

Climate Adaptation Master Plan for Water (CAMP4W)

WORKING MEMORANDUM 7

INTEGRATING CLIMATE CHANGE ADAPTATION INTO METROPOLITAN'S PLANNING PROCESSES

December 2024

1 Introduction

Extreme weather conditions in recent years have presented Southern Californians with an unsettling preview of the challenges ahead, where climate change is resulting in weather whiplash, abruptly swinging the state from periods of severe and extended drought to record-setting wet seasons. This is putting mounting pressure on the year-to-year management of the region's available water and power resources. In response, the Board directed staff to integrate water resources, climate, and financial planning into a Climate Adaptation Master Plan for Water (CAMP4W) and in October 2023, chartered a Joint Task Force of Board Members and Member Agency Managers to facilitate the development of CAMP4W in a timely and transparent process. CAMP4W includes: (1) Climate and Growth Scenarios, (2) Time-Bound Targets, (3) A Framework for Climate Decision-Making and Reporting, (4) Policies, Initiatives, and Partnerships, and (5) Business Models and Funding Strategies. CAMP4W will increase Metropolitan's understanding of the climate risks to water supplies, water and energy infrastructure reliability, operations, workforce, and business model. CAMP4W will also provide decision-making tools and long-term planning guidance for adapting to climate change to ensure Metropolitan is mitigating that risk and ultimately strengthen its ability to fulfill its mission.

The development of a Climate-Decision Making Framework, including evaluative criteria, has been a significant component of the CAMP4W process to date. Using a comprehensive assessment approach, projects and programs will be evaluated through a set of criteria to determine consistency with the Board's overall climate adaptation objectives. This Working Memorandum describes Metropolitan's approach to identifying new projects and programs and provides initial recommendations to ensure that climate adaptation considerations are integrated into existing and future planning processes. The stepwise approach of CAMP4W, including the identification and evaluation of projects and programs, is included in **Figure 1**.

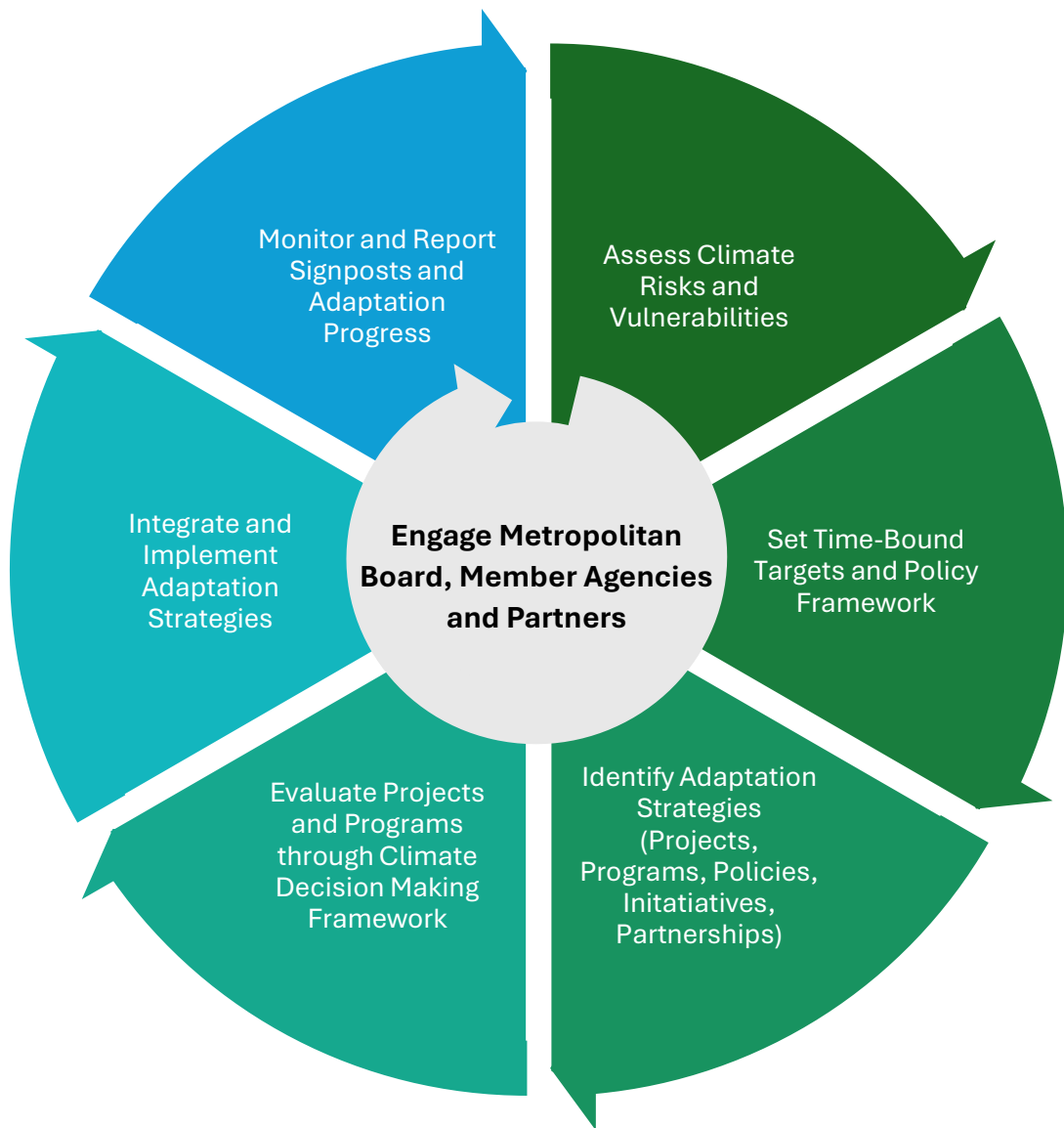


Figure 1. Climate Adaptation Master Plan for Water Implementation Process

In general, Metropolitan identifies potential projects and programs to advance water supply and power reliability, continued system operation, asset management, infrastructure reliability, and energy sustainability through several planning processes initiated by various groups within Metropolitan. These existing processes are described in detail in **Appendix A** and have varying assessment cycles, with some occurring more frequently than others, and some only occurring when needed. While these processes have effectively identified projects and programs to meet Metropolitan’s needs, changing climate conditions and increased uncertainty require additional considerations and criteria in project and program development as well as project and program evaluation.

Through CAMP4W, staff recommends adding climate adaptation considerations into every aspect of the organization's resource and infrastructure planning processes to align with the CAMP4W Climate Decision-Making Framework and evaluative criteria. Importantly, climate considerations should also extend to projects and programs not evaluated through the CAMP4W process (e.g. replacement and refurbishment projects) to ensure Metropolitan infuses climate change into all investments and moves towards a climate resilient future.

This approach is consistent with the following Next Steps identified in the CAMP4W Year One Progress Report:

- "Refine adaptive management and how to institutionalize it in Metropolitan's processes."
- "Refine the process for integrating CAMP4W projects into CIP and budget."

2 Existing Project Identification and Evaluation Process

New projects and programs are identified to meet needs through the processes presented in **Appendix A**; through staff identification of replacement and refurbishment (R&R) projects to support existing infrastructure, which may include new capital projects; and through other Board directives. However, currently there is no formal process for evaluating each list of projects holistically nor is considering the impacts of climate change an integral part of each process. Therefore, Metropolitan has identified the need to modify elements of existing processes to better serve the needs of its Member Agencies and to integrate the Board-identified climate adaptation priorities, as reflected in the CAMP4W evaluative criteria.

To establish the best path forward for making modifications, it is important to understand existing processes. Projects and programs are identified to address needs through the planning processes identified in **Appendix A**. They currently proceed following multiple paths forward, as shown in **Figure 2**, including:

- Projects and programs are developed through either operations or engineering staff identification of a needed improvement to the system, or they are developed following other Board directives. The majority of projects are for R&R to support existing infrastructure and are evaluated in the Capital Improvement Plan (CIP) process prior to inclusion in the budget.
- Non-infrastructure programs, such as local resource development, water transfer, banking, and conservation, are not part of the CIP process. They move directly to the Board for approval as programs and become part of the budget.
- Some strategic infrastructure investments, such as Inland Feeder, Diamond Valley Lake, and Pure Water Southern California undergo a separate path forward for a longer development and evaluation process compared to a typical CIP project. These long-term infrastructure projects eventually are included in the CIP budget after Board approval.

While the current CIP process does involve a thorough review of each project, a risk evaluation, and a prioritization process to establish which projects will advance, there is also a need to ensure climate adaptation objectives are included in the CIP evaluation process as well as for those programs that do not

go through the CIP evaluation. Elements of current processes account for climate risks and vulnerabilities; however, there is not a consistent set of climate considerations applied throughout the District that address reliability and resilience needs. Through CAMP4W, the Task Force has developed a comprehensive assessment methodology for evaluating projects and programs and these same elements should be integrated into planning processes for consistency at each stage of a project or program’s development, where applicable. With many of these projects and programs extending over multiple years and funding cycles, there will be multiple iterations of evaluation and decision-making prior to a project or program’s final implementation, which supports the adaptive management process.

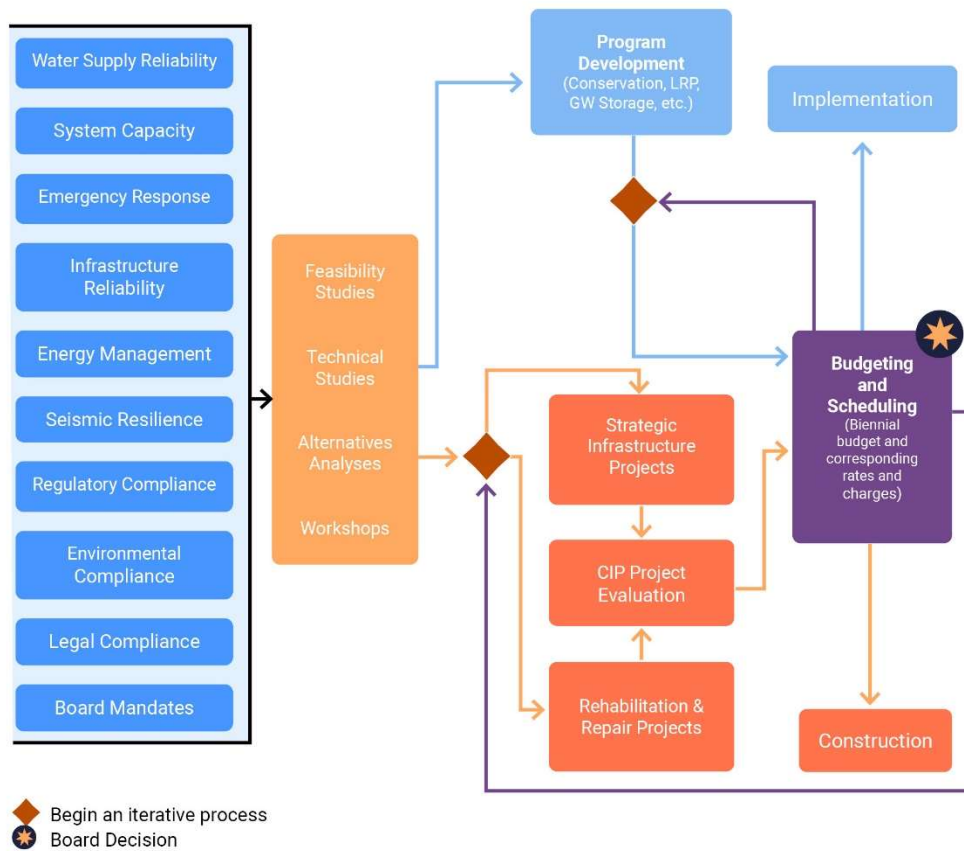


Figure 2. Current Project Development Process

3 Infusion of Climate Adaptation into Project and Program Identification and Evaluation

Climate impacts and vulnerabilities must be considered at each phase of project and program development and evaluation. This will ensure that project and program development is aligned with the CAMP4W evaluative criteria and assessment approach, which will work to streamline planning and implementation. Projects and programs that go beyond R&R will most likely be developed to fulfill a CAMP4W Time-Bound Target (e.g. core supply or storage need identified in the IRP Needs Assessment) or to address a specific climate vulnerability identified through Metropolitan’s ongoing Climate Vulnerability and Risk Assessment. New studies or existing processes), including the existing processes detailed in **Appendix A**, may help identify the specific investments needed to adapt to changing climate conditions and ensure long-term resilience (e.g., storage options, wildfire protections, energy sustainability, heat mitigation, and the compounded impacts from other infrastructure risks such as those from earthquakes).

Opportunities to Infuse Climate Considerations. Infusing climate adaptation into existing planning, evaluation, deliberation, and implementation processes is an efficient and effective method of institutionalizing climate adaptation. Specific actions to integrate climate adaptation into each phase could include:

- 1) Planning Phase:
 - a. Incorporate CAMP4W priorities, as reflected in the CAMP4W evaluative criteria, in updates to Metropolitan plans, guidelines, standards, and reports,
 - b. Add language to Requests for Proposals, if applicable, and project scoping documents to reflect climate adaptation priorities, and
 - c. Update data sets and analyses to reflect real-world conditions (as reported through Signposts) and the best available climate science.
- 2) Evaluation Phase:
 - a. Evaluate projects and programs meeting the CAMP4W threshold utilizing CAMP4W evaluative criteria, and
 - b. Modify CIP evaluative criteria to reflect CAMP4W priorities and utilize for all projects being evaluated
- 3) Deliberation Phase:
 - a. Support Board deliberation at each iteration, and
 - b. Prepare CAMP4W briefing sheets for Board actions
- 4) Implementation Phase:
 - a. Develop project and program implementation documents (specifications, provisions, plans, etc.) to advance CAMP4W priorities.

Projects and programs identified through existing and new planning processes will continue to be developed and evaluated through feasibility studies, technical studies, alternative analyses, and resource management evaluation as is currently done, but with additional climate adaptation and resilience considerations. The information gathered from these studies will be used to support the CAMP4W evaluation process both by providing data needed for the assessment process, and by providing additional information to better support Board deliberations regarding a project or program.

A Dual Path Approach to Project Evaluation. The CAMP4W process has identified a threshold for projects and programs to undergo a focused climate adaptation evaluation utilizing evaluative criteria defined through the CAMP4W Task Force. The goal of establishing this threshold is to allow staff and the Board to focus the additional detailed evaluations on strategic infrastructure investments and programs with the potential to have a much larger impact in helping to meet Metropolitan’s climate adaptation goals, as well as projects and programs specifically conceived to contribute toward achieving Time-Bound Targets. The threshold is summarized in

Figure 3. Projects that do not meet this threshold will still be evaluated as part of the CIP evaluation process, which will be modified to infuse additional climate considerations, as discussed in subsequent sections.

As shown in **Figure 4**, these two paths forward have unique components that culminate in Board deliberations and funding decisions. This section will provide a discussion on each of the two pathways and how climate adaptation will be infused into each.

Determining whether a project or program meets the conditions for CAMP4W evaluation

A “yes” answer to any of the following four questions means a project or program will be considered through the CAMP4W process.

- Is the project or program providing a new core supply, flex supply, or storage, or is the project supporting a new core supply, flex supply or storage project?
- Is the project or program addressing a known vulnerability to an asset(s) and does it involve significant improvements beyond what would be required to perform traditional R&R for that asset?
- Does the project or program work specifically towards significant contribution to a Time-Bound Target?
- Does the project or program exceed a certain flow-based threshold (CFS or AFY) or cost threshold (capital or O&M cost)?

Figure 3. CAMP4W Evaluation Threshold

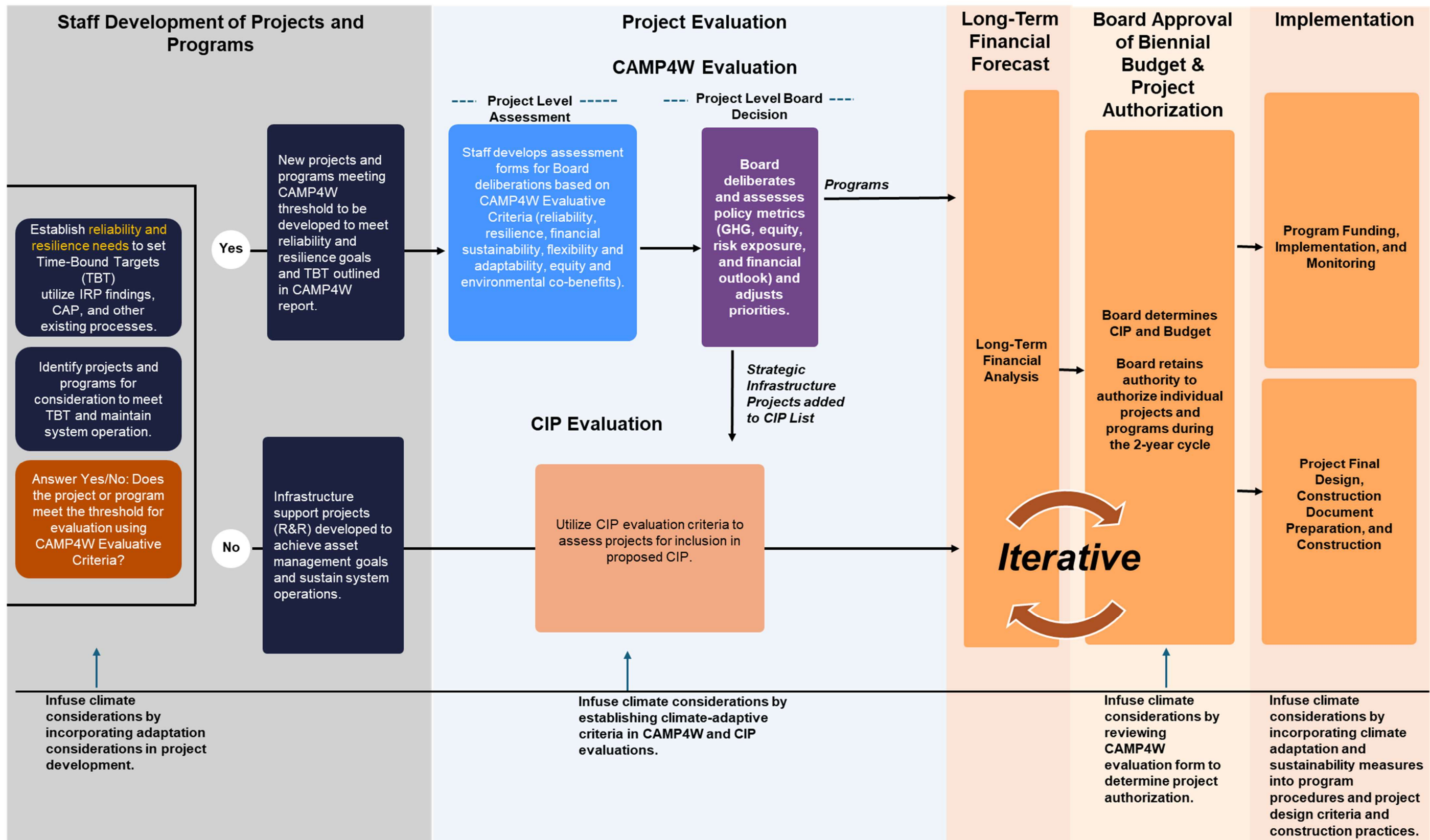


Figure 4. Infusion of Climate Adaptation in Project Identification and Evaluation

3.1 New Projects and Programs meeting CAMP4W Evaluation Threshold

Climate adaptation considerations are integrated into project and program evaluation through the development of the Climate Decision-Making Framework. Projects and programs that meet the CAMP4W threshold conditions (

Figure 3) will undergo the comprehensive assessment process using the CAMP4W Evaluative Criteria developed through the Task Force. This evaluation includes a series of assessment questions under the categories of reliability, resilience, financial sustainability, adaptability and flexibility, equity, and environmental co-benefits that incorporate climate adaptation into their attributes. The information gathered and assessed will be used to support Board deliberations on a project's or program's merits and alignment with the Boards climate adaptation goals. If consented by the Board, projects and programs will be considered in Metropolitan's long-term financial analysis and will eventually be incorporated into the CIP, where appropriate.

Depending on its developmental stage, projects or programs that are within the approved CIP and Biennial Budget would either be developed further to refine scope or advance for implementation. Importantly, all projects and programs listed in the recommended CAMP4W portfolio, regardless of their developmental stage, will continue to be a part of the long-term financial analysis and Board deliberation process that results in an approved biennial budget. This will establish which projects and programs from among all being considered will be funded for a particular budget cycle. In this way, the Board will deliberate and determine the timing and extent of funding for a project or program. Deliberation will be based on a number of factors including priority, urgency, need, and available funding. Upon approval of a budget, the Board still retains authority for determining which projects and programs in the budget are actually authorized to begin implementation. Due to the long-term nature of many projects and programs that will undergo this process, it is important to note that these efforts will extend across or repeat over multiple years and funding cycles. Steps include the following:

- Project / program identified (see studies that lead to project identification in **Appendix A**)
- Project / program evaluated using CAMP4W Evaluative Criteria
- Project / program receives Board approval to either continue its development or advance to CIP for implementation
- Project / program evaluated by staff to determine, considering all other Metropolitan needs and commitments, whether it will be proposed for funding in current or future budget cycle
- Board budget deliberations determine biennial funding allocations and timing of implementation (this could be an iterative process among staff and Board)
- Continued Board oversight since projects / programs included in the biennial budget still require Board authorization at various stages of implementation

**Note that the timing for the CAMP4W Evaluative Criteria evaluation process for a project or program could be completed outside of the CIP budgeting cycle so that it is ready when the next CIP budget cycle commences.*

Next Steps. Next steps involve continued refinement of the Evaluative Criteria and project and program assessment process, refinement of the Time-Bound Targets, and refinement of the Signposts. Next steps also include establishing the methodology for including climate adaptation considerations in the planning processes such as those summarized in **Appendix A**.

3.2 Existing Projects and Programs not Meeting the CAMP4W Threshold

Metropolitan performs regular R&R to its infrastructure as a normal course of business. Overtime, assets experience reduced functionality and reach the end of their useful lives, and Metropolitan reserves a budget in the CIP based on its asset management plan to ensure the functionality of existing infrastructure. Replacement needs are often established prior to infrastructure failure through management of assets and the diligence of engineering and operations staff. Some repairs are unexpected and occur due to impending failure or failure of an asset or system of assets.

With the impacts of climate change placing increasing stress on Metropolitan's facilities, additional planned and unexpected R&R projects are becoming necessary to maintain the system during and after extreme events. These projects as well as other programs needed to support Metropolitan are identified and evaluated for inclusion in the biennial CIP. The CAMP4W process has identified the need to infuse climate adaptation into the evaluation process for these projects to ensure climate adaptation planning is embedded in all investment decisions.

To support infusing climate adaptation into the development of these types of projects and programs, Metropolitan will develop guidelines, which may include policies, checklists, and criteria, that will lead to solutions that are more climate adaptive and resilient. This will bring climate adaptation to asset level improvements, where appropriate, to ensure Metropolitan is building for climate resilience.

Specific metrics are being developed and may address those categories discussed for integrating climate adaptation considerations into existing planning processes in Section 3. Staff will also consider including greenhouse gas emissions assessments, revised design standards to protect against fire and flood, and implementation of heat resilience standards to mitigate the impacts of extreme temperatures. This will help Metropolitan withstand the impacts of climate change and reduce Metropolitan's carbon and environmental footprint. Metropolitan is also considering additional guidelines to improve the long-term sustainability of its projects and facilities by considering the durability, life cycle costs, and resource efficiency of materials and construction practices. Long-term monitoring will also be an essential component to test the efficacy and impact of new and revised criteria.

Once these R&R projects are established, they will proceed to the existing CIP and budget evaluation process, as shown in **Figure 4**.

Next Steps. Key next steps will be to develop the list of assessment questions, guidelines, or policies that will become a part of the CIP evaluation process and the program evaluation process. This will be an ongoing effort as the CAMP4W process moves forward.

4 Conclusion and Next Steps

CAMP4W provides the roadmap of infrastructure and program development and implementation, allowing Metropolitan to take a holistic look at the problems that need to be solved. While iterative in nature through the adaptive management process, CAMP4W will provide a reasonable indication of what planned capital investments will achieve over time. This process will serve to:

- Reflect the values of Metropolitan and its Member Agencies
- Prioritize Metropolitan’s capital investments.
- Confront our new climate reality.
- Meet our Member Agency water demands (Reliability)
- Improve our ability to withstand and recover from disruptions (Resilience)
- Exemplify a fair, just, inclusive, and transparent process (Equitable)

Presented in **Figure 4** is a project delivery process directed by the Board deliberation and with climate adaptive measures infused into each stage of the process, including project identification, evaluation, deliberation, implementation, and the decision-making points. Projects and programs evaluated through the CAMP4W process will be evaluated at each decision point, from funding for initial planning efforts, through design, and construction or program implementation. In this way, Metropolitan can utilize the adaptive management process to decide at each decision point whether to continue to fund the project based on real world conditions (Signposts and Time-Bound Targets) and the feasibility of the project or program to meet needs while avoiding stranded assets.

Next Steps. The next steps in this process involve further refining the Climate Decision-Making Framework components, including the Signposts, Time-Bound Targets, and Evaluative Criteria both as it pertains to new investments and investments to maintain Metropolitan’s existing system. This involves infusion of climate adaptation considerations into existing processes, including the CIP evaluation process.

In addition to the next steps for the project identification and evaluation phases, which are documented in the previous sections of this memorandum, Metropolitan aims to develop guidelines to promote the use of sustainable materials and practices in project implementation. As an example, Metropolitan may require implementation-level sustainability measures for materials, construction practices, and monitoring requirements, which could be verified as part of the CIP evaluation process.

As Metropolitan refines these processes and the methodology for infusing climate adaptation into each phase of project and program development, Metropolitan will move towards meeting the goals of the Task Force and creating a reliable and resilient future water supply.

Appendix A

Existing Planning Processes for Project Identification

1 Historical System Reliability Strategy Planning

In 2007, Metropolitan developed the Integrated Area Study, which identified five processes that together contribute to the System Reliability Strategy, as presented in **Figure 1**. This was a collaborative process between Metropolitan and its Member Agencies.

The Water Supply Reliability component addresses Metropolitan's ability to supply water to meet Member Agency demands under all foreseeable hydrologic conditions. The System Capacity component addresses Metropolitan's ability to convey, treat, and distribute supplies to meet firm demands under peak conditions. The Infrastructure Reliability component addresses Metropolitan's ability to maintain facilities in readiness to ensure system deliveries. The System Flexibility component addresses Metropolitan's ability to respond to short-term changes in water supply, water demands, and water quality and meet Member Agency water demands during planned or unplanned facility outages. The Emergency Response component addresses Metropolitan's ability to respond quickly to unplanned outages to restore service.

By addressing each of the five reliability components, Metropolitan has developed a robust approach to ensure the overall system reliability for its service area. These have the potential to identify projects or programs that Metropolitan may implement that are resilient and sustainable, and that can address risks due to climate change. The following sections provide additional information on each of these processes.

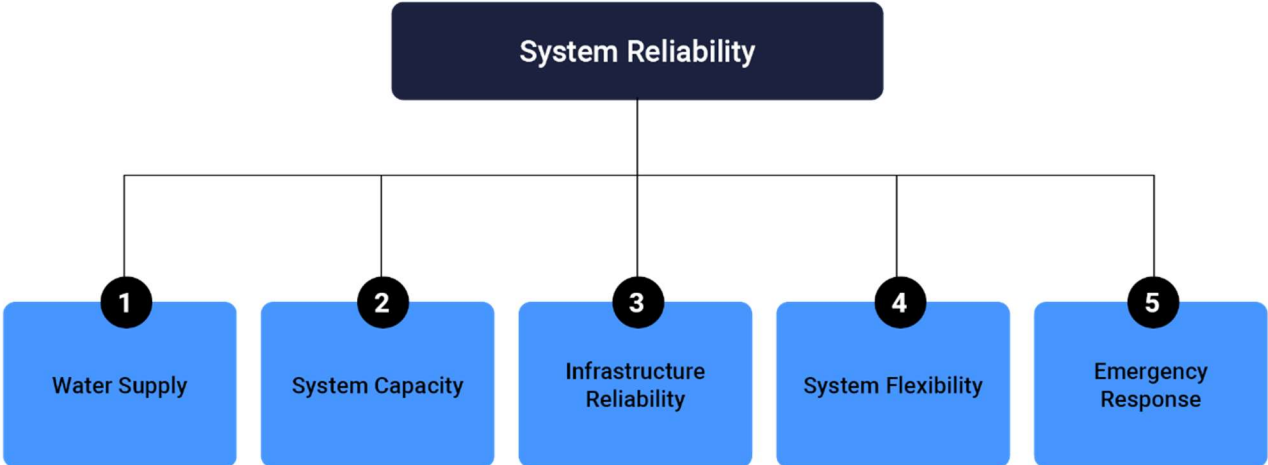
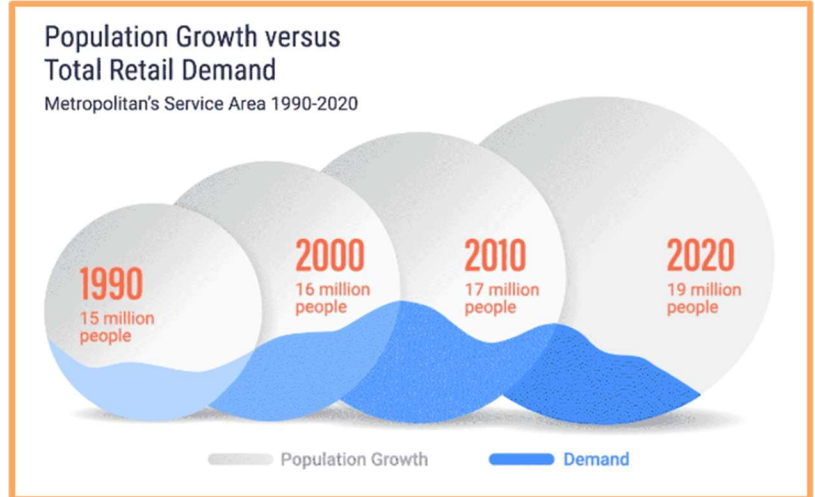


Figure 1. System Reliability Strategy

1.1 Water Supply Reliability

The **water supply reliability** component is intended to develop and maintain an adequate water supply portfolio to meet full-service retail demands under all foreseeable hydrologic conditions.

This component is the focal point of Metropolitan's Integrated Resources Plan (IRP) development process and is also reflected in the Urban Water Management Plan. The IRP assesses the changing conditions facing Southern California to better adapt to those changes. The IRP planning process resulted in the Board adopting IRPs in 1996, 2004, 2010, and 2015, with the most recent IRP being completed in 2020 and approved by the Board in 2022. The IRP lays the foundation for water supply reliability, establishes future water demand for the region, and establishes Metropolitan's water resource vision and strategy. The purpose of the water supply reliability planning process is to achieve reliability by maintaining the existing water supply, diversifying water portfolios, exploring local supply investments, and advancing conservation.



Example Project Identified through Water Supply Reliability Planning

Diamond Valley Lake is a key example of the results of Metropolitan's water supply reliability planning efforts. Diamond Valley Lake is a storage facility that nearly doubled Metropolitan's in-region surface storage while increasing emergency storage.



Diamond Valley Lake West Dam and Forebay

Other examples include the Local Resources Program (LRP), which provides Metropolitan funding to support Member Agency projects that reduce demand for imported water supplies and increase regional resilience.

Metropolitan's conservation programs also provide water supply reliability through turf removal and efficiency rebate programs.

1.2 System Capacity

The **system capacity** component addresses Metropolitan's ability to convey, treat and distribute supplies to meet firm demands under peak conditions.

The studies conducted under this component are designed to explore options for meeting IRP-identified capacity needs, including additional local facilities. In 2004, system capacity was evaluated through the System Overview Study. This study followed the 2004 IRP, which established the resource development needs and identified gaps. The System Overview Study was used to understand how the system can address supply gaps, evaluate facilities required to deliver imported water supply and evaluate policies and guidelines for infrastructure improvements. In 2007, the Integrated Area Study was completed to expand beyond the System Overview Study to review policies and guidelines for infrastructure improvements and develop portfolios of projects to meet the IRP-identified gaps at that time.

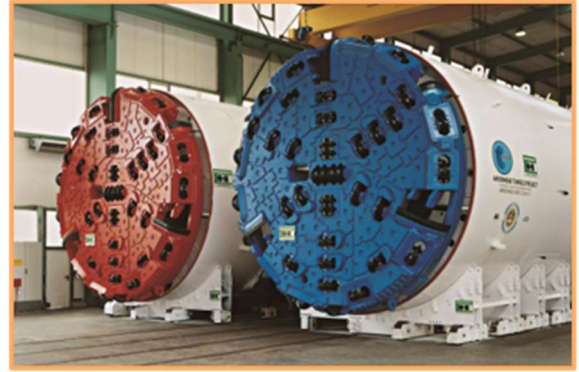
During the development of those studies, proposed projects were not evaluated based on whether they were Member Agency or Metropolitan projects but whether they achieved the desired objectives of collectively meeting community demands. The studies outlined facilities that must be developed to convey and distribute Metropolitan supplies to meet demands.

In addition, the robust hydraulic and hydrologic models of Metropolitan's entire system are used to identify and address constraints related to capacity in the system. Hydraulic and hydrologic modeling tools provide more dynamic and descriptive results, which have helped Metropolitan arrive at more efficient and cost-effective solutions to capacity concerns. Continued upgrades to the model are ongoing.

Example Project Identified through System Capacity Planning

The Inland Feeder is an example of a project identified through this process. Inland Feeder more than doubled Metropolitan's water delivery capacity from the State Water Project (SWP) east and is an essential second supply to multiple MWD reservoirs such as Diamond Valley Lake, Skinner, and Matthews, depending on how the system is operated.

The hydraulic model was also used to identify solutions to address State Water Project dependent areas and drought mitigation efforts.



Arrowhead Tunnels Boring Machine

1.3 Infrastructure Reliability

The Infrastructure Reliability component refers to the maintaining of facilities in a state of readiness to ensure system deliveries.

To ensure reliable service to the Member Agencies, the Integrated Operations Planning and Support Services Group, the Treatment and Water Quality Group, and the Conveyance and Distribution Group, collectively referred to as the Water System Operations Groups (WSO) Group, and the Engineering Services Group (ESG) work to maintain Metropolitan's infrastructure readiness. These groups have developed specialized programs to inspect, maintain, replace, and rehabilitate equipment as needed. These programs require collaboration between WSO and ESG to identify and prioritize needed projects and implement them in an economically and environmentally responsible manner.

WSO oversees the **Maintenance Management Program (MMP)**, which ensures reliable day-to-day performance of Metropolitan's infrastructure by implementing best practices in maintenance activities. This is accomplished through inspection and monitoring to assess the condition of facilities and equipment, identify needed repairs, or perform maintenance tasks.

WSO utilizes the **Computerized Maintenance Management System (CMMS)** to collect information to plan, schedule, and track the maintenance of Metropolitan's infrastructure and over 140,000 pieces of equipment. The information is used to evaluate the effectiveness of maintenance practices, revise maintenance strategies, meet regulatory reporting requirements, and investigate the root cause of systemic equipment problems.

Metropolitan's ESG oversees the Infrastructure Protection Plan (IPP). The goal of the IPP is to ensure reliable long-term performance of Metropolitan's infrastructure by conducting special condition assessments and vulnerability assessments, which involve:

- Special condition assessments: extensive evaluation of facilities beyond routine maintenance and monitoring activities. The assessments are conducted to identify needed R&R projects that can lead to long-term reliability programs.
- Vulnerability assessments: postulate hazards such as vehicle impact, flooding, fire, equipment failure, and earthquakes to identify their potential impacts on water delivery. The assessments look at both individual facilities and Metropolitan's system as a whole.

These efforts result in projects being identified that proceed to the CIP evaluation process.

Example Project Identified through Infrastructure Reliability Planning

CRA pump and discharge valve rehabilitation at Iron Mountain presents an example of a project identified through infrastructure reliability planning. In Iron Mountain, newly installed cranes were used to work on the CRA pumps and discharge valve rehabilitation work.

Examples of Metropolitan's reliability programs include:

- Treatment Plant Improvement Programs
- Colorado River Aqueduct Reliability Program
- Pipeline & Distribution System Reliability Programs
- Hydroelectric Power Plant Improvements Program
- Dam Rehabilitation and Safety Improvements Program
- Seismic Upgrade Program

Examples of the vulnerability assessments include:

- Treatment Plant Vulnerability Assessments
- Colorado River Aqueduct Vulnerability Assessment
- Distribution System Vulnerability Assessment
- Seismic Vulnerability Assessment

1.4 System Flexibility

The **System Flexibility** component considers Metropolitan's ability to respond to short-term changes in water supply, water demands, and water quality and the ability to meet Member Agency needs during planned or unplanned outages.

System flexibility has two components – operational flexibility and delivery flexibility:

- Operational flexibility is Metropolitan's ability to respond to short-term changes in water supply, water demands, and water quality.
- Delivery flexibility is the capacity to meet Member Agency needs during planned and unplanned outages.

Metropolitan's System Flexibility Study is used to assess the impacts of planned and unplanned outages as well as to evaluate how potential failures in the system could impact Metropolitan's ability to deliver water. The study uses modeling to evaluate the impacts of pipe breaks, for example, to identify how many service connections could have re-routed water and how many would not have an available backup alternative. Metropolitan frequently meets with Member Agencies to discuss the findings and evaluate potential solutions in the event that the modeled conditions were to occur.

Example Project Identified through System Flexibility Planning

An example of a system flexibility project includes the Inland Feeder/Lakeview Intertie. This project was created in 2015 in response to the 2014- 2015 drought. It enabled the delivery of water from Diamond Valley Lake to Mills Water Treatment Plant (WTP) and Lakeview Pipeline service connections. This project removed the Mills WTP service area from the SWP-dependent area. During low SWP allocation periods between May and December 2021, approximately 131,000 acre-ft of water was made available for agencies needing water.

The drought mitigation projects in the SWP-dependent areas, in some cases, were identified as flexible solutions.

1.5 Emergency Response

Emergency response is the ability to respond to unplanned outages and restore service as quickly as practical.

Emergency response is addressed through multiple plans, including but not limited to:

- Emergency Response Plan
- Business Continuity Plan
- Information Technology Disaster Recovery Plan
- Seismic Resilience Task Force
- Mutual aid agreements
- Prequalified emergency contractors
- Pandemic Action Plan

Metropolitan maintains an Emergency Response Plan that outlines the strategy to respond to emergencies. A Business Continuity Plan outlines strategies, procedures, personnel, and resources that will be used to allow Metropolitan to conduct its essential functions after an emergency or a disruption. An Information Technology (IT) Disaster Recovery Plan focuses on the restoration of Metropolitan's computer and network systems following a disruption in services. Additionally, Metropolitan periodically evaluates the

effectiveness and reliability of its Emergency Operations Center, Disaster Recovery Facilities, communication infrastructure, cyber security, fuel storage, and a variety of other systems. A Seismic Resilience Task Force focuses on ensuring Metropolitan is prepared for seismic events.

Metropolitan considers the development of Mutual Assistance Memoranda of Understanding (MOU) a vital piece of emergency planning. These MOUs would allow for an organization to provide assistance to other agencies and organizations in times of emergency if able to do so and outline procedures for receiving this assistance, provide for reimbursements of costs and expenses, and address indemnification issues. An executed MOU allows for expedited assistance after a seismic event. Metropolitan also encourages collaborative efforts amongst local and regional agencies through partnerships such as the Seismic Resilience Water Supply Task force collaborative effort between Metropolitan, DWR, and LADWP.

Maintaining a list of prequalified emergency contractors reduces the time to procure services in an emergency. A Pandemic Action Plan was developed in response to the Covid-19 pandemic and is in place in the event of a future pandemic.

Example Effort Identified Through Emergency Response Planning

Metropolitan owns and operates machining, fabrication and coating shops. These facilities are equipped to respond to two simultaneous pipeline breaks in the system. Frequently used materials such as steel plates and valves are stockpiled so that they are readily available in an emergency. Metropolitan also staffs its own construction crews and owns construction equipment (e.g. truck mounted generators, ventilations systems, portable pump systems, etc.) that can be quickly mobilized.

Metropolitan also conducts workshops and exercises regularly that simulate a major emergency event. In past years, Metropolitan has conducted over 50 emergency response exercises; many of the exercises were with Member Agencies and other critical utility partners such as Southern California Edison and the Department of Water Resources. Metropolitan is party to multiple mutual aid agreements that can be utilized in events that require additional resources beyond those maintained by Metropolitan.

Additionally, Metropolitan takes the security of its facilities seriously following an event, and has participated in exercises with emergency responders, the national guard, and the military in preparation for such an event.



Examples of preparedness in the event of a two-line break emergency:

- **Heavy tracking equipment for immediate mobilization**
- **Ensuring shop capacity**
- **Maintaining inventory of structural repair resources**

2 Additional Processes Developed following the System Reliability Strategy

Since 2007, multiple programs have been created and implemented, using the System Reliability Strategy as a general framework for achieving overall reliability goals. These include the following:

- Energy Management Policy (2010) / Energy Sustainability Plan (2020)
- Earthquakes – Seismic Resilience Strategy (2018)
- Aging Infrastructure – Asset Management Program (2019)
- Water Quality – WQ Event Response Guidelines (2023)
- Pandemics – Pandemic Action Plan (2022)
- Drought – SWPDA Drought Mitigation Actions (2023)
- Climate Change – Climate Vulnerability and Risk Assessment (2024)
- Resilience – Strategic Infrastructure Resilience Plan (2024 – 2025)

2.1 Energy Management / Energy Sustainability Plan

The development of economically responsible energy projects is something Metropolitan is actively seeking to incorporate. Solar projects and battery projects are gradually being implemented into the system, with the goal of moving Metropolitan towards energy independence. Included in this process was the development of the Energy Policy Principles and the Energy Management and Reliability Study.

Energy Policy Principles (2008)

Goals of the 2008 Energy Policy Principles include:

- Protect Metropolitan's investment in long-term renewable power resources such as the Hoover and Parker Dams' power plants.
- Develop economically responsible renewable energy projects.
- Promote energy conservation through water conservation.
- Promote effective and equitable legislation and regulations regarding energy-related climate change and sustainability issues.

Energy Management and Reliability Study (EMRS) (2010)

Goals of the 2010 Energy Management and Reliability study include:

- Adoption of Energy Management Policies (2010)
- Contain costs and reduce exposure to energy price volatility.
- Increase operational reliability by providing system redundancy.
- Provide a revenue stream to offset energy costs.
- Move Metropolitan toward energy independence.

2.2 Seismic Resilience Strategy

The Seismic Resilience Strategy is presented to the Board annually to provide a verbal update, with a written report delivered every five years, with the next to be delivered in 2025. This effort includes the components in **Figure 2** which comprise Metropolitan's Seismic Resilience Strategy, developed through a structured program that identifies projects that increase the seismic resilience of Metropolitan.



Figure 2. Seismic Resilience Strategy

Impacts to Metropolitan's infrastructure, such as the risks posed by seismic events, have the potential to cause significant disruptions, to which Metropolitan must be prepared to respond. The Puente Hills Thrust

Fault and the Newport Inglewood Fault have the potential to cause major damage to our local water systems. Additionally, there are four aqueducts that cross the Southern San Andreas earthquake fault: the east and west branches of the State Water Project, the City of Los Angeles' Los Angeles Aqueduct, and Metropolitan's Colorado River aqueduct. Each presents a vulnerability to Metropolitan's supply reliability were damages to occur. More distant but also potentially significant is the potential damage to the levies within the Bay-Delta if there is a major earthquake in the Bay-Delta region in Northern California because of the disruption that would cause to the State Water Project supplies as they move through the Delta. This disruption would not only be immediate but there would be potential long-term impacts on the water quality caused by seawater intrusion.

Within Metropolitan's service area, seismic vulnerabilities include potential damage to individual facilities and pipelines and tunnels. To reduce the risk of damage and service interruptions from earthquakes, for over thirty years Metropolitan has worked to strengthen its facilities and develop a robust and collaborative seismic resilience strategy that has several elements, including:

- Assess the structural adequacy of all facilities.
- Maintain capacity to perform rapid repairs, including support to Member Agencies
- Identify vulnerabilities in pipelines and aqueducts for areas vulnerable to liquefaction or ground deformation.
- Evaluate with Member Agencies the need for interconnections, backup supplies, or local storage.
- Incorporate seismic resilience into the design of all new facilities and retrofits, including design to the latest codes.

2.3 Asset Management Program

Asset management is a systematic and comprehensive lifecycle approach to managing infrastructure assets through integrated and effective business processes to maximize the value of each asset while balancing costs and risks to meet service demands in an economically and environmentally responsible manner. Metropolitan's asset management strategy is defined in the Strategic Asset Management Plan (SAMP) published in 2021.

The SAMP was designed to provide guidance on how to enhance infrastructure reliability by managing risk and while developing staff in asset management processes. It provides the framework for developing tactical plans for managing Metropolitan's infrastructure and other assets to determine when assets will be refurbished or replaced to deliver a high standard of service to the Member Agencies. Currently, the plan does the following:

- Outlines the strategy and objectives for managing Metropolitan's physical assets effectively and
- Ensures that assets are managed in a way that supports Metropolitan's goals.

Metropolitan will continue developing and improving the asset management strategy into the future. Key outcomes of the SAMP are revisions to Metropolitan's written specifications (to include requirements to collect data from every contractor based on a lifecycle analysis) and a refined CIP prioritization based on standard asset risk criteria to allow for identification of priority projects.

2.4 Water Quality Response Guidelines

Metropolitan first created a compilation of Water Quality Action Response Guidelines (Guidelines) in 1989. The guidelines establish procedures for staff to follow when a water treatment plant does not comply with Metropolitan's established water quality goals. These guidelines were developed to ensure compliance with applicable state and federal drinking water regulations.

In addition, these goals allow a sufficient margin of safety and time to implement corrective actions prior to the required notification to the Division of Drinking Water (DDW) and/or Metropolitan's member agencies. Metropolitan's primary goal has always been to always maintain 100 percent compliance with drinking water regulatory requirements. Over the years, these goals have evolved to include water quality goals and action level response guidelines for the water treatment plants, distribution system, source water reservoirs, quagga mussel control program, and desert domestic water supply systems.

The Guidelines provide detailed action levels for Water Treatment Plants, the Distribution System, Source Water, and the Desert Domestic Water System. An action level is a concentration of a substance or water quality parameter that, if exceeded, triggers operational changes, increased monitoring and sampling, or other requirements by staff. The Water Quality Action Response Guidelines contain target water quality ranges or goals for these substances and parameters. Water quality ranges above or below these goals are categorized as Action Level 1 (just outside of normal range) or Action Level 2 (a more serious issue). The Guidelines summarize the target and action level ranges currently used by Metropolitan and indicate the minimum responses that staff are required to follow.

2.5 Pandemic Action Plan

The focus of the Pandemic Action Plan is to prepare Metropolitan to respond to an infectious disease outbreak or pandemic that affects employees while maintaining operational continuity. It was published on March 11, 2020, immediately before the effects of the COVID-19 pandemic started to cause serious disruptions to life in Southern California. The plan describes the actions that can be taken to coordinate and synchronize a district-wide response to such an event. This plan assumes that local health officials will provide guidance and in some cases directives on the actions that Metropolitan will need to take to mitigate the spread of the illness.

The plan provides background on possible types of illnesses that may be encountered, key coordinating agencies, and a concept of operations describing Metropolitan's planned response actions. The following objectives drive the preparedness, response, and recovery actions taken by Metropolitan in the event of a wide-spread illness which may threaten Metropolitan employees and/or its operations:

- Prepare for and respond to wide-spread illness and protect the health and safety of employees.
- Identify wide-spread illness preparedness, mitigation, and associated triggers for response.
- Ensure continuity of critical operations and business activities during a multi-week period of random employee absenteeism of up to 40%.
- Ensure a safe, healthful, and supportive workplace and reduce employee fears of coming to work.
- Implement an effective communications strategy during advisories or crises, including two-way communications with stakeholders where appropriate.

2.6 State Water Project Dependent Area Drought Mitigation Actions

Extreme drought in northern California between 2020 and 2022 resulted in a historic low cumulative three-year allocation from the State Water Project. The low allocation resulted in mandatory conservation for those areas highly dependent on SWP supplies. To mitigate a potential recurrence of the drought and its impacts, a plan was developed to address the supply reliability of the SWP dependent areas and develop a Drought Mitigation Action Portfolio. The results of these efforts are presented in **Figure 3**.

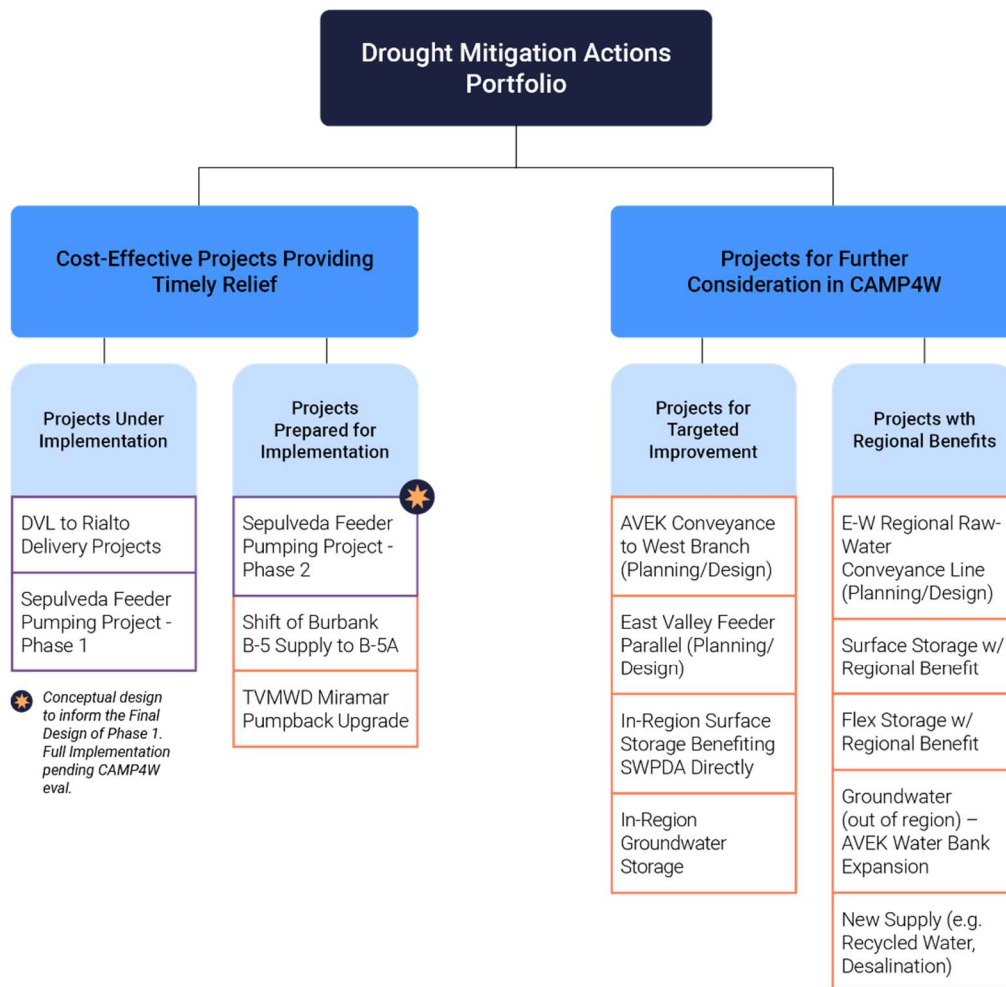


Figure 3. SWPDA Drought Mitigation Actions

2.7 Climate Vulnerability and Risk Assessment

The Climate Vulnerability and Risk Assessment (CVRA) was completed in 2024 and presents an evaluation of the climate risks Metropolitan faces across a range of hazards. The CVRA serves to:

- Establish the framework for an adaptive management process in the face of a changing climate.
- Identifies how Metropolitan is currently managing risk associated with climate change.
- Provide structural recommendations that will enable Metropolitan to better adapt.

The CVRA includes the following recommendations:

- Characterization of a broad range of climate hazards
- Assessment of vulnerabilities to infrastructure, operations, workforce, and business model
- Development of climate adaptation actions that can build Metropolitan's resilience.

2.8 Strategic Infrastructure Resilience Plan (2024 – 2025)

Metropolitan's Strategic Infrastructure Resilience Plan (SIRP) is designed to support maintaining a robust conveyance and distribution system capable of absorbing shocks while continuing to operate and fully restore any potential service losses as quickly as possible. The plan addresses Metropolitan's ability to manage an event or risk as it unfolds in real-time. The plan covers the water and electric power systems owned and operated by Metropolitan. The SIRP is a framework that can be used for strategic planning over the next decade or more. The SIRP will be used to enhance and expand Metropolitan's organization-wide resilience program. The SIRP will be updated as necessary as the organization-wide resilience program is implemented and with more knowledge gained from resilience lessons learned over time. The SIRP addresses multi-hazard and is multidisciplinary. It provides a comprehensive and systematic approach to addressing the need to maintain services and restore any lost or reduced services to member agencies in a timely manner following an event. The timeliness of service restoration focuses on the member agencies' public health and safety needs and the regional socioeconomics related to water use. The SIRP looks at Metropolitan's dependencies on other systems and the interactions needed to reduce impacts from dependent systems.

By addressing resilience, Metropolitan will have the ability to react to events including, but not limited to:

- Drought
- Seismic Activity
- Liquefaction
- Erosion/Scour/Flooding
- Wildfires
- Wind & Wind Blown Projectiles
- Climate Change
- Vehicle Impacts
- 3rd Party Construction Impacts
- Vandalism
- Terrorism
- Hydraulic Surge
- Corrosion
- Equipment Malfunction
- Cyber Security
- Pandemic

2.9 Local Hazard Mitigation Plan

The Local Hazard Mitigation Plan (LHMP) will assess Metropolitan’s exposure to natural hazards including earthquake, wildfire, landslide, flood, severe weather, drought, and climate change. The plan sets goals for hazard mitigation and identifies and prioritizes studies and projects that will move the organization toward those goals. The plan requires approval by the Federal Emergency Management Agency (FEMA) as well as Metropolitan’s Board of Directors for finalization and adoption. Completion of the LHMP would qualify Metropolitan for federal grant funding programs to offset the costs of hazard mitigation studies and projects identified in the plan.

The LHMP is required to undergo a formal update and approval every five years. However, an approved plan can be amended at any time to include new studies and projects that have been identified without requiring additional approval. This process complements the adaptive decision-making framework of the CAMP4W process, and the projects identified in the LHMP through a risk-based evaluation can inform the CAMP4W as part of its portfolio.