QC, safety, sample protocol, correct testing methods, and the most up-to-date approved test method to meet permit requirements. They should routinely analyze control samples using Method Blanks, Reference Standards, Duplicate Samples, Spiked Samples, and Split Sampling where applicable.

Chain of Custody – Required for all outside and in-house process laboratory analyses, the chain of custody records the sample preservation and handling procedures for detailed tracking of samples. The Operations contract should utilize an in-plant laboratory and operations logbook to further track the laboratory procedure from sampling through final analyses for all process samples. They must comply with all chain of custody, preservation, and transport requirements defined by the MPWMD for all permit required analyses.

Instrumentation – Laboratory equipment and plant meters, including in-line equipment, are calibrated to ensure accurate and precise analysis results and calibrations are recorded in logbooks to meet regulatory requirements. When calibrations prove to be outside of operating specifications, the staff should perform necessary preventive and corrective maintenance. Annual third-party calibrations should be completed to ensure compliance.

This approach will need to be documented in the QA Manual, which should be customized for this project. A dedicated Compliance & Reporting Team should perform regular internal audits of the laboratory procedures and reporting and will require analysis of blind audit samples at least twice per year.

2.3.1 Quality Control Protocols

QC requires technicians to essentially demonstrate that each day's analysis was successful. All essential QC elements are incorporated with each method analyses, including, but not limited to: Method Blanks, Laboratory Control Samples, Duplicate Samples, Matrix Spikes, and Matrix Spike Duplicates. Each essential QC element must meet the minimum USEPA-established acceptable criteria for each analysis performed.

Each laboratory should have defined control limits for precision and accuracy that bracket the variation inherent in the test at that lab on its particular sample matrices. By using precision and accuracy control charts, analysts can track trends and identify the emergence of systemic error. The graphs and charts necessary for these activities at the project site may be prepared using proprietary spreadsheet tools, such as Jacobs' "QC Stats", or other such tools.

2.3.2 Laboratory Information Management System

The laboratory data software programs that recommended by Jacobs are the Hach Water Information Management Solution (HACH WIMS) database and Microsoft Excel and Access. HACH WIMS is the primary database used for compiling permit and process laboratory data. The information is tracked, compared to historical averages and targets, and sent to our process supervisors to make any necessary changes at the facility.

The laboratories should use a Document Control System to retain all original observations, calculations and derived data, and calibration records including:

- Laboratory data logbooks, chain of custody, and bench analysis books.
- Identity of personnel involved in sampling, sample receipt, preparation, or testing.
- Information related to equipment, test methods, sample receipt, sample preparation, and data verification.
- Record-keeping system that facilitates retrieval of information for verification or inspection.
- Sample preservation, including appropriateness of sample container and compliance with holding time requirement.

EXHIBIT 3-B

- Sample identification, receipt, acceptance or rejection, and log-in.
- Sample storage and tracking including shipping receipts and sample transmittal forms (chain of custody form).
- Documented procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.
- All original raw data, whether hardcopy or electronic, for calibrations, samples, and QC measures including analysts' worksheets and data output records.
- Copies of final reports.
- Archived SOPs.
- All corrective action reports, audits, and audit responses.
- Blind sample proficiency test results and raw data.
- Results of data review, verification, and cross-checking procedures.
- Analytical records, (such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs) including data and statistical calculations, review, confirmation, interpretation, assessment, and reporting conventions.
- QC protocols and assessment.
- Electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries.
- Method performance criteria, including expected QC requirements.
- Personnel qualifications, experience, and training records.
- Records of demonstration of capability for each analyst.
- A log of names, initials, and signatures for all individuals who are responsible for signing or initialing any laboratory record.
- Internal audit reports.
- Management review.
- Corrective and preventive actions.
- Laboratory Chemical Hygiene and Safety.

A detailed approach to managing laboratory chemical hygiene and safety includes:

- Developing a site-specific Laboratory and Chemical Hygiene Plan (LCHP), to include a consistent procedure for daily, weekly, and monthly hygiene requirements for the laboratory.
- Maintaining an inventory of the laboratory chemicals; label, store, or dispose of according to the LCHP.
- Installing all safety equipment as required by regulation.
- Installing and/or updating required signage for all laboratory entrances.
- Installing a fire blanket, smoke detector, broken glass disposal box, and other required safety equipment.
- Setting up safety preventive maintenance (PM) for all laboratory equipment.
- Performing Occupational Safety and Health Administration (OSHA)-required fume hood ventilation calibration, if applicable.
- Installing ground-fault circuit interrupter receptacles in laboratory, if and where necessary.

- Providing laboratory safety training.
- Review, train, and document Material Safety Data Sheets (MSDS) and laboratory chemical hazards with staff.
- Maintenance.

The approach to maintaining the laboratory, equipment, and ancillary equipment should include:

- Developing PM procedures for laboratory equipment according to manufacturer's recommendations and input practices into the Maintenance Computer Tracking system.
- Developing PM and inspection frequencies for Laboratory Safety Equipment as required by the CFR, Standard Methods Online Version, MUR, and manufacturer's recommendations.
- Implementing Laboratory Maintenance Log for Probes and Laboratory Equipment.

2.3.3 Laboratory Resources

Resources available to all personnel include:

- Regional Laboratory Coordinator for guidance.
- Compliance Laboratory Director for guidance.
- Corporate C&R Team for guidance.
- Initial laboratory start-up/training and follow-up training.
- Blind Study/DMR QA assistance for testing and reporting.
- Ongoing updates of methods and regulation revisions and adaptations.
- Continuing laboratory training onsite and via webinar.
- Regular laboratory reviews as required by state and federal regulations.

2.3.4 Source Materials

Materials that should be provided by a Contract Operator include:

- Hach WIMS or similar computerized data management program
- QC Stats Program
- Laboratory QC Manual
- Bound Bench-book templates for lab parameters, maintenance, and calibration
- Laboratory Review Checklist
- Contract Laboratory Review Checklist
- LCHP
- Laboratory training modules
- SOP Library
- Standard Methods, Online Version
- Access to Laboratory Quality and Safety programs and templates;
- Laboratory SharePoint site access (houses laboratory tools and resources)
- STT
- Laboratory Techniques videos
- Laboratory video shorts
- Preliminary Excursion Guide

<u>EXHIBIT 3-B</u>

3. Safety

The health and safety of all staff should be the heart of culture and approach. The contract operator should have a comprehensive safety programs and excellent track records. The program established by Jacobs is already in extensive use in California.

Any Contract operation company should be committed to Health & Safety (H&S) for all their projects and clients. Jacobs aims to strengthen our culture of caring with the goal to consistently deliver an incident and injury free environment for all our people. Jacobs has a long history of keeping employees safe and consistently outperforming the industry average in safety, as seen on Figure 3-1. This should be high in consideration of contraction operations. The examples below are from Jacobs contract operations and are provided for consideration for review of any contract operating company.

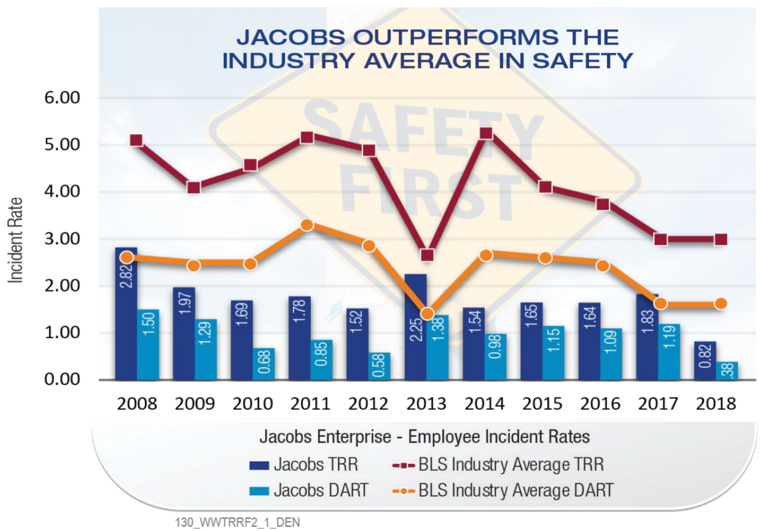

Figure 3-1. Jacobs Outperforms Industry Averages in Safety Year After Year

One of our first priorities for the operations of MPWMD will be to identify any and all safety concerns at each facility and service area. These safety issues will then be corrected with the appropriate remedies to ensure all staff and stakeholders can work in a safe environment.

Supervisors, team leaders, managers, and staff have a special obligation through their own actions to create a safety culture and climate where those around us share concern for their personal safety and the safety of their co-workers. Safety leadership starts at the top of each company and flows down. With the total commitment to safety at the corporate level, this commitment then flows to the Program Director and Project Manager, function leaders such as Operations Manager and the Maintenance Manager, and on to other leaders and all workers.

MPWMD's contract operator's commitment and culture are key to always achieving excellence in all areas of H&S performance. All of MPWMD's contract operator's employees should be empowered and required to make H&S and zero injuries a reality at each job task.

3.1 Positive Mental Health

Your contract operator's employees are its most important assets. We believe that each employee's mental health has a direct impact on safety, morale, and productivity.

Mental Health program that allows employees to receive support for mental disorders, financial challenges, legal questions, and other well-being issues. Jacobs initially launched mental health training in November 2016 as part of its global "Mental Health Matters" strategy and now has over 1,200 positive mental health champions across the globe. These individuals are trained in how to guide staff who have mental health concerns or crises to the appropriate level of help. The goal of this network of champions is to raise awareness of the risks of mental health and encourage open dialogue about mental illness. MPWMD should seek a similar commitment from its contract operator.

3.2 Physical Security

Physical Security policies should be implemented to provide a secure work environment for employees and guests and to proactively protect information and property by requiring compliance with the established industry standards and best security management practices. A security plan should address crisis management, business continuity, relocation and evacuations, and general security at the project. In addition to following, standard security and asset protection procedures, a contract operations company should focus on improving physical security for the MPWMD managed assets. In addition to these measures, they should bring a "Culture of Safety and Security" to this project. Written policies and procedures can be a very effective way to increase the safety and security posture. When all staff members take personal responsibility for safety and are encouraged to speak up when something is not being done correctly, it empowers staff to take pride in their facility.

3.3 Cyber Security

Jacobs is implementing some of the best cyber security systems in the industry, with a focus on water treatment and distribution systems as our highest priority. In partnership with the leading vendor in this space, the system we utilize can be added to any existing industrial control network, which then maps the components, identifies gaps and risks, makes recommendations for improvements, and then monitors the system in real time for potential threats. Just this year, an attempt to hack the sophisticated Twin Oaks Water Membrane Treatment Plant in San Diego was thwarted—an attack that appears to have originated in Russia. We recognize this is a real risk, and getting more common every day, so the contract operator should plan to take aggressive action to protect MPWMD assets and customers within 90 days of contract execution.

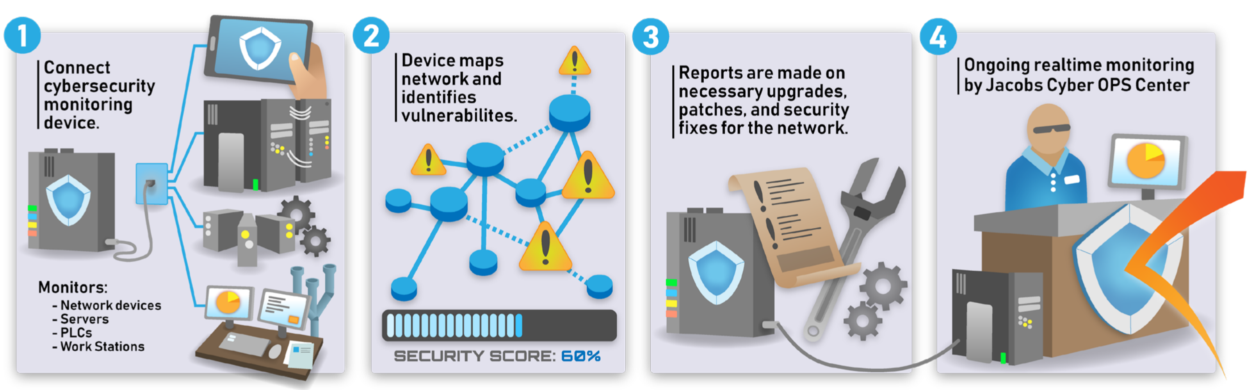

Figure 3-2. Security evaluation

3.4 Material Safety Data Sheets

MSDS information is required for onsite hazardous materials and used for training annually. An MSDS is a document that contains information on the potential hazards (health, fire, reactivity, and environmental) and how to work safely with the chemical product. It is an essential starting point for the development of a complete H&S program. It also contains information on the use, storage, handling, and emergency procedures all related to the hazards of the material. The MSDS contains much more information about the material than the label. MSDS are prepared by the supplier or manufacturer of the material. It is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if accidents occur, how to recognize symptoms of overexposure, and what to do if such incidents occur.

Public water systems are required to maintain MSDS for every chemical stored and used. Typically, all MSDS should be stored in a labeled loose-leaf binder in a central location. Employers may computerize the MSDS information as long as all employees have access to and are trained on how to use the computer, the computers are kept in working order, and that the employer makes a hard copy of the MSDS available to the employee or safety and health committee/representative upon request.

There are nine categories of information that should be present on an MSDS. These categories are specified in the Controlled Products Regulations and include the following:

- Product information: product identifier (name), manufacturer and suppliers' names, addresses, and emergency phone numbers
- Hazardous ingredients
- Physical data
- Fire or explosion-hazard data
- Reactivity data: information on the chemical instability of a product and the substances it may react with
- Toxicological properties: health effects
- Preventive measures
- First aid measures
- Preparation information: who is responsible for preparation and date of preparation of MSDS

Many companies automatically send the MSDS with the purchased chemical; however, the best way to make the most current MSDS available is to request a copy of the MSDS when the chemical is ordered. If you already have the product but need an MSDS for it, contact the manufacturer (either look on the product packaging or ask purchasing to find a manufacturer contact for you). Most manufacturers will e-mail you an MSDS right away, and many large manufacturers of chemical products have MSDS websites for their products. If you have any trouble getting the manufacturer to send you an MSDS, you may need to write a letter requesting the MSDS so that you have documentation of your request in case OSHA ever inspects us. If it is considered a nonhazardous product for which no MSDS is required (such as a product with no hazardous ingredients or that is packaged and intended for general household or office use), the manufacturer must be willing to tell you that in writing.

A good MSDS approach is to ensure that all controlled products have a current (less than three-years-old) MSDS when it enters the workplace. The MSDS must be readily available to the workers who are exposed to the controlled product and to the H&S committee or representative. If a controlled product is made in the workplace, the employer has a duty to prepare an MSDS for any of these products. If new, significant information becomes available before the three years has elapsed, the supplier is required to update the product label and MSDS. If there is no new information on the ingredients by the end of the three-year period, the supplier must review the MSDS and the label for accuracy, revise it where necessary, and revise the preparation date on the MSDS.

Most states require that public water systems provide training on the use of all chemicals used in the WTP to their system operators. Training programs must meet applicable standards established by OSHA and state requirements.

3.5 Safety Training

Employee training is a critical element of any safety program. Prior to starting up a project, the H&S manager should review each task and determines the required training for each employee and enters this information into our training tracking system. This process starts during the transition period as further discussed in Section 4 of this proposal.

Immediately upon joining the company, employees should be required to participate in an orientation to the safety program, during which they learn about the policies and procedures outlined in an Accident Prevention Plan (APP). The contract operator should have access to online safety courses which allows employees to receive required training without disrupting operations. Training should also include classroom and practical based safety training programs, which are designed to meet specific OSHA regulations. Examples of courses designed to comply with OSHA regulations are:

- Hazard communication
- Hazardous waste operations
- Confined space entry
- Bloodborne pathogens
- Lead
- Benzene
- Lockout/tagout
- Working from heights
- Personal protective equipment (PPE)
- Electrical safety

Prior to performing high-risk tasks, a safety team should conduct classroom/practical training (NFPA 70E, CSE, Fall Protection, and similar). In addition, training programs such as OSHA 30-hour construction, general industry, and construction and industrial safety awareness training that exceed the regulatory requirements should be available to the employees.

A contract operator should have a number of medical surveillance programs that meet OSHA requirements, including hazardous waste operations, benzene, lead, and respiratory protection. A database that tracks employees who have received medical monitoring and who require additional examinations should be maintained.

A H&S training database should be used to assess the training needs for each worker. The system should provide real-time data used to track and ensure that each employee has received the required training. Employees and supervisors can receive notices in advance of training expiration dates. In addition to tracking training requirements the system should also be used to track medical surveillance where required, audiometric testing, and respirator fit testing.

3.6 Safety Scorecard

We can only improve on what is measured. Therefore, Safety Scorecard that holds all levels of management accountable for the project safety should be developed for the facilities. The Scorecard should be comprised of two lagging indicators and eight leading indicators (listed below). By developing this type of Scorecard the project can focus on each of the leading indicators and will ultimately reduce the recordables and motor vehicle accidents. The Scorecard leading indicators should be as follows:

- Required training completion performance
- Completion of safe observation reports (SOR)
- Performance on scored Health, Safety and Environment (HSE) audits
- Weekly H&S inspections of the site
- Timely completion of corrective actions identified in HSE audits and weekly inspections
- H&S prequalification of subcontractors
- Timely submittal of incident investigation documentation
- Timely reporting of injury incidents to the Occupational Health Case Management nurse

3.7 Annual Audits

The project site should be audited at least annually by a professional H&S manager. The audited components recommended are as follows:

- Management engagement
- Planning of work
- Record keeping and maintenance of written programs and plans
- APP
- Work control plans
- Activity hazard analyses
- Hazard communication program
- Confined space entry program
- Lockout/tagout program
- PPE hazard assessments
- Training assessments
- Site physical conditions such as electrical safety, machine guarding, life safety, and housekeeping
- Site work practices such as confined space entry, fall protection, NFPA 70E compliance and work practices, equipment operation, chemical handling, and PPE usage

3.8 Weekly Inspections

The project team should conduct weekly job site safety inspections. These are a management responsibility. Each department is required to inspect work areas and identify unsafe conditions or regulatory noncompliance.

3.9 Safe Observation Reports (SOR)

An SOR system should be established that requires managers and supervisors to regularly observe work as it is being conducted at the project. This provides the opportunity for positive reinforcement of good work practices as well as coaching opportunities where improvements may be made. The observation also requires an evaluation of the pre-task plan/hazard analysis to determine whether it was adequate and is being implemented. Besides addressing behavior, SORs provide an opportunity to identify and correct site physical and health hazards. The results can be tracked in a computer-based system, which generates trending reports. The trending reports allow the team to identify areas for focused improvement.

3.10 Equipment Inspections (Maintenance Connection and Other Tools)

The project will generate work orders for the inspection of H&S equipment such as eye wash stations, fire extinguishers, confined space monitoring meters, emergency lighting, and exit signs. These items are incorporated into maintenance connection and other PM software to ensure that the inspections are scheduled and completed in a timely manner.

3.11 Safety Plans and Documents

A H&S program should incorporate several different plans:

Safety Management Standards/Standards of Practice: Safety management standards/standards of practice that outline the comprehensive H&S requirements, including procedures for hazardous waste operations, written hazard communication program, and similar.

Office Safety Programs: Establish an office safety programs to prompt safety and health in the office environment and to address employees' safety concerns for all business operations. Central to the office safety programs would include an office safety committee that would be responsible for developing and implementing emergency planning and response procedures, identifying office safety hazards, and increasing safety awareness

APP: A site-specific APP should be created to ensure the safety of employees and to protect the MPWMD equipment and environment. The APP and procedures complement our corporate policies. A H&S team should evaluate and tailor the APP and procedures to align with best practices, changes in laws and regulations, and established H&S work procedures. The project manager or director should be responsible for the implementation of the safety program and should be closely supported by a H&S team. A full-time onsite safety manager is recommended for this size of facility.

Competent Persons: A contract operator should have a program in place for providing competent persons, either through their own or subcontractor personnel, as required by OSHA.

Inspections: A program for providing job site inspections. This program consists of both self-assessments and third-party audits.

PPE: A program that provides employees with PPE as required by the activities they are conducting.

Subcontractor Management: A contract operator should have or develop the following systematic methods for managing risks associated with subcontractors' health and safety:

- Contract language that assigns the responsibility for safety to the appropriate party and outlines expectations associated with safety.
- Prequalification of subcontractors based on their safety performance. The criteria used include EMR, OSHA statistics (such as incident rate, lost workday case rate), training, and written safety program.
- Based on the relationship with Jacobs, subcontractors may be required to submit safety documents to demonstrate they are in compliance with appropriate regulations and are capable of managing their safety risks.

4. Process Control Plan

4.1 Operation Overview

The Monterey water system has multiple sources of water, multiple types of treatment, and a very large variation in elevation served. Water sources include the following:

- Saline water from wells influenced by ocean water
- Wells requiring little treatment (basically, chlorination)
- Wells requiring iron and manganese filtration
- Wells requiring activated carbon adsorption
- Aquifer storage and recovery (ASR) wells

The wells are widely scattered geographically through the region and are also at significantly varying elevations. Treatment includes the following:

- Chlorination only
- Iron and manganese removal
- Brackish water desalination
- Activated carbon adsorption
- Arsenic removal
- Sulfide removal

The treatment plants are also widely scattered geographically. Water quality from the plants varies and must be managed properly to maintain stable quality—neither scaling nor corrosive.

The Monterey water distribution system consists of over 600 miles of pipe. Much of this pipe is unlined steel, unlined cast iron or asbestos cement. These materials typically raise concerns over internal and external corrosion, "beam" or "ring" breaks (cast iron and asbestos cement), water quality issues (red water) and porosity (asbestos cement). These materials can also present repair problems—a repaired pipe can lead to further breaks due to disturbing the soil in the area of the break.

Numerous water storage tanks are spread across the system, again, widely scattered geographically and at various elevations. These tanks are critical to providing consistent water service (including fire protection, in some cases). The large number and volume of the tanks also creates potential issues with water age. These must be carefully managed to achieve all water storage goals.

Service to the wide variation in elevation of the service area is achieved with over 70 pump stations and numerous pressure reducing valves. In addition, check valves and pressure relief valves control flows within the distribution system. Failure in these valves can cause damage due to excessive pressure or reduced pressure.

In addition to classic water system components, the Monterey system is underway with a project to reuse water from several sources (reclaimed wastewater, stormwater, food processing water, and impaired surface water) for injection into the Seaside Basin. The capacity of this facility is expected to be 3,500 acre-feet per year.

Construction of a desalination plant at 6.4 millions gallons per day is underway to further expand and diversify the system's production capacity.

The operations plan serves as a framework to efficiently and reliably complete the O&M activities required to provide adequate quantities of water at required pressure and quality— in compliance with regulations.

This plan is presented by areas (source water, treatment and pumping, water quality, distribution, special areas). The plan is purposely high level due to the lack of specific information about the Monterey system. Where appropriate, details have been provided on methods that will be used as a part of the transition from existing operations to contracted O&M.

4.1.1 Source Water

Source water operations will be the responsibility of the water production manager. Responsibilities include the following:

- Operating and maintaining wells
- Operating and maintaining ASR wells
- Tracking and reporting water withdrawal
- Maintaining adequate water supply
- Continuous improvement of water supply, energy efficiency
- Coordinating with technical groups on future water supply issues, water rights, environmental issues
- Inspections, preventive, predictive and corrective maintenance including planning of activities to maintain continuous service
- Tracking, analyzing, and reporting raw water quality
- Coordinating raw water quality with treatment
- Cross-training staff to provide service to multiple areas (wells, pumping, treatment, and similar)
- Maintenance of appropriate levels of training and certification of staff

A crew of highly trained and cross-trained staff of field operators will complete field operations and light maintenance across the areas of wells, remote chemical feeds, remote pump stations, hydropneumatics tanks, and related appurtenances. Field operators will be encouraged to obtain both treatment and distribution operator certification.

Crews will be equipped to address basic water quality issues, routine operations, inspections, PM, and light corrective maintenance activities. The field operations crew will be led by a field operations chief operator who reports to the water production manager.

Typical field operator duties in the area of source water include the following:

- Well inspections
- Well water sampling and testing
- Well flow tests
- Well water level testing – static and pumping
- Data input
- Assisting with corrective actions – redevelopment, pump replacement, well disinfection and testing, start-up and commissioning after repairs/replacements
- Monitoring SCADA/Distributed Control System (DCS) screens
- PM such as lubrication, air filter replacement, valve inspection, and exercising

Note that field operators will have additional duties in other areas listed below. All field operations work will be completed by or under direct supervision of a certified operator, at the required certification level.

Wells will be inspected, and PM completed using a computerized maintenance management/work order software package. “As found “and “As left” conditions will be recorded along with materials used, description of work completed, and suggestions for improvements for future activities.

4.1.2 Treatment

Treatment plant O&M will also be the responsibility of the water production manager. A chief water treatment operator will assist with leadership within this group.

Within the treatment area, the water production manager’s responsibilities include the following:

- Oversight of treatment facilities, including filter plants, desalination, reverse osmosis, iron removal, carbon adsorption, remote disinfection
- Oversight and planning of preventive and corrective maintenance including coordination of major repairs and capital improvements
- Monthly operating reports
- Chemical specifications, maintaining proper inventory and safe storage of production chemicals
- Oversight of pumping and storage systems
- Oversight of pressure reducing valve stations
- Coordinate with engineering groups on treatment-related capital improvements
- Coordinate with asset management staff on treatment-related equipment and facilities
- Manage continual improvement and sustainability initiatives
- Prepare annual treatment budget
- Support pilot plant activities (as needed) and support research activities
- Lead the training and cross-training program for operations staff
- Confer with regulatory personnel, as guided by the MPWMD
- Respond to emergencies (water quality, water treatment, pumping) and support water distribution staff on technical matters
- Inspections, preventive, predictive, and corrective maintenance including planning of activities to maintain continuous service
- Tracking, analyzing, and reporting raw water quality
- Coordinating raw water quality with treatment
- Cross-training staff to provide service to multiple areas (wells, pumping, treatment, and similar)
- Maintenance of appropriate levels of training and certification of staff

A crew of highly trained and cross-trained staff of treatment plant operators will complete operations and light maintenance at the treatment plants. The treatment crew will operate and provide light maintenance on the iron removal plants, reverse osmosis/desalination plant and GAC plants. Crew members will also be cross-trained to provide backup for operation and light maintenance of remote pumping / chlorination facilities. Operators will have required certification for treatment plant operations and be encouraged to attain higher levels of certification than that required for shift operators.

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There will be a core group of operators (Water production operators on the proposed organization chart) with more advanced training who will monitor the SCADA/DCS system—managing overall system flows, tank levels and monitoring alarms. Water production operators will also be fully trained on the hands-on operations of each plant.

Operators will complete light maintenance activities, including predictive and PM on the treatment facilities.

Typical treatment plant shift and production operator duties include the following:

- Equipment inspections
- Water sampling and testing
- Oversee chemical deliveries
- Adjusting chemical feeds
- Collecting and recording regulatory-required data
- Collecting and recording operating data – tank levels, flows, equipment run times
- Monitoring SCADA/DCS screens and alarms
- PM such as lubrication, air filter replacement, valve inspection & exercising
- Operate equipment including filters, membrane treatment, chemical feeders, pumps, valves
- Clean and lubricate equipment
- Maintain records of activities performed at the plants
- Calibrate online instruments to ensure accuracy
- Exercise equipment to ensure reliability
- Complete regulatory-required sampling and testing for field parameters such and pH, chlorine residual, alkalinity

4.1.3 Production Maintenance

The water production manager will oversee a production maintenance manager and group. Production maintenance staff will have primary responsibility for maintaining all production-related equipment including pumps, filters, membrane units, chemical storage and feed, distribution system specialty valves (pressure reducing and pressure relief) and related equipment. Production maintenance staff will be cross-trained to provide support for distribution system repairs and maintenance.

Production maintenance staff will be encouraged to attain certification as maintenance technician in California. Within the group, technicians with specialized training and certification will be responsible for completing work on online instruments, radio/fiber optic communications systems, and electrical systems.

The production maintenance manager's responsibilities include the following:

- Oversight and management of the maintenance management information system
- Overseeing and leading maintenance of all production related equipment including specialty valves in the distribution system
- Tracking and reporting maintenance activities, life cycle costs
- Coordinating with asset management staff
- Continuous improvement of water production reliability, sustainability
- Coordinating with technical groups on equipment replacement, equipment specifications
- Inspections, preventive, predictive, and corrective maintenance including planning of activities to maintain continuous service
- Overseeing training and safety of maintenance staff
- Develop maintenance schedules including preventive and predictive maintenance

- Cross-training staff to provide service to multiple areas (wells, pumping, treatment, and similar)
- Coordinate with contractors to provide supplemental or specialized maintenance activities as required
- Provide backup for distribution system manager and production manager
- Develop maintenance budget
- Oversight of the SCADA/DCS system including radio/fiber optic telemetry
- Oversee the production maintenance planner/scheduler

Typical maintenance technician duties include the following:

- Specialized equipment inspections
- Advanced preventive and predictive maintenance
- Recording “as found”, “as left”, “work completed” for work completed
- Corrective maintenance on most equipment and coordinate with specialty repair contractors
- Maintain building envelops—windows, doors, roofs
- Oversee management of specialty building systems such as fire protection, computer communication, phones
- Repair/replacement of damaged equipment including chemical feeds, valves, valve actuators, pumps, instruments, and related equipment
- PM on distribution system specialty valves including pressure reducing valves, pressure relief valves
- Maintain hydropneumatics tanks and related appurtenances
- Provide support for distribution system technicians

A production maintenance planner/scheduler will ensure that all maintenance work is prioritized properly and completed efficiently.

4.1.4 Water Quality

The water quality group will be under the direction of the water production manager and will be responsible for all water sampling and testing, whether completed in-house or by contracted services. The water quality group will have a significant role in regulatory compliance—supporting the water production manager who will have the overall responsibility for compliance.

The water quality group will be led by a laboratory supervisor. Lab technicians will collect samples and complete most tests in-house, including Coliform bacterial testing. The lab supervisor will be responsible for attaining/maintaining state certification for Coliform testing.

Distribution system water quality will be an important part of the water quality group’s work—ensuring that all water in the distribution system, including the numerous “dead ends” and low use areas meet regulations and is aesthetically pleasing. This work will require coordination with treatment plant operators and distribution crews along with extensive knowledge of water chemistry.

The water quality group will be supported by corporate resources for compliance, specialized data analysis, modeling, and training.

4.1.5 Process Engineering

Due to the complex nature of the water utility, two process engineers will provide technical support for the water production manager. Activities will include process optimization, specialized process monitoring, water resource tracking and permitting, distribution system analysis and modeling, hydraulic analysis, specialized water quality analysis, and interpretation. The process engineers will primarily provide support for the water production group and will also provide support for the engineering group.

4.1.6 Water Distribution

The water distribution group, led by the water distribution manager, will have responsibility for the underground piping system. Crews will be led by a crew leader who can also serve as an equipment operator in case of personnel shortage. Each crew will include an equipment operator and distribution technicians. A planner/scheduler will ensure that work is prioritized and completed efficiently.

The areas of responsibility for the water distribution manager include the following:

- Leadership and oversight of the underground piping system including valves and hydrants
- Coordination with the production maintenance group on maintenance of specialty distribution appurtenances such as hydropneumatic tanks, pressure reducing valves, booster pumps, and related equipment
- Management of rolling and nonfixed assets such as trucks, backhoes, portable pumps, and related equipment
- Coordination with engineering resources for computer modeling, system improvements, capital improvements, and major repair and replacement projects
- Lead PM activities including hydrant flushing, flow testing, valve exercising
- Maintaining distribution system maintenance management system
- Lead emergency repair efforts to assure minimum outages
- Administer contracts for larger maintenance and capital projects
- Oversee distribution system planner/scheduler
- Continually improve system reliability and sustainability

Distribution crews will be cross-trained to provide support and assistance to the production maintenance group. Typical duties of the distribution system crew include the following:

- Perform emergency repairs of main breaks
- Perform PM such as hydrant flushing, valve exercising
- Perform preventive repairs such as valve and hydrant replacement
- Assist meter staff on an as-needed basis
- Record data on work completed, flow tests, and related activities
- Disinfect water mains and appurtenances after repairs and new installations
- May complete taps and service installations
- Operate small equipment such as power saws and portable pumps
- Assist production maintenance staff as needed

Distribution operators will work under direct supervision of crew leaders or managers having required certification as required by California regulations. All members of the distribution crew will be encouraged to achieve distribution system operator certification.

4.1.7 Water Engineering

The water engineering group will provide local engineering and technical support. Duties of the chief water engineer’s include the following:

- Manage the Geographic Information System and mapping

- Coordinate with consultants for specialty services and design
- Assist with reporting required for environmental permitting including water rights, withdrawal permits, air permits, and traffic control
- Coordinate with developers, city engineering/planning departments on development/redevelopment activities and reviews
- Provide capital improvements planning and manage capital improvements projects
- Manage asset manager and asset management plan (AMP)
- Support other groups within the utility for technical services

4.2 Process Control

Process Control is the active changing of the process based on the results of process monitoring. Process control will be an essential part of the operation and maintenance of the MPWMD facilities. The following sections illustrate how the contract operator will apply process control to optimize the quality of water, minimize O&M costs and provide long-term value to the MPWMD.

As examples, two areas, water source and water pressure, are profiled here.

EXHIBIT 3-B

4.2.1 Multiple Water Sources

If the acquisition proceeds, the MPWMD would own and operate several sources of water with several distinct types of treatment—from simple chlorination to advanced membrane processes. Integration of these multiple sources into a quality water supply to consumers is critical.

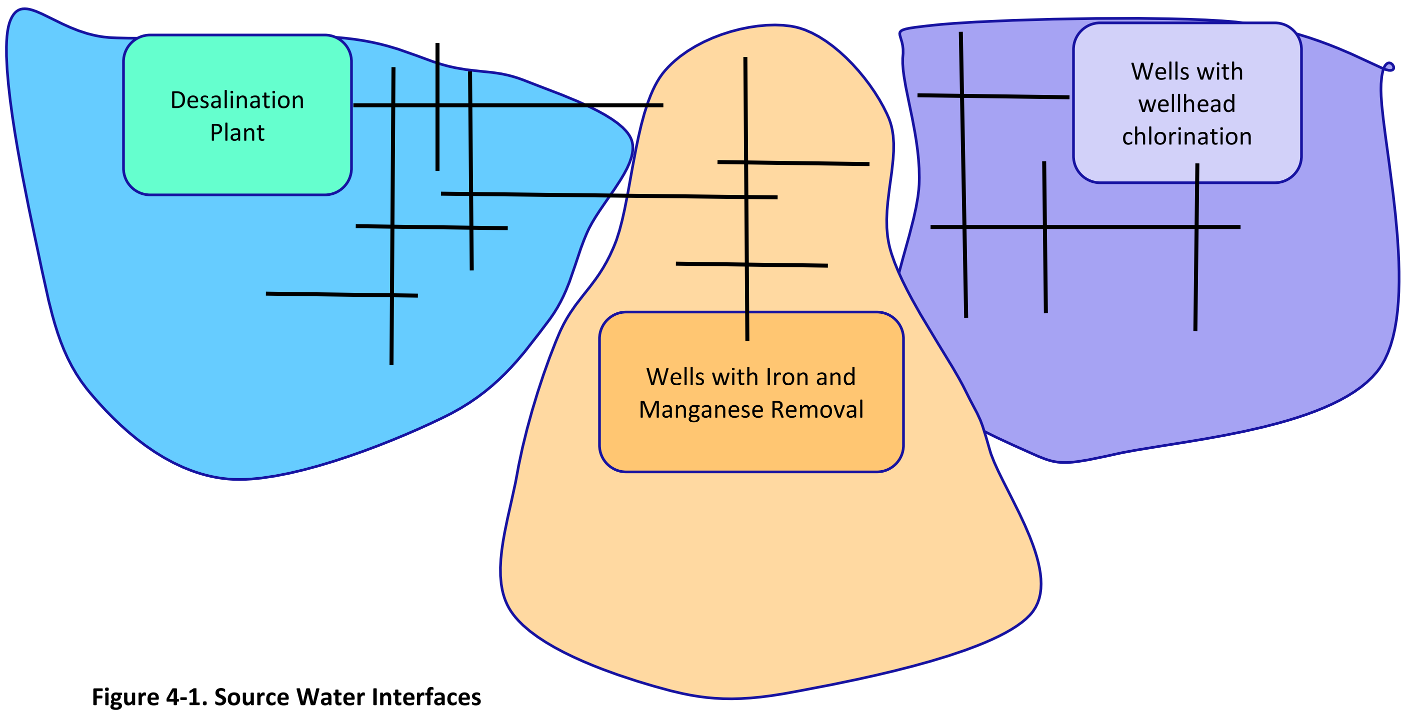

Figure 4-1. Source Water Interfaces

Some customers will get all or most of their water from one source, some customers will get all or most of their water from another source, and some customers will routinely get a blend of water. Some customers will have their water alternate between sources periodically. All of these customers must receive water that is safe, aesthetically pleasing, and in adequate quantity and pressure. Distribution system water quality testing and monitoring will provide the data required for this goal, and process control will provide the tools for operators to use to attain this goal.

The distribution system water quality is critical to maintaining compliance with the lead and copper rule as well as other water regulations. Carefully planned sampling and data analysis and interpretation, coupled with process control, will provide assurance that lead and copper compliance will be well within regulated values.

The same process will also ensure that water age is kept to a minimum and that water is aesthetically pleasing for all customers.

4.2.2 Water Pressure

The MPWMD system has over 1,000 feet of elevation variation between customers near the beach to those in the neighboring mountains, translating to over 430 psi. More than 70 pump stations, 80 tanks, and 14 pressure reducing valves are used to provide reasonable pressure to all customers. Accurately monitoring the pressure and water use in each zone is critical to achieving service goals. The monitoring must be in the form of both online instruments and manual readings by field personnel. Maintenance, including predictive maintenance, is needed to assure all links in the chain—pumps, tanks, valves—are fully functional at the highest level.

A contract operator should provide the trained technicians to monitor the pressure and flow and take corrective actions before a failure occurs.

4.2.3 Other Applications of Process Control

These same principles will be applied to all controllable aspects of the water system: plant operation, disinfection, remote pumping, ASR, water age, and pressure reducing valves are a few examples.

4.2.4 Process Control Tools

Unit Process Control Plans—roadmaps for operators—will establish the key parameters, drive process adjustments, establish communication protocols, and provide a level of detail for operators and maintenance personnel to make informed decisions.

Having documented procedures and process targets shared with all stake holders ensures a common purpose and goal and maximizes efficiency and minimizes potential for errors and downtime.

SOPs will be developed for all typical work activities and will support the Unit Process Control plans.

As mentioned in Section 2, the tools and procedures established through the Compliance & Reporting Team, such as Hach WIMS and STT, will be utilized daily.

EXHIBIT 3-B

5. Staffing

The following approach to O&M is designed to meet or exceed the scope of work and performance standards for the MPWMD. This approach will not only be cost effective, it will also provide the desired LOS to meet or exceed the needs of customers in the MPWMD service area, as well as any contract performance standards, and will have the flexibility to provide additional services when needed, including the support for continuous improvement and capital projects.

5.1 Personnel

The following provides the proposed organizational structure for the O&M team. The structure has been designed to provide O&M teams that will be responsible for the operations and assets within the service system. This structure will maximize efficiencies in the field through:

- Optimization of asset knowledge retention
- Ownership and accountability of asset performance
- Minimization of travel times

The management team personnel will also form part of the transition team. This will enhance the mobilization and provide for a seamless transfer to the operational team on commencement of service.

Our proposed Service Delivery Team Organization Structure is depicted on Figure 5-2. The approximately 85 positions shown in Figure 5-2, plus the support staff, is consistent with the 87 cited under contract operations in the Environmental Impact Report. It is recognized that Cal-Am acknowledges 74 existing employees in their current General Rate Case and MPWMD has cited the need for a net increase of 6 additional positions. Due to a lack of specific information under current operations, it is believed that the structure depicted in Figure 5-2 is consistent with maintaining operations at current standards and sets the stage for improvements in LOS after review following an initial operating period.

EXHIBIT 3-B

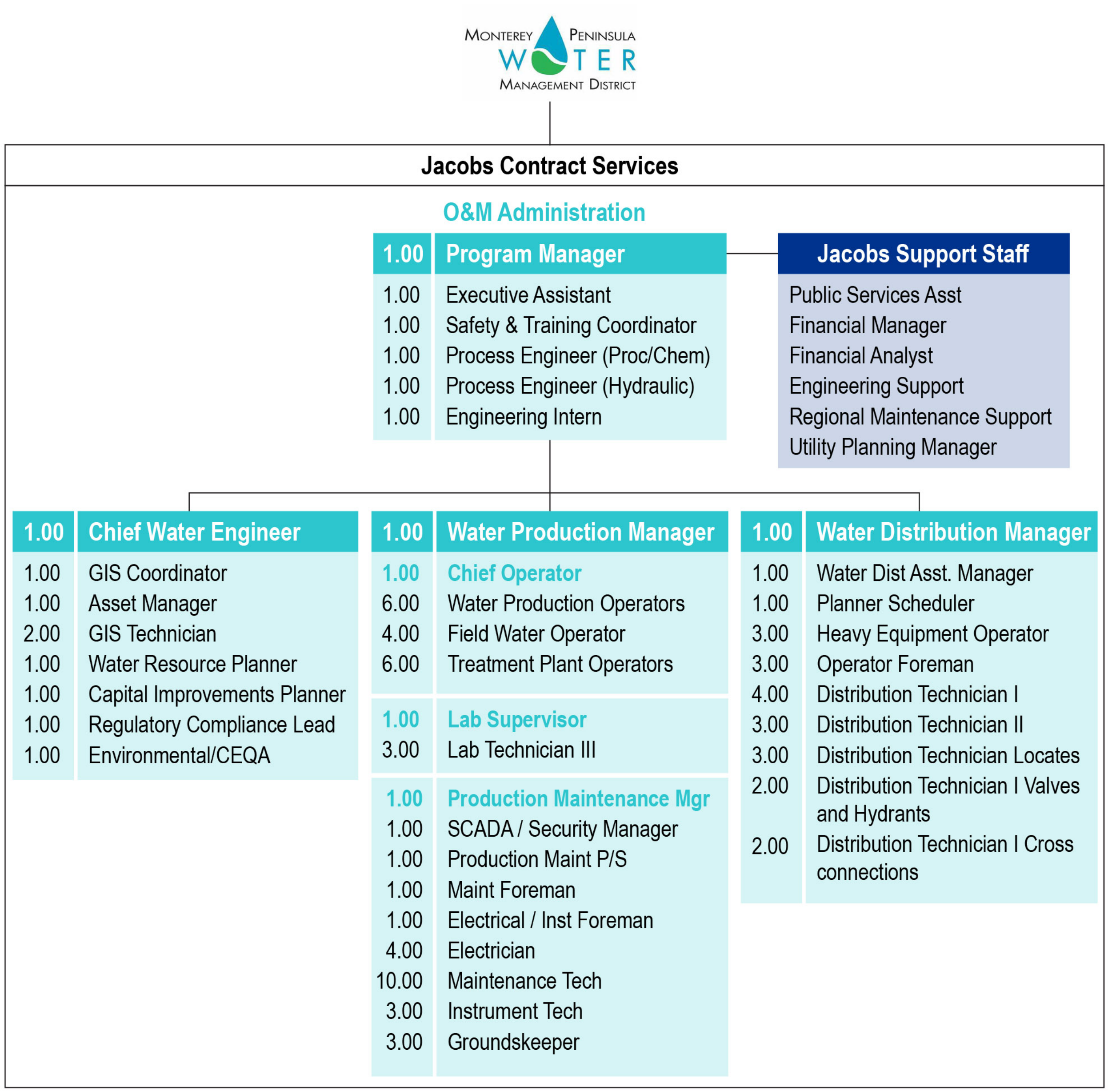

Figure 5-2. Contract Service Organization Structure

5.2 Operation and Maintenance Staffing Delivery Approach

The staffing delivery approach has been developed to provide MPWMD with an optimized and efficient delivery team and O&M services that will:

- Ensure compliance with water quality, public health and environmental regulations, laws and standards.
- Provide continuous safe and compliant O&M, including the ability to adequately manage standby and after-hours monitoring and reporting requirements.
- Optimize operations and provide efficiencies in the areas of energy consumption, chemical usage, and labor resources.
- Protect and optimize the life of MPWMD's assets.

- Comply with regulatory and MPWMD requirements for communication, data collection, reporting, and procurement.
- Provide strong and in-depth technical expertise, engineering, construction, and consulting support through our in-house resources when needed in all areas of water and distribution services including regulatory compliance, safety, maintenance, asset and risk management, and resource optimization.

5.3 Transition Management

During the transition period, and for as long as required to incorporate the elements of the transition into the contract operations, the management team will also include a dedicated transition manager who will lead the transition to ensure a seamless integration from the transition phase into service delivery and for the completion of the necessary aspects of our transition, not just those required to achieve a minimum acceptance level of performance.

5.4 Operations and Maintenance Management

The O&M management team will have the required experience and corporate support to ensure this is a successful evolution for MPWMD operations and creates an environment where job satisfaction and opportunity is enhanced.

5.5 Water Treatment

A dedicated water treatment team will be maintained in line with existing training and practices of the Monterey water system. This team will consist of 16 O&M staff, including a chief operator with a California Class 5 certification. It is anticipated that 12 operations staff, including the chief operator will be based at the water production facility with the remaining 4 operations staff will be in the field for checks of the remote facilities and wells. If necessary, cross-train all staff to allow for the ability of staff to cover all areas of water treatment and productions to assist during times when greater numbers or relief staff are required.

Due to the criticality of water treatment operations, rosters will be structured to allow for daytime coverage on weekends in the field areas by one operator and with two operators rostered to cover the needs of the WTPs. We have considered a team structure combining water and distribution system operations but have concluded the benefits of specialist water operations outweighs the flexibility and travel cost savings provided by combining these operations duties. We are also mindful of the perception for the possibility of contamination of treated water by staff moving from distribution to water sites.

The initial focus for water treatment should concentrate on creating highly empowered teams supported by proven systems applied in a uniform manner across sites and by highly experienced and knowledgeable management and technical staff. An optimization phase would need to be planned in the first year of service and a dedicated O&M teams should be heavily involved in this process.

5.6 Team Leaders

The approach to the team leader roles is that they will be incorporated into the O&M teams. While fulfilling a leadership role, leaders will also be required to undertake hands-on plant O&M. They will be focused on removing any barriers to the joint performance of O&M activities and will be responsible for fostering teamwork within and between teams.

Applications for team leader positions will be considered from a wide variety of backgrounds including mechanical or electrical trades, as well as experienced process/operations staff or persons with tertiary qualifications and suitable experience. Ideally, applicants with a combination of skills will be available, but in any case, aptitude, experience, and intelligence will be viewed alongside qualifications to create teams with all the necessary skills.

5.7 Qualified Maintenance Resources

It is recognized that it will take time to establish a fully integrated team with minimal distinction between O&M activities. As such, it is important to be clear that all areas of the MPWMD will be equipped with suitable numbers of qualified tradespersons to bring the majority of routine mechanical maintenance work and first response troubleshooting in-house. They will also offer in-house instrumentation and electrical knowledge sufficient to perform a base level of routine maintenance coupled with the ability to quickly respond to and address urgent repairs or asset performance issues.

There will still be a requirement for support from external instrumentation and electrical contractors, however these will now also have a direct O&M provider contact to minimize these costs and response times and maximize the retention of knowledge within the O&M teams. For example, our trade staff will work alongside specialist contractors to resolve a problem which they could not initially solve themselves and will benefit from this experience. This will enable the prevention of future incidents and more rapid response to similar incidents at other sites.

The intent for any operations contractor should be to provide all qualified staff currently operating the system with the opportunity to join their team. Former operations staff will still be required to perform a range of maintenance tasks in accordance with their training and position description. This work will be planned by the O&M coordinator in conjunction with team leaders and with the guidance of more experienced or senior trades staff. This will be the first step in the establishment of truly homogeneous O&M teams. From the outset of the contract, these new employees from a maintenance background will also be trained and rostered into operations duties. This process should be facilitated by access to a wide range of established operator training modules within the organization.

5.8 Recruitment

In the recruitment of new operations staff, preference would be given to applicants with trade qualifications and experience. Similarly, in the recruitment of maintenance staff, preference will be given to applicants with treatment plant O&M experience. This will serve to further facilitate our move to a uniform, multi-skilled O&M team.

The contract operator should respect the experience of all existing staff and consult with them widely during transition and initial operations to maximize knowledge retention and transfer ensuring all the positive facets of the operations history can be transferred to our organization and add value to our existing systems and practices. Existing staff should be encouraged to apply for positions throughout the new structure and in time will be in line to benefit from being directly linked to two large organizations with numerous opportunities in the water and wastewater industry, not just from training but also from mentoring and knowledge transfer from highly skilled and experienced operations, maintenance, process, engineering, and construction professionals.

EXHIBIT 3-B

6. Asset Management Plan

6.1 Introduction

This section describes the AMP for the MPWMD facilities and has been prepared by Jacobs in the role as the Operating Consultant. The Operator is responsible for liaison with its client, MPWMD, regarding the document content, maintenance, and version control.

The main purpose of the AMP is to ensure that there is a working and living document that is used by the contract operator and agreed by its Partner, MPWMD, to effectively manage the approach to AMP and the Mid Life Capital (MLC) investment for their respective water projects. To ensure the document is recent and is a true reflection of the Asset Management Approach, the content will be reviewed annually to reflect continuous improvements as the approach to AMP matures.

The main aims from the implementation of the AMP are that the shareholder, MPWMD, and lenders obligations are recognized, managed, and delivered to meet the requirements of the contract. The document content intends to describe the Asset Management Strategy in a way that gives MPWMD and lenders the confidence in the approach to AMP. The document aims to describe the risk-based approach being applied to the capital and maintenance investment to give confidence in the informed decisions being made, enabling the sanction of future MLC expenditure that complies with the client and contractual obligations set by best practices and the respective contracts. To achieve this good communication, transparency and stakeholder liaison throughout the AMP process is essential and will lead to a greater support for capital investment by increasing stakeholder understanding regarding the value of targeted asset investment to improve water utility performance.

6.1.1 Project Background

Sustainable water infrastructure is critical to providing the domestic and commercial customers of the MPWMD WTP and facilities with a quality environmental service that ensures social, environmental, and economic sustainability. This partnership is a public-private partnership contract to upgrade, operate, and maintain existing water treatment, water pumping stations, and the water distribution system at the following locations across the MPWMD.

6.1.2 Purpose of the Asset Management Plan

The purpose of the document is to clearly describe and demonstrate the approach to the AMP for MPWMD, keeping key stakeholders informed on how a contract operator and MPWMD would be managing the capital investment, operation, and maintenance of the asset base on their behalf.

The document aim is to clearly describe and demonstrate an approach to strategic AMP and the framework in place detailing the policy, processes, and procedures implemented to ensure that the assets are managed, operated, renewed, and fit for purpose to deliver the required asset performance over the life of the assets. The AMP will provide an ongoing program that includes detailed information on the current asset base, their condition, criticality, refurbishment, and replacement. This detailed information will be included in the preparation of an Annual Capital Investment Plan (CIP), Five-Year Investment Profile (5YIP), and a Service Period Investment Profile (SPIP) and is fundamental to the AMP.

The scope of the AMP will include the following elements and describe how they fit into the overarching Asset Management Strategy.

1) The Asset Management Strategy and maintenance philosophy applied
2) The approach to AMP—methodologies, processes, and procedures
3) The forecasting and modeling techniques applied to determine the level of investment
4) The outcomes from the implementation of the AMP

The future developments and business improvements to AMP approach.

This is illustrated on Figure 6-1.

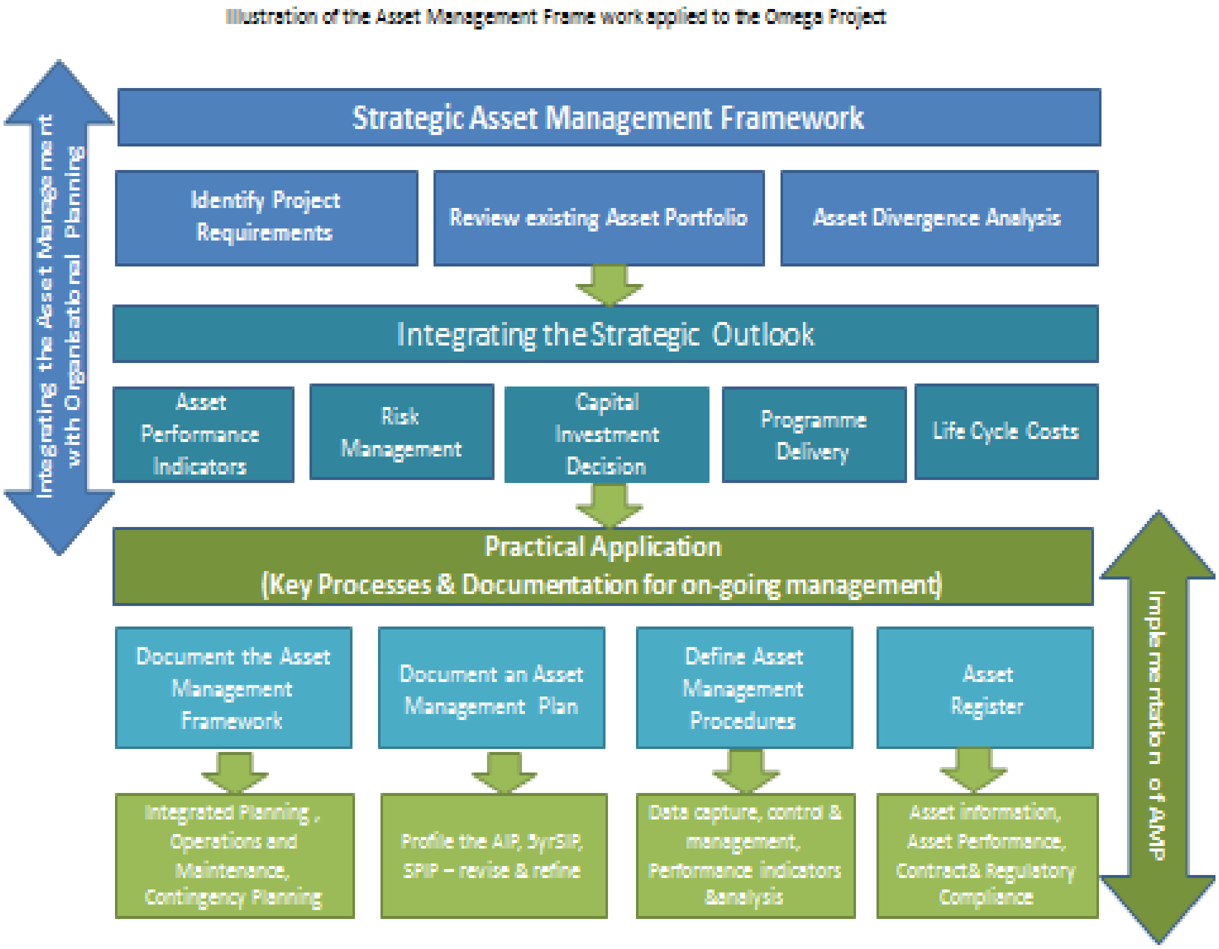

Figure 6-1. Asset Management Framework

6.2 Context of the Asset Management Plan

This AMP defines the objectives, principal drivers, and key indicators and methodologies applied to the MPWMD projects that support the decision-making process for asset management and investment over the service period to provide a continuous and sustainable service to MPWMD. The AMP details the asset lifecycle approach to investment and maintenance to ensure the asset base is maintained at the lowest whole life costs while managing operational risk and meeting contractual and performance obligations throughout the service period.

Through the implementation of a coordinated AMP, the project operator can comply with the obligations of the required service ensuring asset availability, reliability and capacity, forecast operational resource requirements, improved resilience, management of asset performance risk, and realize capital and operational cost savings. It is important to recognize the explicit requirements for information stewardship as there must be one validated version of the asset data and information, “one version of the truth”, available to all stakeholders. To achieve this position, integrated business systems and processes are crucial for accurate and reliable asset data whose analysis will enable informed investment decisions that are transparent and accessible to all key stakeholders.

The main objectives and outcomes of the AMP process will be to:

1) Comply with the obligations in the contract, balancing cost, performance, and risk.
2) Define the CIP over the service period of the project concession ensuring that each element of the facilities achieve their maximum working life consistent with economical and reliable operation.
3) Improve water asset performance and environmental compliance.
4) Reduce the long-term system operating and investment costs, reducing refurbishment, renewals, power, and chemical costs and minimizing resources through best operational/maintenance practice and engineering innovation.

6.3 Structure and Governance Arrangements

6.3.1 Organizational Structure

To successfully develop and deliver the AMP, the appropriate resources will be evaluated in detail and a governance structure will be implemented across the project. As is shown in figure 5-2 the proposed team and the wider business unit structure. The team comprises of a number of operational, maintenance, performance business analysts, project engineers, and program managers to maximize asset and contractual performance. A critical role is the asset manager who is responsible for the development and management of the MLC program, the business case development of the project portfolio and criticality, and serviceability assessments.

In addition, further expertise is provided in the form of federated asset management and maintenance roles within the wider Jacobs business. The maintenance manager plays a pivotal role in the implementation of the AMP. The maintenance manager is responsible for the development of a work scheduling system, system management development for asset data collection, O&M resource planning, and the alignment of the AMP to the Maintenance Strategy.

6.3.2 Governance

The project structure is supported by a governance framework that details the arrangements on how to engage and liaise with the client regarding the operator's management of the AMP process, approval and management of MLC expenditure, and oversight of the approach to lifecycle works.

This may include challenging the project proposals identified and agreeing upon alternative O&M interventions in preference to sanctioning capital investment. Through this process, any early stage issues will be identified and resolved that may otherwise lead to dispute, which aims to continuously improve the process and benefit of all parties.

6.4 Asset Management Approach and Methodologies

6.4.1 Strategic Asset Management Framework

The Asset Management Framework describes the strategic approach and methodologies applied to the contract operator managed MPWMD water treatment facilities and distribution system and how they are used to effectively manage the facilities, target and prioritize capital investment to manage the business risks, and meet the contract requirements. This document describes the strategic Asset Management Framework being applied to the contract and details the policies and procedures that have been implemented and those that are in development to ensure that the AMP:

- Explains the Asset Management Strategy, clearly documenting the strategic intent and how the AMP will be implemented to meet the service delivery needs to comply with the contractual obligations and maintain the well-being of the asset portfolio
- Details how the capital investment profile over the service period will be delivered

- Describes the Asset Management policies and procedures that provide a basis for the internal control environment and good management practice
- Explains how the Asset Register is used as the basis for both the financial and nonfinancial information to improve service performance and apply the relevant accountability measures

6.5 The Asset Management Plan

The Asset Management Framework adopted for the MPWMD facilities defines and integrates the strategic asset management goals relevant to the contract and correlates the asset management decisions with program delivery requirements that will benefit the asset portfolio. This will be achieved by the development and delivery of the AMP that integrates with the operating contractor's obligations under the project documents and includes:

- Implementing a maintenance strategy that promotes best practices of known maintenance techniques across the business providing increased maintenance effectiveness, improved assembly reliability, culture change from reactive to condition-based approach, and improved resource management.
- Develops and maintains a comprehensive Asset Register with criticality, age, and asset condition data. This detailed information is included in the preparation of the 5YIP alongside the SPIP and is fundamental to AMP.
- Ascertains the program delivery options (this may include non-asset solutions in the form of Operator interventions).
- Utilizes asset performance indicators to identify, review, and manage the asset portfolio.
- Undertakes capital investment analysis when refurbishing, renewing, and acquiring new assets.
- Integrates risk management into all asset management decisions.
- Ensures that the full lifecycle costs are understood and recorded so the whole life cost of owning and maintaining the asset base is known.

In developing the AMP, steps have been taken to ensure that industry best practice is applied and that the document content and practices comply with the Jacobs Quality Management System and are supported by detailed O&M procedures for all treatment facilities. Together these documents form part of the QA system based on the requirements of International Standards Organization (ISO) 9001.

EXHIBIT 3-B

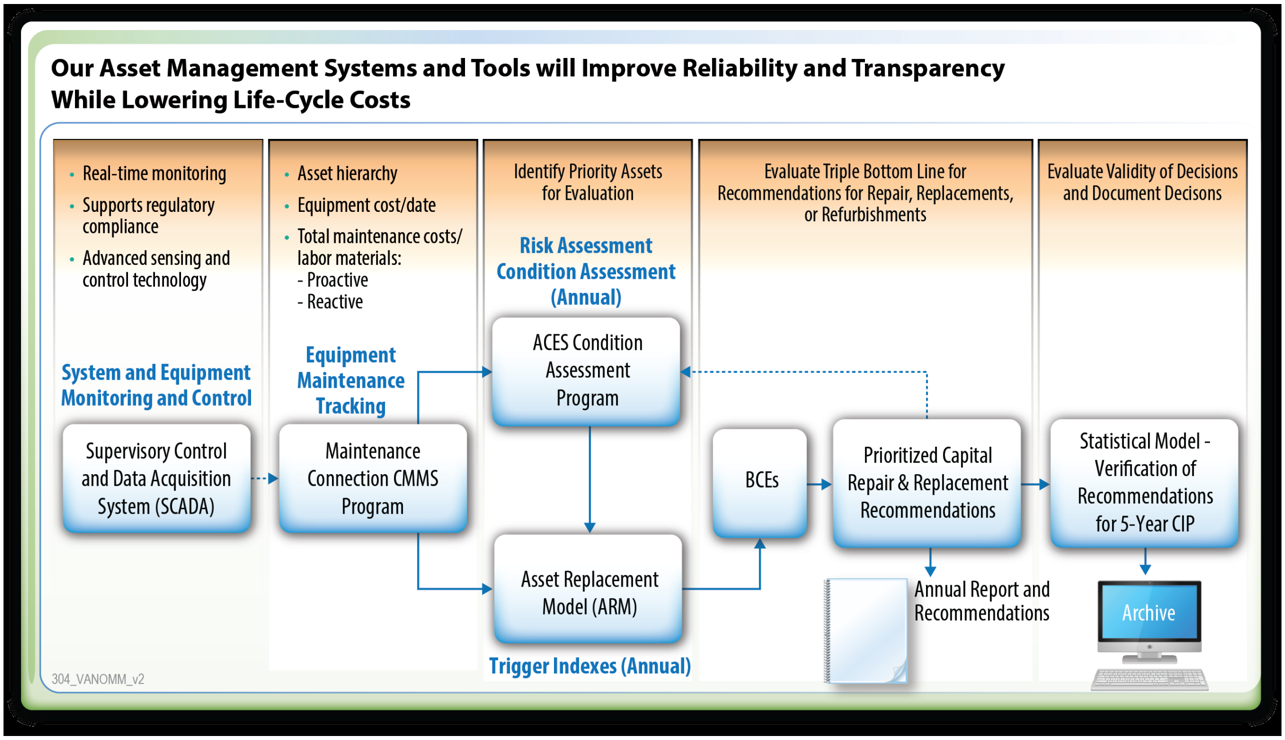

Figure 6-2. Asset Management Systems and Tools

It is recognized that using this framework for asset management best practices and governance will help to demonstrate competency, ability to establish improvement priorities, alignment of the whole life strategic planning approach with facility contingency plans, and the “day-to-day” O&M activities.

To achieve this aim, the AMP will be a working document that is fully integrated with the O&M Service Delivery Plans for all facilities included in the MPWMD WTP. When preparing the plan, steps will be taken to ensure that the content is aligned with the site operational procedures and contingency plans. The plan identifies for each treatment facility the critical assets, detailed procedures, resource allocation, and experienced personnel to manage a major event or incident. To ensure the document is “live” and remains recent, it will consider all aspects of operational and contingency plans and will be formally reviewed and updated on an annual basis.

When fully implemented, the AMP will determine the CIP and SPIP that will deliver the following benefits over the contractual period:

- Compliance with contractual obligations and requirements of the project documents
- Extend the asset life of the facilities
- Provide additional asset capacity, availability, and reliability
- Give a greater understanding of the total asset life costs
- Deliver a tailored capital expenditure program matching the asset needs and meeting contractual obligations
- Minimize the O&M costs associated with reactive work by matching resources to workloads and improving productivity

Implementation of the AMP will result in the delivery of good management practices, providing a framework for making informed investment decisions and improved execution of short- and medium-term operational practices and optimal asset management. By continuing to develop a coordinated approach to AMP and through the delivery of the AMP, contractual obligations of the contract can be meet, deliver the required serviceability performance, and meet the hand back requirements at the end of the concession period. In addition, applying the AMP and driving out continuous improvements will also begin to improve and guarantee asset availability, forecast production volumes, determine resources planning requirements, manage asset performance risk, and realize operational savings.

6.6 Production of the Capital Improvement/Investment Plan

The CIP is the capital investment profile for the physical assets in the contract and is the primary output of the AMP. The MLC plan has three distinct service period components of capital investment:

1) The SPIP- the whole capital investment over a 10 to 20-year period
2) The 5YIP– medium-term investment plan
3) The Annual Investment Plan (AIP) - the short-term investment plan

The development of the CIP is determined through implementation of the key asset management methodologies making up the Asset Management Framework in conjunction with the application of a comprehensive maintenance strategy that is integrated into the day-to-day operation of the water facilities. The details of the asset investment profiles and their development are discussed in more detail in Section 3 of this document.

6.7 Maintenance Philosophy

Underpinning the implementation of the AMP is the delivery of the maintenance regime for the assets within the scope of the MPWMD and contract operator partnership. The maintenance philosophy adopted by Jacobs is to produce a strategy that promotes the implementation of best practices of known maintenance techniques across the business in a consistent, controlled, and focused way. One of the main principles of the strategy is that all parties who carry out maintenance within. The contract operator should always do so with safety in the forefront of their minds and rationalize the way in which maintenance is carried out and, in doing so, provides several benefits.

These benefits include:

- Increased maintenance effectiveness
- Improved asset reliability
- Culture change from reactive to condition-based approach
- Improved resource management and a strategy and policies that people can relate to, understand, and contribute to

6.7.1 Maintenance Strategy Approach

The maintenance department’s main responsibilities and obligations are to ensure that all assets are maintained to meet operational requirements at best whole life cost. A major contribution toward achieving this is a maintenance strategy that enables the key components to be put in place to facilitate best practices and continuous improvement. It is essential that all parts of the strategy can be linked and developed to enable analysis and performance improvement of people, assemblies, and assets. For example, the Asset Register must be able to facilitate data analysis, the generation of relevant performance reports, and support the criticality model to enable informed investment decisions. The strategy will enable the organization to develop and evolve, adopting the required technology, tools, and more advanced methodologies of maintenance through continuous improvement.

Figure 6-3 demonstrates the evolution and the linkage of the various components of the maintenance strategy.

EXHIBIT 3-B

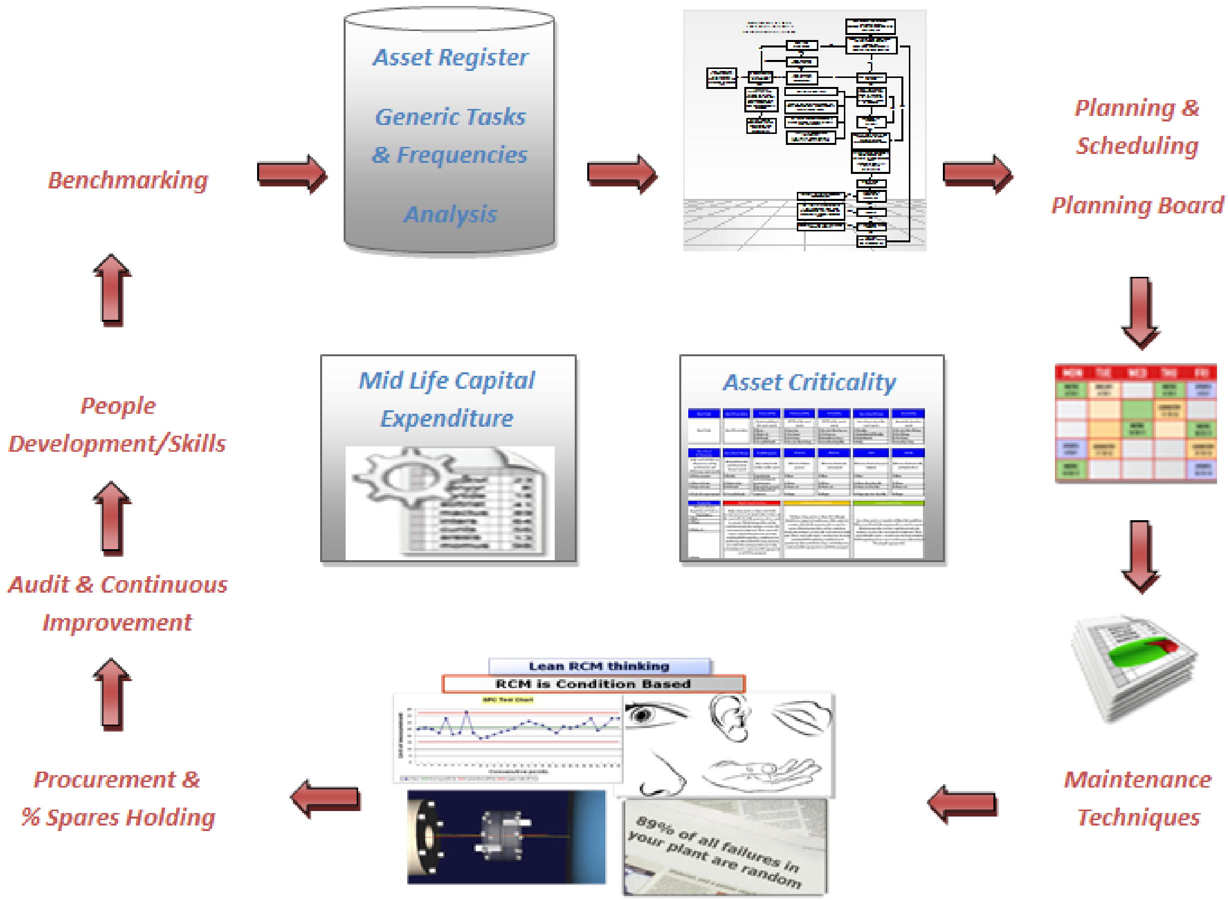

Figure 6-3. Evolution and Linkage Within the Maintenance Strategy

The maintenance strategy applied aims to give guidance in developing a coordinated asset management approach that utilizes best in industry practice involving an audit program, a benchmarking exercise against industry best practice, and delivery of continual performance and process improvement.

From a service delivery perspective, the availability and operability of all facilities and equipment has a major impact on maintaining compliance from a regulatory and environmental perspective as well as a contractual one. Therefore, the strategy and implemented maintenance plan will ensure that the assets with the most immediate impact on compliance and contractual obligations are identified to enable capital investment to be targeted and the correct maintenance technique applied to prevent failure and assess condition. The most important aspect of any strategy development is the actual plan where the necessary tools and techniques can be determined. As with any other maintenance concept, fundamental questions must be posed to ensure a structural, logical, and more importantly an effective approach is being taken. To support this process, a maintenance determination model will be developed for application across the MPWMD Water facilities and this is detailed in the flow diagram on Figure 6-4.

EXHIBIT 3-B

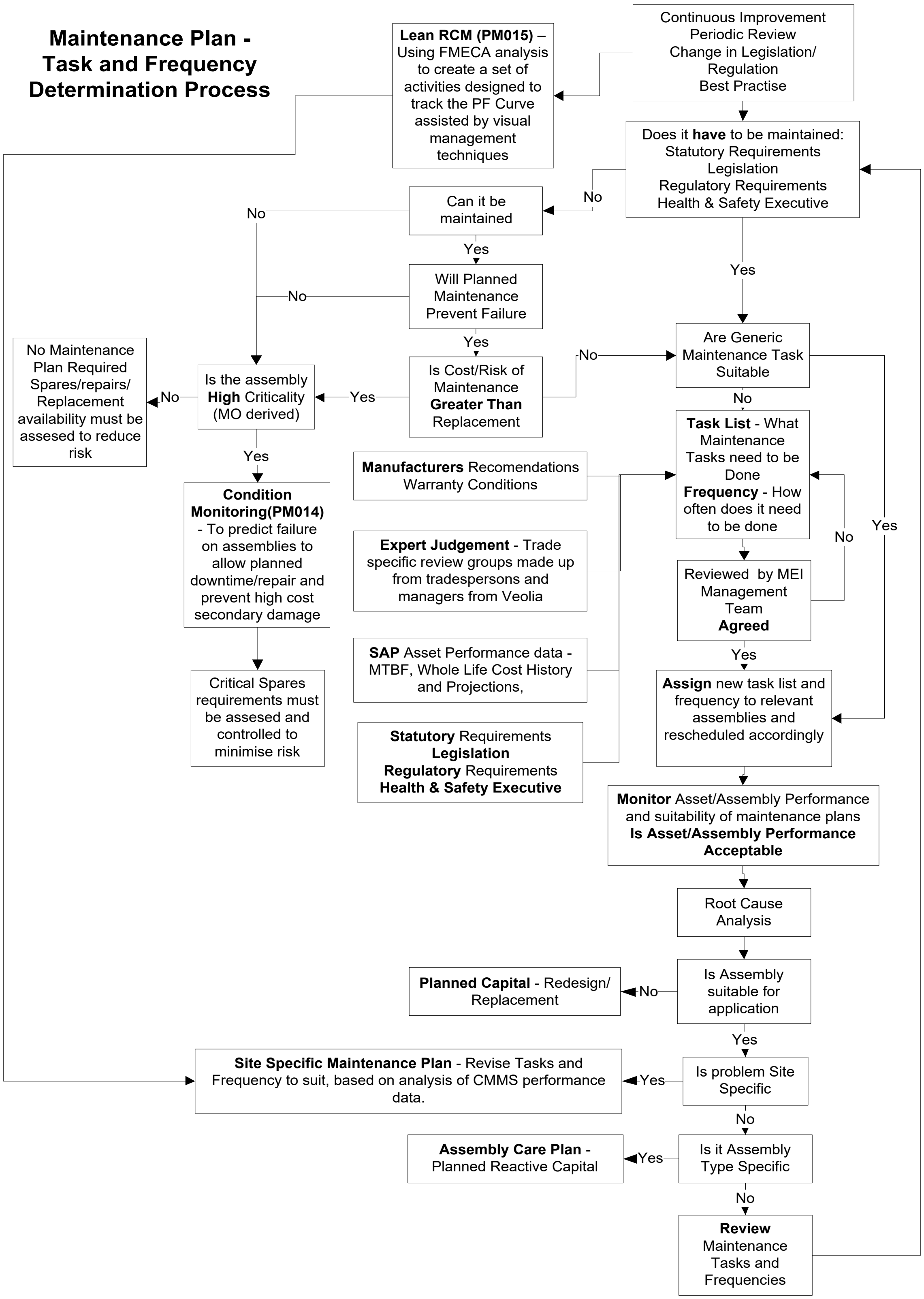

Figure 6-4. Detailing the Maintenance Determination Process

6.8 Asset Data, Information, and System Management

The basis for all AMP and planned maintenance regime starts with the development and maintenance of the Asset Register for the facilities included in the scope of the project. For the MPWMD water assets, the Asset Register will be held within a computerized maintenance management system (CMMS), this should be a web-based maintenance management software system. Jacobs recommends Maintenance Connect (MC) for the software, however other software is available. The system is used to manage maintainable items needing asset care and gives access to asset and maintenance management information.

The management system will be deployed across all facilities and systems to provide the following functionality:

- Asset registration/de-registration, including type, location, and hierarchy.
- Deployment of works scheduling for PM and operational activities.
- Schedule of maintenance activities, tasks, and frequencies.
- Status of work orders and scheduled tasks.
- O&M resource planning.
- Asset fault types, modes, and causes (as applicable).
- Total lifecycle management information – repair, refurbish, or replace costs.
- Performance Management reporting and key performance indicator dashboard availability.

6.8.1 The Asset Register

The Asset Register is the primary source of data and information regarding asset management and O&M planning. It is the central hub of all asset management processes upon which investment needs are identified and from which all asset-related reports on condition and performance are generated.

Throughout the service period the operating contractor will maintain the Asset Register to provide accurate and up-to-date information on the asset base giving details of:

- Fixed assets
- Moveable plant, equipment, and component parts
- Consumables.
- Spares (flush out)

The information contained within CMMS is fundamental to developing the CIP requirements via a "bottom up" approach through the identification, collation, and aggregation of asset information into a comprehensive Asset Register. A major task to improve this position has been through the creation and population of the Asset Register within CMMS. This is an ongoing process as it is recognized that the Asset Register is a live database with static data attributes such as type, location, rating, sizing, etc., and with dynamic information such as criticality, age, and condition that will be continually reviewed and updated to keep the information recent, accurate, and complete the asset data gaps.

A full review of the asset inventory will be held within CMMS and will be jointly reviewed by the contract operator for completeness, data quality, and accuracy.

It has been recognized that in the compilation of the Asset Register there will be several omissions and gaps in the dataset and these will be filled overtime through data input from the operational work schedules and annual inventory reviews. In addition, over the service life of the contract, the renewable and decommissioned items will be added to the schedule through the asset registration and de-registration process. The assets will be registered under a "parent to child" hierarchy with the following subdivisions and assigned assembly codes as illustrated on Figure 6-5.

EXHIBIT 3-B

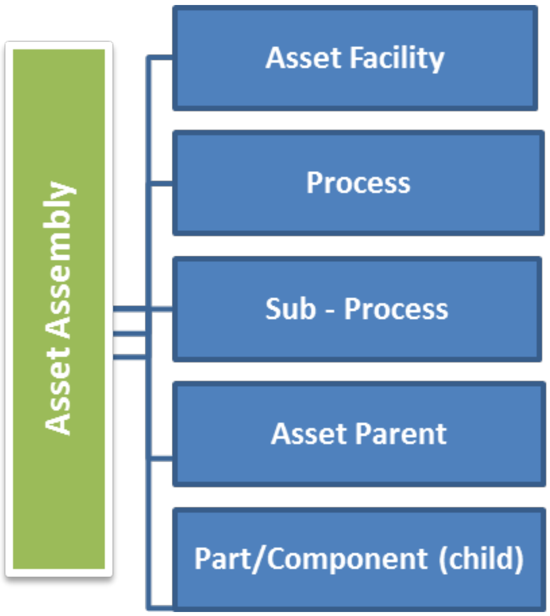

Figure 6-5. Asset Hierarchy Structure Applied to Data Captured on the Asset Register

6.8.2 Asset Coding Guide

Each asset assembly is given a unique code known as the equipment reference that identifies the site it is located on, the process the assembly is connected to, and the form the assembly takes. A sequential number is then added to identify the order of the assembly and its component parts. This type of information is needed to identify who has the responsibility for the assembly, to narrow down the type of assembly it is, and what work is necessary to ensure sound operation and enable effective reporting.

6.8.3 Equipment Reference

The equipment reference code, also called the technical identification, is designed to identify each item of plant using four types of identification indices.

1) Location

   This takes the form of numbering or letters and is utilized to identify the site and/or the cost center associated with the assembly.

2) Process Code

   This is a three-letter code preceded by a hyphen. It identifies the process in which the assembly/component is contained within and the type of unit process it forms a part of.

3) Assembly Code

   This can be a three-letter code again preceded by a hyphen. It identifies a generic group or type of equipment. This allows equipment to be grouped for reporting purposes.

4) Sequential Number

   This is a two-digit number and is followed by the assembly code without separation, indicating the instance of an item of equipment within a process area. A sequential number of '1' would be shown as '01'. If a process area had two pumps, the assembly code and sequential number would be PMP01 and PMP02.

EXHIBIT 3-B

An assembly can be identified at a process, at a site. Consider the example of the screens at a sample water treatment facility. The assembly code would take the form of Screen Number (SCN) 01, whereby SCN represents the functional type of equipment and 01 indicates that it is SCN 1.

To enable better performance reporting from the database, the equipment is given a group code that better explains its function. The group code allows the "type" of assembly to be described. For example, PU is the identifier for a pump, but it is also necessary to explain what type of pump it is. This allows for the separation of submersible pumps from screw pumps, ram pumps, etc. This also allows the varying maintenance requirements to be identified and targeted, as a screw pump requirement may be different from a centrifugal pump. It also allows for comparison of all centrifugal pumps across the entire equipment register. This functionality allows the identification of poor asset performance, condition, and reliability.

Group Description	Group Code	Type Code	Type Description
Pump	PMP	CEN	Centrifugal

6.8.4 Instrumentation

All electrical and mechanical equipment is allocated as a functional piece of equipment. Instrumentation and control assemblies within the control of the water process control are coded separately because of their importance to the control of the process and require strict maintenance controls. The philosophy of the coding structure is similar to those previously described but separates out from the instrument at facility level.

6.8.5 Data Collection and Asset Information

It is important to recognize that the assembly coding is not just a way of allocating an individual assembly a unique number as part of an asset inventory ledger, it is also an essential tool in the report writing and performance reporting of any maintenance system or data provider.

The asset assembly coding guide can be utilized to collect data in a structured way, strongly supporting data analysis, capital investment, and performance data of both the asset assemblies and people resources.

An example of how the data and information is utilized is shown in Table 6-1.

Table 6-1. Data Utilization

Problem Type	Pipework	Pump	Quality System	Screen	Grand Total
Failed	462	3,214	347	127	4,150
Incorrect Out/Input	383	938	1,624	43	2,988
Alarm	104	697	298	10	1,109
Damaged	330	279	50	27	686
Signal	13	57	181	4	255
Insecure	112	92	18	7	229
Stopped	34	151	27	11	223
Noise	13	129	1	3	146
Temperature	8	41	6	1	56

Table 6-1. Data Utilization

Problem Type	Pipework	Pump	Quality System	Screen	Grand Total
Odor	17	18	1	3	39
Grand Total	1,537	5,828	2,594	247	10,206

The data chart above gives the example of how failure modes on the assemblies are associated with the most frequent work activities across the contract. The highest incidence of work orders are associated with the pipe work. Pump, quality system, and screen are all assembly code types with the problem types being taken from the work request. This data information is used to target specific maintenance regimes, operator interventions, and to help make informed decisions regarding replace and refurbishment cycles.

6.9 Best Operating Practice

Reference must be made regarding Jacobs' approach to implementing operational best practice in this area. The basis of our philosophy for asset ownership is the understanding and implementation of tried and tested processes and the maintenance and monitoring routines of the plant within those processes to maintain performance. Standardization of equipment, together with appropriate selection, based on engineering best practice is key to asset ownership. This approach ensures that the correct plant is selected and with the appropriate level of maintenance will deliver the required level of availability for the various assets within each facility.

6.10 Asset Condition and Performance

This section covers the principles and methodology used to monitor and evaluate the condition and performance of the assets. Current condition, together with an assessment of the characteristics of deterioration and an understanding of the criticality of individual assets, provides the necessary information to determine serviceable life using a risk-based approach. The evaluation of asset condition is critical to the development of the optimum CIP that will allow compliance with the performance requirements of the Contract.

The AMP allows prioritization of asset investments through a regime of assessment, maintenance, and renewal of assets based on the condition and performance of individual assets and their criticality to the delivery of the service.

6.10.1 Condition Grading

The contract operator will assess the condition of all assets as a planned maintenance activity, using the scoring system described in Table 6-2. The condition grading for each asset from the planned maintenance activity is captured in the CMMS. Throughout their lifecycle each of the assets will move through a series of changes to the asset condition. This detailed information is included in the preparation of the AIP, 5YIP alongside the SPIP and is fundamental to AMP.

EXHIBIT 3-B

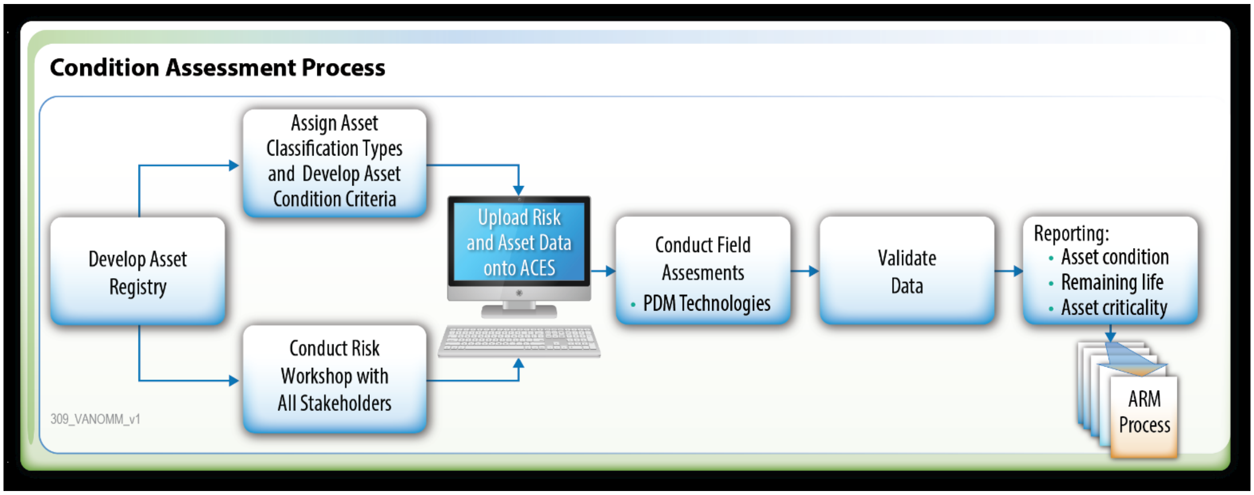

Figure 6-6. Condition Assessment Process

Table 6-2. Asset Condition Grade Assessment and Criteria

CG	Criterion
1	Sound construction of component, well maintained and operable under all relevant conditions.
2	Sound construction of component but showing some signs of normal wear and tear. Well maintained and operable under all relevant conditions.
3	Functionally sound components but with appearance significantly affected by deterioration. Structures marginally preventing leakage. Plant exhibiting reduced efficiency and minor failures.
4	Deterioration has a significant effect on performance. Structural problems or slight leakage evident. Plant functions but requires significant maintenance.
5	Functionally unsound components. Structural problems having a detrimental effect on the performance of the asset. Plant requiring excessive maintenance and having reliability problems affecting asset performance.

Note:
CG = condition grade

New assets will initially be graded **CG1**. After a period, each asset will move naturally to **CG2** with the normal ownership conditions and maintenance provided. The time it remains in the relevant condition grading group will depend on the asset type, maintenance regime, and general operation.

Continued operation and maintenance of these assets will at some point bring the asset to **CG3**. The assets in this CG category will still provide adequate service and performance. However, the asset condition will require monitoring and provision for replacement should be planned and scheduled within an appropriate timescale.

In the unforeseen event that the asset suffers premature wear and tear due to elevated working hours or increased demands over and above the design capability, then it will be expected to move through the CGs at a faster rate.

Redundant assets on facilities will be expected to be at, and remain at, **CG5** for the period of the contract. As a minimum requirement these assets will be maintained and decommissioned in a safe state to ensure that there is no adverse impact on the environment or a health and safety risk to staff and site visitors.

EXHIBIT 3-B

An example asset conditions summary is provided on Figure 6-7.

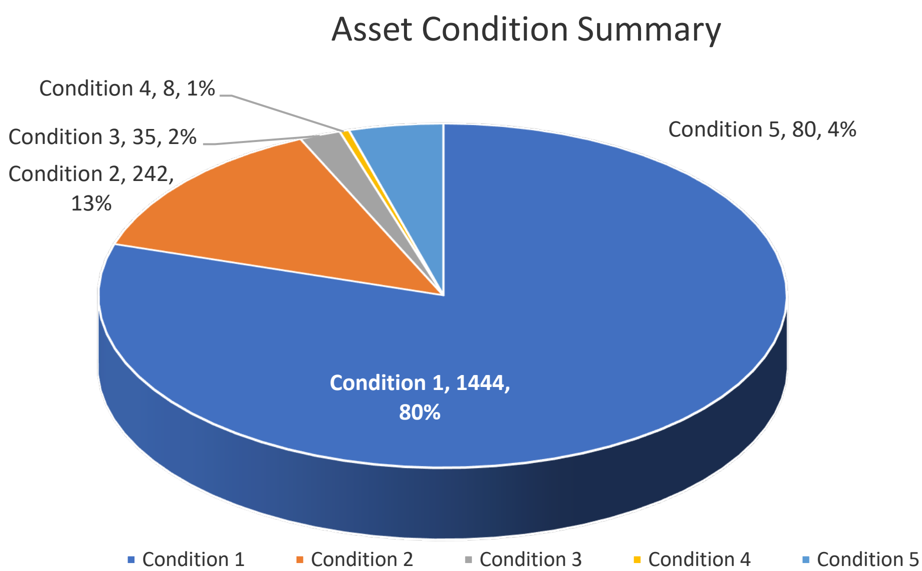

Figure 6-7. Example of Asset Condition Summary

6.10.2 Data Confidence

The CGs for each asset within this project are captured and recorded in the CMMS at asset level. The process for carrying out the assessment is through the scheduling of a planned PM task in MC that instructs operational and maintenance staff to assess and record the CG of each item on the Asset Register. An improvement to the assessment process going forward will be the inclusion of the confidence grade for the condition data captured. Where the asset is visible and can be assessed it is likely to be assigned a high confidence grade (level A or B). Where the asset is buried, submerged, or otherwise cannot be visibly assessed, the confidence grade will be low (level C or D).

Table 6-3. Confidence Grades

CG	Description
A	Sound textual records, procedures, investigations, or analysis properly documented and recognized as the best method of assessment.
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, and some use of extrapolation.
C	Extrapolation from limited sample for which Grade A or B data is available.
D	Unconfirmed verbal reports, cursory inspections, or analysis.

Assignment of confidence grades will determine the level of reliability and accuracy of the asset data and this improvement has been implemented by adding additional fields to MC. To drive out continuous improvement and where feasible, Jacobs aims to lift data assessed as category C or D into the A or B category over the next financial year, particularly for those assets that have been identified for early inclusion into the AIP and 5YIP. This exercise is currently ongoing with the data confidence to be improved as part of Jacobs' continuous improvement process.

EXHIBIT 3-B

6.10.3 Condition Monitoring

There are a series of asset condition indicators that show the asset's state of health and effective performance. These fall into these categories:

- Increase in consumables usage (such as energy consumption)
- Vibration and temperature increases

Any change in these parameters noticed by O&M staff will, as a routine, be raised through the generation of a corrective work order.

In the contract, several assets have been assessed and considered as critical to serviceability performance based on criticality and risk. These assets have been identified and prioritized for condition monitoring assessments

6.10.4 Performance Monitoring

Overall performance of the operational assets is measured and reported in the monthly balanced scorecard. Measures reported at this level include compliance with wastewater regulations, serviceability performance, and contractual compliance.

While the principal asset-related performance measure is reliability, the monthly management reports record several different maintenance performance measures including:

- Monthly work orders – Closed (completed)
- Planned by work type – PM/CM/H&S/Statutory & Regulatory/Training
- Work planned against work completed
- Work order history by priority
- Planned vs. reactive ratios by age and priority

6.10.5 Preventive Maintenance and Operational Tours (Inspections, Rounds)

It is extremely important that the plant and equipment operate within design parameters. Failure to do so will have a negative effect on the asset assembly and could result in increased costs and increased failures no matter what the maintenance plan. The importance of an effective planned maintenance regime is critical to the effective and efficient operation of a treatment facility and related assets. Planned PM approach is time based or condition-based, depending on the asset age and condition and consists of a set of assembly-specific tasks that the maintenance personnel carry out. The tasks are aimed at checking the general condition, functionality, performance, and calibration of the assembly.

This approach aims to give O&M common goals to ensure asset performance and process stability is supported by good asset ownership. This type of work is carried out by operational staff and takes the total productive maintenance approach. It consists of operational tours, cleaning, visual inspection, adjustments, and calibration and complies with supporting site procedures and ISO standards. The operations technicians carry out their routine tasks on the plant determined by the work scheduling system, ensuring that all operational tasks are linked with maintenance activities. As a result, the true maintenance tasks are reserved for the skilled maintenance technicians. The Lean Reliability Centered Maintenance (RCM) approach will support this approach by simplifying checks and controls and freeing up time for staff to spend on more value-adding activities.

6.10.6 Operations and Maintenance Deployment -Works Scheduling

To effectively maintain the asset base, the CMMS will be utilized to carry out all reactive and planned work at the request of operations. The system will be used to ensure that the "right people" are deployed to do the "right work" at the "right time" and required frequencies in place to effectively manage and prioritize planned and reactive work against the process needs. Each site has a site-specific Best Operations Practice (BOP) and

Maintenance program tailored to the site requirements to ensure the appropriate tasks and frequencies are applied to the assets to keep them in service and deliver the required asset performance. The work priority for any activity on a site may be changed at the request of operations to reflect operational circumstances and maintain service levels. Attached to each priority is a descriptor dictating the requirement that is based on condition-based reasoning.

A summary of the priorities with response times applied are detailed on Figure 7-8:

Priority 1	Immediate	Out of Hours Response
Priority 2	24 hrs	Same Day Response
Priority 3	72 hrs	Next Working Day
Priority 4	168 hrs	5 Working Days
Priority 5	720 hrs	30 Days

PM System Origin

Planned Corrective Maintenance Requester Origin

Fix on Failure Manual Origin

Figure 7-8. Priority Response Time

6.10.7 Reactive Maintenance - Repairs on Failure

This is unplanned work to repair faults or failures of equipment that are raised by a work request. The prioritization of the work is based on the operational requirements at the time of the request and will be subject to classification and the associated response time. A proportion of random failures are inevitable due to the nature of the operational environment, the age of the plant, and unexpected events that take place (random failures will occur). An event is determined as an unforeseen event, usually weather related, however the robustness of the maintenance plan and strategy will keep this type of reactive work to a minimum.

6.10.8 Works Scheduling and Resource Management

All O&M tasks will be reviewed for the assets, considering the asset risk, criticality, condition, and asset performance. The system will be developed to ensure that all maintenance staff are strategically deployed considering reporting centers, workload, skill requirements, availability, and the installation of new plant and equipment. The system will look to actively improve work processes, monitor the effectiveness of the O&M staff taking into consideration the asset type, work and frequencies required, job type, and hours. This approach will enable the contract operator to take advantage of any operational improvements and commercial activities within the project and locally.

6.10.9 Maintenance Performance Reporting

To drive operational improvements and meet service requirements, performance scorecards and reporting systems will be introduced across the MPWMD water assets. The reporting framework also ensures that an audit trail is present, demonstrable, and satisfies ISO standards. The performance information is used to understand the effectiveness of the strategy and to gain an understanding of how resources are best deployed across the asset base to meet operational requirements and serviceability levels. To effectively manage performance in these areas the monthly performance data is distributed to the maintenance teams containing the following information:

- PM completed over the last 6 months
- Critical PM backlog over the last three months
- Work request work completed and backlog in the last six months (opex and capex)

- Priority backlog by priority
- Assets revisited reactively after a PM

An example of the detailed performance monitoring dashboard used is shown on Figure 6-9:

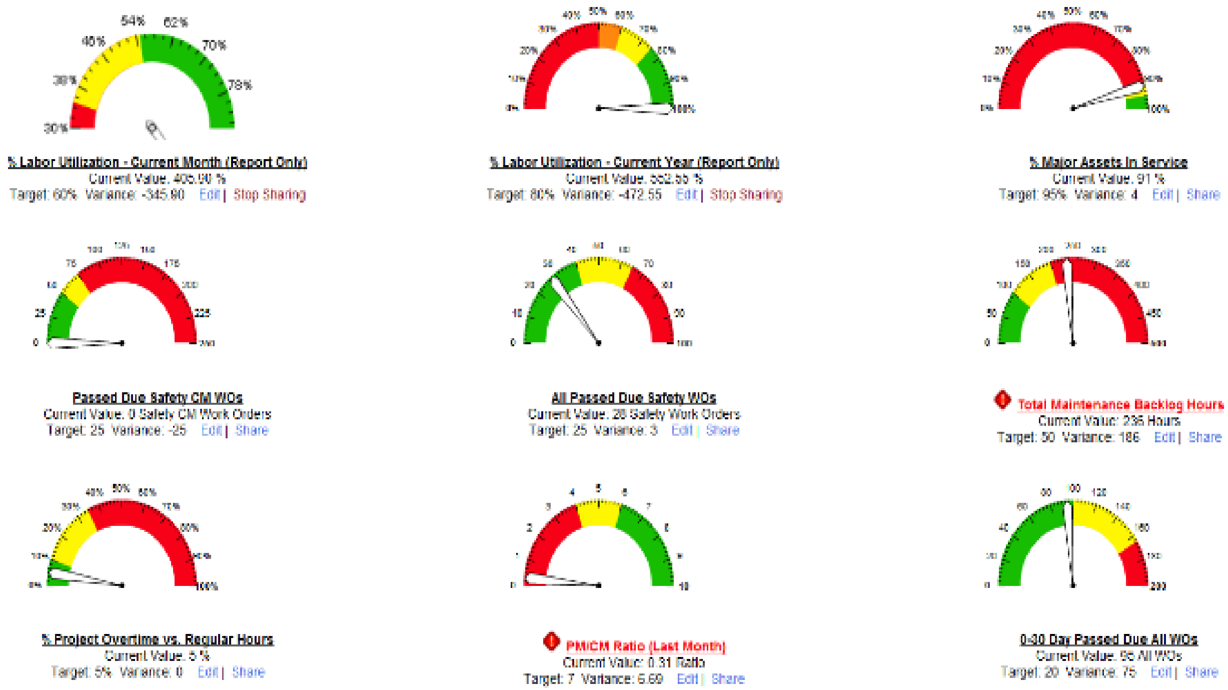

Figure 6-9. Detailed Performance Monitoring

The maintenance system support function is responsible for ensuring that that there is a suitable audit trail, demonstrating that due diligence is being applied to all maintenance activities to ensure compliance with the contract obligations and regulatory requirements.

6.11 Capital Investment Planning

Application of the Asset Management Framework and refinement of the asset data and cost information will allow the MCCS to be used to collect costs at asset level. The process will be fully implemented within the 12 months of commencement of services. It will then be possible to start accurately building up whole life costs of the assets. By capturing data and costs in a consistent way, it will be possible to continuously validate and benchmark asset lives and costs with other similar assemblies. It will also be possible to implement Lean RCM and develop a profile of each asset assembly to determine the frequency of breakdowns, mean time to failure, and investment periods based on historic evidence collected within the database. These will take the form of short-term (Annual), mid-term (5 years), and full-term profiles (complete contract length).

6.11.1 Asset Replacement Planning Process

Assets will be replaced when they reach the end of their serviceable life, the work being funded as CIP. This will be either when the maintenance needed to achieve the performance required becomes either impossible or unreasonably expensive, the frequency of repair or refurbishment becomes excessive, or when spares or consumables are no longer available.

Asset deterioration characteristics are reasonably well understood for specific asset classes (such as pumps) but the attributes for individual assets are unique and therefore the prediction of asset failure is not an exact science.

In the absence of mature asset condition data, this fact influences the mid- to long-term approach to replacement of assets needs.

Initially this requires the asset replacement life to be statistically based, generally on a predicted 'asset life', but the reality is that other interventions will be made when the asset condition and potential failure modes are better understood. Applying the theoretical statistical approach may be reliable for large groups or cohorts of assets but cannot be relied upon for small cohorts or in the very short-term. Consequently, there are different approaches for the short- and long-term asset replacement plans that take into consideration asset life expectancy, refurbishment cycles, asset condition, whole life costs, and meeting the requirements of the contract.

6.11.2 Long-Term Asset Plans

The purpose of holding asset information at this level of granularity is to enable operational work tasks to be allocated at the detail level (such as, inspection, testing, calibration). For CIP planning, the renewable item needs to be identified and determined as "the unit that would be replaced should it or its components fail."

An example of this would be to consider a package plant such as a polymer dosing system. These systems are generally supplied as single units but throughout the course of their lifecycle there will be components with the package plant that will fail (such as the dosing pumps) which will be replaced as discrete plant items. However, if the entire "package" (multiprocess or system) requires replacement, then the replacement will include all subcomponents.

It is recognized that the Asset Register is a live document with static data (asset attributes such as size, rating, and similar) updated and added as information becomes available and asset gaps filled as they are identified.

As part of the approach to driving and delivering continuous improvements, both the renewable items and gaps in the Asset Register will be captured over the course of the contract to improve the confidence in the asset data used to make operational, maintenance, and capital interventions.

It is a recognized fact that when compiling the Asset Register for an asset-intensive contract it is inevitable that some assets will be missed and that over the early stages of the contract period these will be progressively identified and added to the Asset Register. To help with this objective, the renewable items in the asset schedule will be classified to distinguish between those that are known and understood and those that are known to exist but have little or no available asset information.

On an ongoing basis the asset inventory will be reviewed within the CMMS for completeness (appropriate level of granularity) and adding assets that were previously omitted. Greater emphasis will be placed on the accurate recording of data within the CMMS which plays an important part in the continual refinement and development of the CIP. The asset data and performance information derived from the MCCS, the from the Asset Condition Evaluation regarding asset performance information, CG, risk and consequence, together with testing against the compliance requirements of the contract will determine eligibility for funding and deliver a robust CIP for the year and over the remainder of the contract term.

6.11.3 Replacement and Refurbishment Frequencies

In many cases, the asset life is not predicated by run time or age-related deterioration. This is the reason why the Lean RCM approach is being adopted across the asset base.

The majority of the assets in use in the water industry are mechanical, electrical, instrumentation, control, or of civil construction. While some of these have predictable asset lives, many factors influence the life of an asset. These will include suitability to operating duty, duty/standby arrangements, environment, performance of upstream equipment, quality of manufacture, care of initial installation, quality of maintenance, and age.

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Each renewable item fits within a sub-category which in turn fits within an Asset Category. Each asset category fits within an asset assembly system.

A given example of this would be a polymer mixer within a coagulation basin and this would be categorized as follows:

- Renewable item – Water System Process (WSP) polymer mixer No. 1
  - Asset system – WSP system
    - Asset Category – mixer
      - Asset sub-category – mixer-submersible

For the purposes of modeling the SPIP, asset lives have been applied at the asset sub-category level. While simplistic this experiential-based forward projection works for large cohorts of assets and it is expected to be reliable for the size of the asset base under the project.

It is recognized that for many assets there will be one or several asset refurbishments prior to the asset requiring replacement. This has been recognized in the asset planning process and consequently for many assets there will be a proposed frequency for refurbishment and a different frequency for replacement. This is driven from experience coupled with analysis of the available asset data. Due to the varied nature of the wear characteristics and consequent refurbishment activity it is neither practical nor possible with any accuracy to break down the activity into further levels of detail.

6.11.4 Identifying the Initial Intervention – The Asset Risk Register

While modelled asset lives will derive the expected time period between interventions, they are not sufficiently accurate to determine the initial replacement or refurbishment interventions. As a result of this uncertainty early in the contract concession, the initial activity will be based on the risk and consequence posed by the asset failing. The asset risk is assessed against certain criteria and derived from the likelihood and consequence of asset failure. Where risk is low then the asset condition will be used to determine the intervention. Where risk is low and condition is good then replacement will be based on asset age and submitted to a technical challenge review to assess eligibility for CIP funding. The methodology followed for the assessment of the likelihood and consequence of failure is illustrated on Figure 6-10.

Likelihood Category	Wt.	Negligible = 1	Unlikely = 3	Possible = 5	Likely = 7	Very Likely = 10
Physical Condition	75	Condition Grade 1 Very Good. Only Normal Maintenance Required.	Condition Grade 2. Good. Minor wear. Normal and minor corrective maintenance required	Condition Grade 3. Fair. Major wear impacting level of service. SIgnificant corrective maintenance required	Condition Grade 4. Poor. Unable to meet level of service. Major corrective maintenance required.tFailure Imminent.	Very Poor. Grade 5. Requires Complete Rehabilitation Or Replacement. Failed.
O and M Protocols	25	Complete, up-to-date, written, performed and reviewed at least 3 cycles	Complete, written, up-to-date, performed and reviewed at least one time	Developed but not fully vetted	Written, but out-dated	No written procedures or not being used
	100					

Figure 6-10. Modelling Risk - Likelihood Assessment

The combination of the likelihood and impact scores gives an assessment of risk associated with each asset and is illustrated on Figure 6-10. When making an asset assessment, not all impact categories or likelihood measures should be considered equal and consequently, a weighting factor is applied. For each asset assessed both likelihood and impact scores are converted into percentages and these are multiplied to derive a combined risk score which is expressed as a percentage figure. Scores greater than a determined threshold are high risk and scores lower than a lower threshold are considered low. Those assets that are considered high risk are submitted for replacement in the AIP.

Assets that are a medium risk have their first intervention based on their asset condition. Medium risk assets with a CG of 1 or 2 are planned for replacement based on their residual life; those with a CG of 3 are planned for replacement at a time period as a proportion of their total asset life; those with a CG of 4 or 5 are planned for replacement in the AIP.

Subsequent replacements are planned at a time period equivalent to the theoretical asset life but will be challenged though the Asset Investment Planning process (refer to the process flow diagram in Figure 6-12) to determine if the asset life can be extended, the risk managed, and/or if the asset performance can be maintained through applying alternative maintenance and operational interventions.

In all cases, planned for replacement means that there will be a further review of the condition and performance of the asset to determine what, if any, intervention is warranted. There is then further review to determine whether the cost of the intervention is eligible for funding as CIP in accordance with the O&M contract.

LOS Category	Wt.	Negligible = 1	Low = 4	Moderate = 7	Severe = 10
Safety of Public and Employees	30%	No Injuries Or Adverse Health Effects	No Lost-Time Injuries Or Medical Attention Required	Lost-Time Injury Or Medical Attention Required	Loss Of Life Or Widespread Outbreak Of Illness
Regulatory Compliance	25%	No state local codes or Federal permit violations . No SSO's	Possible technical violation (Inspection finding)	Probable enforcement action, but fines unlikely (Admin Order)	Enforcement action with fines or surcharge. Legal action, Consent decree
Financial Impact	20%	Can be repaired within Utility budget (<$5,000)	>$5,000 > =$100,000	>$100,000 <$200,000	Greater than $200,000
System Restoration	15%	No impact	Minor impact to process or out of service less than 4 hours. No loss of service	Potential impact to process, out of service >4 <8 hours. Loss of service	Major impact to process, out of service >8 hours, outside services required, Loss of service
Public Confidence and Perception	10%	No social or economic impact on the community. No reactive media coverage. Any media coverage is a result of proactive announcements by Utility. No complaints.	Minimal disruption (e.g., traffic, dust, noise, odor). No adverse media coverage. Some complaints.	Substantial but short-term disruption. Adverse media coverage due to public impact. Localized media coverage.	Potential long-term impact. Area-wide disruption. Regional media coverage.
	100%				

Figure 6-11. Combining Likelihood and Impact Assessment to Drive Risk Scores

6.12 Asset Management Plan Outcomes

This section summarizes the capital investment outcomes from applying the asset management methodologies and utilizing the asset data from MC and the intelligent modelling outputs from ACES. Figures 6-12, 6-13, and 6-14 detail these outcomes.

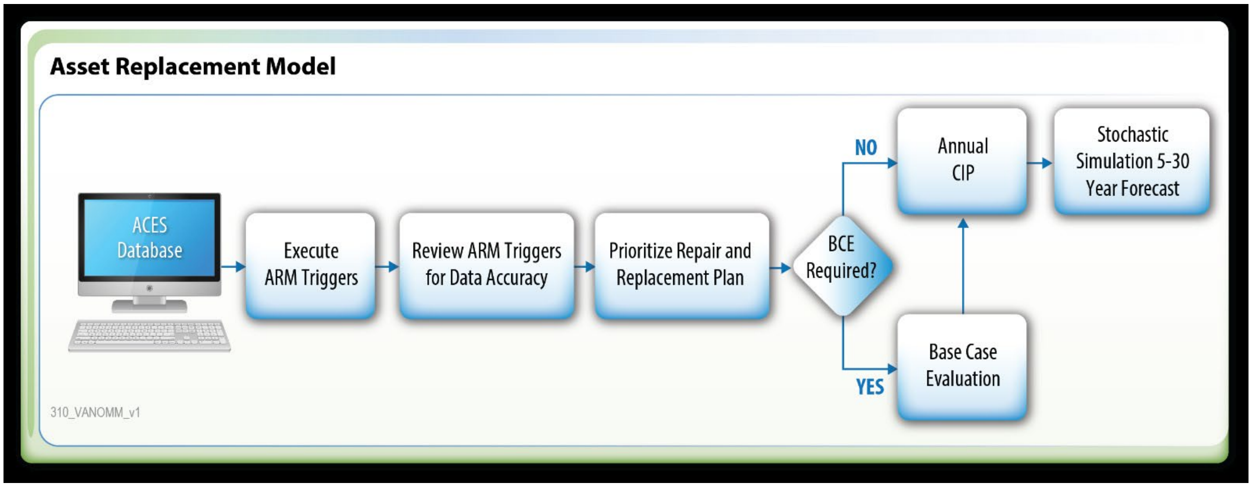

Figure 6-12. Asset Replacement Decision Flow

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Figure 6-13. ARM Triggers and Decision Funnel

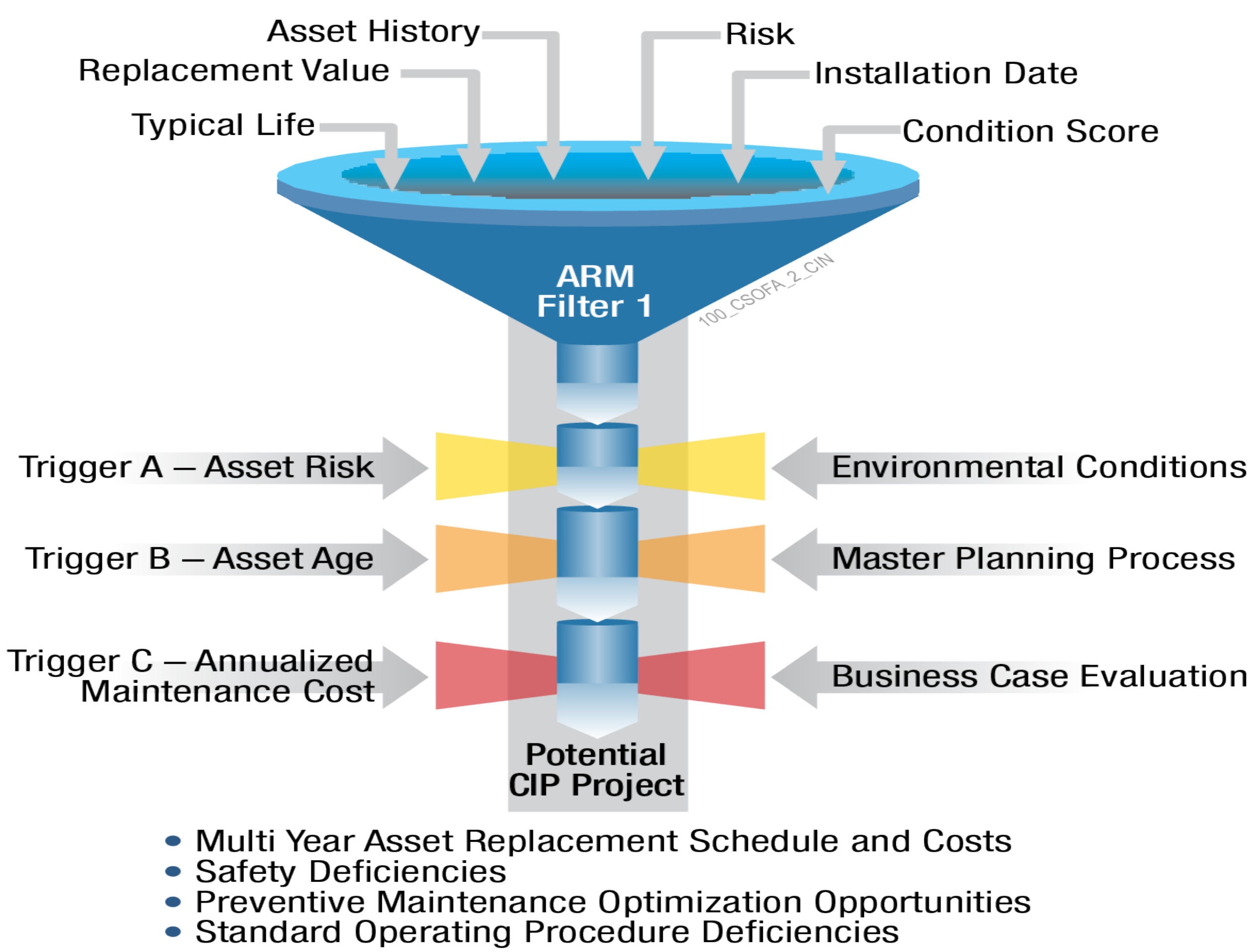

Figure 6-14. Asset Management Funnel

6.13 Service Period Investment Profile and Expenditure Envelope

The asset base will be modelled from a "bottom up" approach taking each asset in the Asset Register, assessing its age, risk profile, and condition and assigning that information to the asset in a model. That then enabled judgments to be made on risk, condition, and age as a priority order across the entire asset base to establish an estimate of the first intervention for each asset. The Reference Profile was then derived from the forecast refurbish/renews frequency based upon the operator's experience and industry data. The SPIP has been derived from the Reference Profile following a top down review of the validity of the asset cost and expected life predictions together with sense checks of high cost asset interventions.

6.14 Five-Year Investment Profile

The 5YIP is derived from the service period plan in accordance with the process set out on Figure 6-12. It represents the transition from the service period envelope to the AIP. It drives the operator to review the performance of those assets in further detail to determine the likelihood of the need for intervention and if so, to what extent that might be necessary. It provides a look ahead to work that might be required and underpins resource planning.

6.15 Annual Investment Plan

The AIP is the set of planned asset interventions required to maintain the services as required under a typical O&M contract. For the initial AIP it is proposed that a phased approach will be taken to deliver the AIP consisting of program Phases 1, 2, and 3.

- Phase 1 consists of a project scheme of immediate concern and includes fully developed project definitions.
- Phase 2 project definitions are under development and approval will be sought in defined years to progress with those MLC Works.
- Those projects identified in Phase 3 are currently in the conceptual phase of project definition and it is anticipated that approval will be sought in future years as determined by the contract operator and MPWMD to progress those MLC Works.

7. Future Developments and Continuous Improvement

7.1 Updating Asset Management Plans

The Jacobs team have identified four focus areas that drive continuous improvement to further develop the MPWMD Project Asset Management Framework, improve the effectiveness of the AMP, and enhance asset and operational performance.

Figure 7-1. APM Focus Areas

These areas are:

1) Further integration and alignment of asset procedures with operational procedures and contingency (Asset Care Plans)
2) Asset Data – Asset Register
3) Lean RCM
4) Procurement and supply chain

7.1.1 Integration and Alignment of Asset and Operational Policy and Procedures

The asset care plan describes the asset and the O&M regime with a projection of capital investment over the life of the asset to maintain service standards. Future assessment of asset criticality and condition over time will enable O&M philosophies to be changed to reduce whole life costs, extend asset lives, and improve asset performance.

7.1.2 Asset Data

Assignment of the confidence grades will determine the reliability and accuracy of the asset data and this improvement will be implemented on a phased approach to the AMP during the initial financial year, aiming to improve the data confidence rating to A or B across the highest priority assets. To support these process changes the operator will carry out an annual review on a sample set of the recorded asset base to calibrate the confidence levels in the data.

7.1.3 Work Planning and Scheduling

With the intention of further improving workforce management, the resource management capability will be improved. This will be completed through increasing the functionality of the work scheduling element in the CMMS to ensure that all maintenance staff are logistically deployed considering reporting centers, work load and type, skill requirements, and availability of plant and new equipment. The associated work processes and performance reporting for all assemblies have been reviewed and the functionality of the work scheduling system adjusted accordingly to drive out continuous improvement regarding getting the “right work” done at the “right time” to the “right quality” standard.

7.1.4 Lean Reliability Centered Maintenance

The contract operator should implement Lean RCM maintenance principles across MPWMD water assets. The intention is to identify the root cause of asset failures through monitoring plant performance and asset condition, reduce the mean time between failures, and pre-empt the failures before they happen. Traditionally, the maintenance approach has been based on the fixed period maintenance schedules utilizing manufacturers’ recommendations or on a set of tasks produced by staff based on experience and best practices. The Lean RCM approach utilizes condition monitoring and simple visual management techniques that can also be applied to ensure that the system/asset is working within the correct asset performance parameters, ensuring efficient and effective energy use and process stability/reliability.

The implementation of the revised approach to maintenance embraces the adoption of industry best practice accompanied by the training and development of maintenance staff, the improvement of relevant business processes, and system management capability. In essence, the strategy and implementation program have been designed to satisfy four main aims:

1) To extend asset life and improve plant/equipment reliability through effective routine maintenance.
2) To reduce maintenance costs through more effective use of labor and reduced breakdowns, resulting in reduced downtime, compliance risk, and unplanned overtime.
3) To make best use of valuable engineering resources by developing effective and robust operator-involved maintenance systems.
4) To achieve operator ownership of equipment performance and workplace organization by employing visual management techniques.

Improvements will be made to the site-specific maintenance regimes for the critical assets, applying condition monitoring techniques as part of the inspection intervals (operational tours) to ensure key measuring points are created and monitored for critical/high priority asset assemblies. This Lean RCM approach has been developed around a model where equipment operators perform the clear majority of the routine maintenance tasks allowing the maintenance engineers time to concentrate on the more complex maintenance activities such as fault diagnosis, pre-emptive maintenance, and root cause analysis of asset failures. This revised maintenance regime takes a different view by looking at each possible failure and implementing a maintenance regime that can identify the process of the failure during its lifecycle. The approach utilizes condition monitoring techniques to gain insight on assembly condition, track the asset reliability, and predict the asset failure modes. Application of these techniques enables any degradation of the asset to be identified and PM applied before critical failure of the asset occurs. The revised maintenance regime specifies the inspection regime based on visual and condition monitoring techniques that enable the development of process failure curves that predict asset failure. Over time, as the asset data matures and PM tasks are completed, the number of random failures significantly decreases and the mean time between failures are greatly reduced.

To enable the successful implementation of the Lean RCM model, a competency-based training program for maintenance and operations staff has been introduced. The training program ensures that the operators understand the concept of Lean RCM and have the skills to perform the maintenance tasks including condition monitoring (temperature/vibration analysis), human sense checks, and practically applying the proactive maintenance processes relevant to the facility.

7.1.5 Procurement and Supply Chain

The Service Delivery Team will work with the Procurement Team to review the processes regarding the procurement of goods and services associated with CIP project work. The existing framework agreements are currently under review and new contracts are being drafted for a future tender issue to key contracting partners with an aim to improve relationships and benchmarking costs and services. The use of these framework agreements will also help achieve the following:

- Duty of care will be demonstrable by assessing the competence of our contracting partners to meet the needs of MPWMD.
- The potential of volumetric savings and quality of service will be achieved through consistent use of framework agreements.
- Agreed standard sets of rates and bills of materials will be introduced with the intention to limit reactive work being carried out at a premium.
- The proposed framework agreements will ensure standard specification of equipment and will ensure service level targets of our suppliers and contracting partners are achieved. The framework agreements will also incorporate performance criteria (cost, quality, and time) and a program review/assessment that will allow us to measure the level of service being achieved.

EXHIBIT 3-B

8. References

American Water Works Association (AWWA). 2016. *M17 Fire Hydrants: Field Testing, and Maintenance.* Fifth Edition.

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