One Water LA

environment LASANITATION CITY OF LOS ANGELES

LA DWP Los Angeles Department of Water & Power

CITY OF LOS ANGELES FOUNDED 1781

ONE WATER LA 2040 PLAN

EXECUTIVE SUMMARY

FINAL DRAFT | APRIL 2018

Eric Garcetti

Mayor of Los Angeles

"Here in Los Angeles, we've responded to the ill effects of climate change and frequent droughts by making conservation a way of life. Whether in the midst of a dry spell or an El Niño season, we have no choice but to change the way we think about water, because we know that every drop counts. The One Water LA 2040 Plan devises permanent measures and resources that help the City and Angelenos more efficiently and effectively save our most precious resource."

Enrique Zaldivar

LA Sanitation Director

"Managing our water resources as though every drop matters is the new normal for the City of Los Angeles as we experience far more extended dry spells than wet seasons. The City's One Water LA 2040 Plan compellingly details the integrated approach of using technology to predict where our infrastructure may be most vulnerable in responding to challenges associated with climate change and natural causes, as well as population swings that often determine our overall consumption and wastewater and stormwater flows to our system.

No utility or municipality could function properly without the unconditional dedication of all of the engineers, operators,and maintenance professionals who have collaborated with academia, regulators, City departments, environmental organizations, and the community in establishing this foundation of smart thinking in the 2040 Plan. I look forward to the strategic implementation of the policies and projects that will propel LA Sanitation to the next generation of infrastructure re-newal and re-engineering."

Richard Harasick

Los Angeles Department of Water and Power
Senior Asst. General Manager, Water System

"The One Water LA Plan has opened up tangible opportunities for collaboration to address the City's water challenges. By better understanding the connectivity of our operations and programs, jointly targeting multiple goals in stormwater management and collection, and aggressively creating new recycled water resources to offset imported water, we are approaching the issue of water in Los Angeles with a common mindset. Along with the entire City family, we are doing our collective best to consider every opportunity to further develop local water resources, improve drainage and flood protection, and protect downstream environments from pollution off our streets."

All Water is One Water

CITY OF LOS ANGELES

ONE WATER LA 2040 PLAN

Executive Summary

FINAL DRAFT • APRIL 2018

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IN COLLABORATION WITH:

SUMMARY OF ONE WATER LA

The One Water LA 2040 Plan (Plan) takes a holistic and collaborative approach to consider all of the City's water resources from surface water, groundwater, potable water, wastewater, recycled water, dry-weather runoff, and stormwater as "One Water." Also, the Plan identifies multi-departmental and multi-agency integration opportunities to manage water in a more efficient, cost effective, and sustainable manner. The Plan represents the City's continued and improved commitment to proactively manage all its water resources and implement innovative solutions, driven by the Sustainable City pLAn. The Plan will help guide strategic decisions for integrated water projects, programs, and policies within the City.

PLAN ORGANIZATION

The One Water LA 2040 Plan consists of ten volumes. Please refer to the One Water LA website (www.onewaterla.org) to view Volumes 1-9.

- Executive Summary (this document)
- VOLUME 1 - Summary Report
- VOLUME 2 - Wastewater Facilities Plan
- VOLUME 3 - Stormwater & Urban Runoff Facilities Plan
- VOLUME 4 - LA River Flow Study
- VOLUME 5 - Integration Opportunities Analysis Details
- VOLUME 6 - Climate Risk & Resilience Assessment for Wastewater & Stormwater Infrastructure
- VOLUME 7 - Implementation Strategy Supporting Documents
- VOLUME 8 - Technical Support Materials
- VOLUME 9 - Stakeholder Engagement Materials
- VOLUME 10 - Programmatic Environmental Impact Report

CITY OF LOS ANGELES

ONE WATER LA 2040 PLAN – EXECUTIVE SUMMARY

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ES.1 PLAN PURPOSE

The purpose of the One Water LA 2040 Plan (Plan) is to increase sustainable water management for the City of Los Angeles (City). The City launched One Water LA with two primary goals:

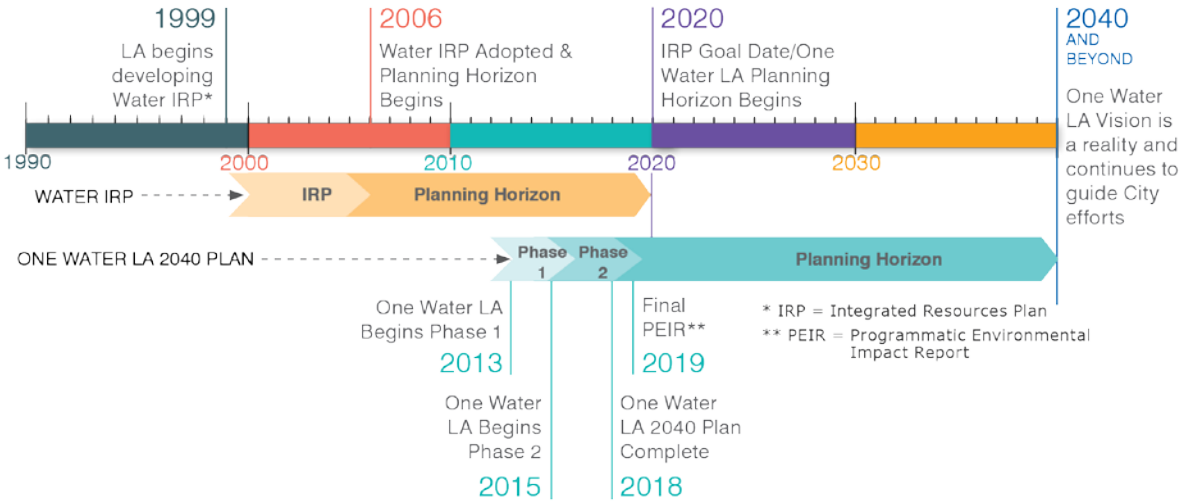
1. Develop a vision and implementation strategy to more sustainably and cost-effectively manage water.
2. Identify ways for City departments and regional agencies to integrate their water management strategies.

Los Angeles Sanitation (LASAN) and the Los Angeles Department of Water and Power (LADWP) led the Plan's development, partnering with other City departments, regional agencies, academia, the business community, and other stakeholders.

The Plan provides a comprehensive strategy for managing water in a more integrated, collaborative, and sustainable way through new project, program, and policy opportunities. The Implementation Strategy provides a roadmap to make the One Water LA Vision a reality. Additional water projects, programs, or policies that are the sole responsibility of one agency, including LADWP's aqueduct or groundwater remediation project, are contained in each agency's appropriate plans.

ES.2 PLAN BACKGROUND

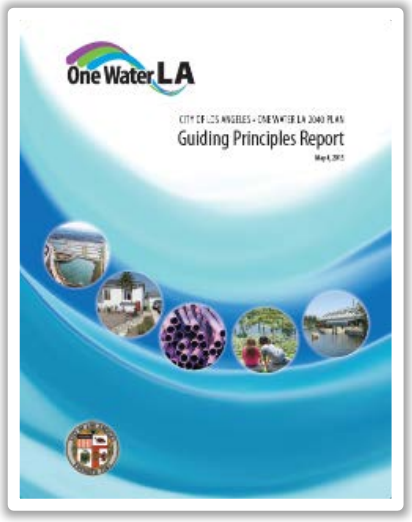
In 1999, the City started preparing its first Water Integrated Resources Plan (Water IRP). In 2006, the Water IRP was completed with a planning horizon of year 2020. Since then, the City's water situation has changed. Some of the most prominent changes have been triggered by the severe statewide drought that began in 2012. Today, it faces sustainability challenges, new stormwater quality regulations, and the threats of climate change. In response to these challenges and to help achieve water sustainability, the City initiated the Plan, which builds on the success of the Water IRP and extends the planning horizon to year 2040.



ES.3 ONE WATER LA VISION, OBJECTIVES, AND GUIDING PRINCIPLES

The One Water LA Vision Statement was developed with extensive input from Stakeholders and the One Water LA Advisory Group to guide the One Water LA 2040 Plan development through the planning horizon to the year 2040. The Vision Statement defines the One Water LA Plan's overall purpose and describes the City's aspirations, in broad terms, for accomplishing it, setting the course for future decisions and actions. The One Water LA Vision Statement is as follows:

> ***One Water LA is a collaborative approach to develop an integrated framework for managing the City's water resources, watersheds, and water facilities in an environmentally, economically, and socially beneficial manner.***
>
> ***One Water LA will lead to smarter land use practices, healthier watersheds, greater reliability of our water and wastewater systems, increased efficiency and operation of our utilities, enhanced livable communities, resilience against climate change, and protection of public health.***



Collaborating with the Steering Committee, Advisory Group, and Stakeholders (described in ES.4.3), the City developed the One Water LA Guiding Principles Report, which defines 7 Objectives and 38 Guiding Principles. The Guiding Principles Report is included in Volume 9 of the Plan. The seven objectives of One Water LA are as follows:

1. Integrate management of water resources and policies by increasing coordination and cooperation between City departments, partners, and stakeholders.
2. Balance environmental, economic, and societal goals by implementing affordable and equitable projects and programs that provide multiple benefits to all communities.
3. Improve health of local watersheds by reducing impervious cover, restoring ecosystems, decreasing pollutants in our waterways, and mitigating local flood impacts.
4. Improve local water supply reliability by increasing capture of stormwater, conserving potable water, and expanding water reuse.
5. Implement, monitor, and maintain a reliable wastewater system that safely conveys, treats, and reuses wastewater, while also reducing sewer overflows and odors.
6. Increase climate resilience by planning for climate change mitigation and adaptation strategies in all City actions.
7. Increase community awareness and advocacy for sustainable water by active engagement, public outreach, and education.

Each Objective is supported by multiple Guiding Principles, which provide specific direction on the desired actions to take to accomplish the Objectives. A complete list of Guiding Principles is provided in Chapter 1.

ES.4 PLAN ELEMENTS AND DEVELOPMENT PROCESS

The One Water LA 2040 Plan was developed in two phases and led by dedicated representatives from both LASAN and LADWP. It was shaped by input received from other City departments, regional agencies, the advisory group, and a large stakeholder group, representing various interests.

The One Water LA 2040 Plan consists of many elements that form the foundation of the Plan Recommendations and Implementation Strategy

Phase 1 defined the Vision, Objectives, and Guiding Principles through an extensive stakeholder-driven process documented in the Guiding Principles Report.

Phase 2 consisted of various elements that combined the findings of strategic planning, analyses, and studies to develop the One Water LA 2040 Plan.

ES.4.1 Leveraging Existing Planning Efforts

One Water LA connects plans, ideas, and people to create more integrated and fiscally responsible water management solutions. By looking at the entire water picture, the City and its partners can create more efficient projects that maximize resources and minimize cost. The City is committed to pursuing projects with multiple benefits, combining financial resources, and identifying funding opportunities to make One Water LA a reality.

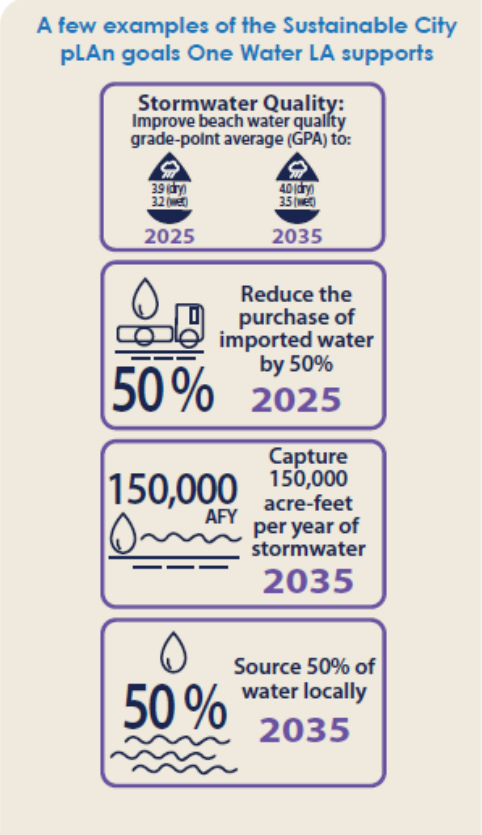
One Water LA integrates information developed for numerous existing plans and studies, such as:

- 2006 Water Integrated Resources Plan (IRP).
- 2015 Urban Water Management Plan (UWMP).
- 2015 Stormwater Capture Master Plan (SCMP).
- 2015 Enhanced Watershed Management Plans (EWMP) representing each of LA's five watersheds.

One Water LA leverages many existing plans and studies

- 2015 LA Basin Stormwater Conservation Study.
- 2015 Sustainable City pLAn.

Chapter 1describes these plans and studies in greater detail. Information and elements from existing plans that present opportunities for integration were incorporated.



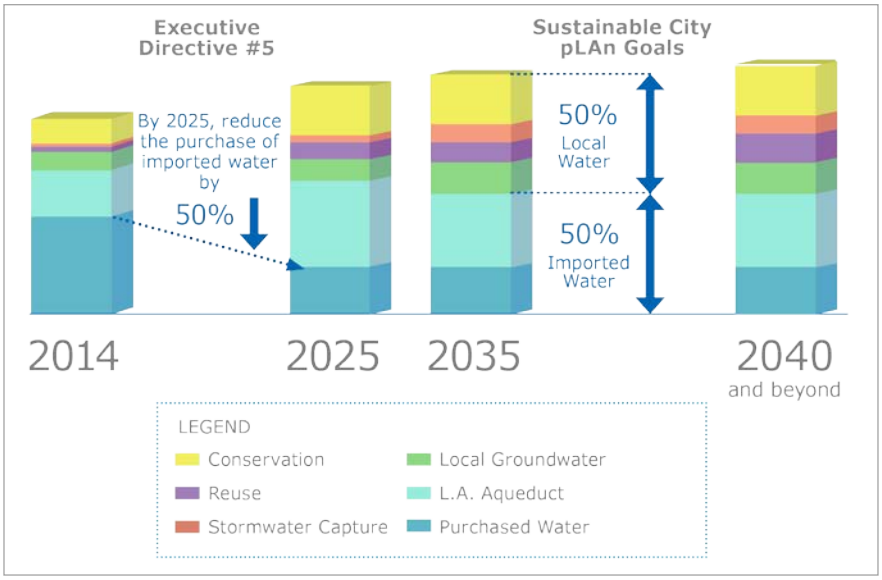
ES.4.2 Water Management Goals

LADWP's 2015 UWMP is the City's long-term water resource plan for developing and managing the City's water supply resources. The UWMP evaluated four key areas to improve local water supply reliability and to reduce the City's reliance on imported water. Specifically, the UWMP seeks to increase local groundwater, recycled water, and stormwater, focusing on supplementing them with increased water conservation programs throughout the City.

The Plan supports the UWMP by identifying opportunities for collaboration to create integrated water management that helps achieve these goals.

The future water supply strategies established in LADWP's 2015 UWMP are designed to meet the Sustainable City pLAn goals, which are summarized in the graphic below.

LADWP's 2015 UWMP provides a strategy for meeting the local water supply goals under normal year conditions and most dry year conditions. The One Water LA 2040 Plan evaluated numerous new project ideas to support meeting these goals during prolonged dry year conditions. To meet stormwater capture and quality goals, a combination of regional and distributed stormwater projects, programs, and policies are recommended.



To support the Sustainable City pLAn water supply reliability and stormwater capture and quality goals, the One Water LA 2040 Plan recommends additional projects requiring partnerships among multiple City departments and regional agencies.

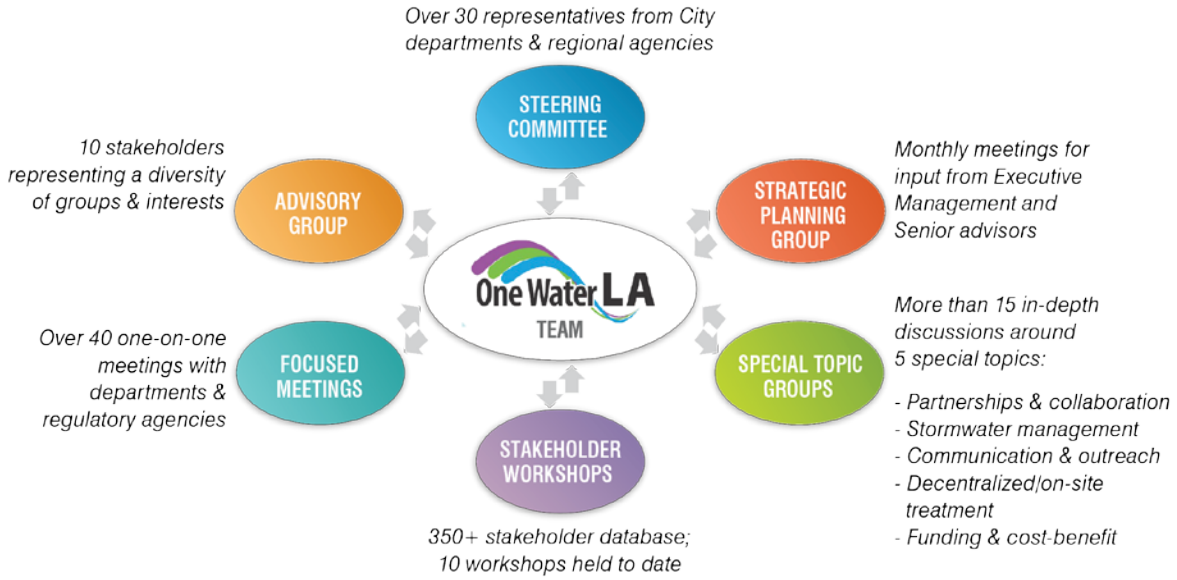
ES.4.3 Collaboration and Stakeholder Engagement

One of the Plan's unique elements is the extensive cooperation and collaboration at many different levels within the City family. To open channels of communication and build collaboration, all departments engaged in water management were involved in the planning process.

Development of the One Water LA 2040 Plan involves extensive cooperation and engagement from a variety of groups and committees.

The One Water LA 2040 Plan is more than just a planning document – it's the product of many people throughout the city working together to change the way water is managed. By bringing together all parties in the planning stage, a collaborative process was developed that will continue through the Plan's implementation and beyond.

To integrate the management of water-related projects, programs, and policies, One Water LA established a variety of groups and engagement activities to increase coordination and cooperation among City departments, partners, and stakeholders. The various engagement groups are described in more detail below.



One Water LA Steering Committee: The steering committee represents 14 City departments and 6 regional agencies shown in the graphic below that collaborated to:

- Develop the Vision Statement, Objectives, and Guiding Principles with stakeholders.
- Identify water-related project integration opportunities.
- Develop policies to integrate and streamline water-related resource management.

Inter-departmental/agency focus meetings: LASAN and LADWP staff met with individual City departments and regional agencies to discuss potential water-related integration opportunities.

Stakeholders participated in roundtable discussions on future project opportunities and evaluation criteria at a World Café-style stakeholder workshop.

One Water LA Stakeholder Group:
The stakeholder group consists of more than 500 stakeholders representing over 200 organizations, including neighborhood councils, non-profits, business and homeowner associations, academia, and others throughout the greater Los Angeles area. Approximately 250 stakeholders actively participate in workshops and meetings.

Stakeholder Advisory Group:
The Advisory Group represents the larger One Water LA stakeholder group in terms of interests, City geography, and past participation in other water-related stakeholder processes. With a smaller, ten-member group, interaction was more frequent and involved more in-depth discussions to guide the Plan's development.

Special Topic Groups:
Five Special Topic Groups were established to facilitate in-depth discussion with a variety of stakeholders for the following key Plan components:

- Stormwater and Runoff Management.
- Funding and Cost-Benefit Analysis.
- Outreach and Communication.
- Partnership, Collaboration, and Innovation.
- Decentralized/On-Site Treatment.

Stakeholders participating in the Funding Special Topic Group gathered and compared funding ideas incorporated into the One Water LA Plan.

The Plan's stakeholder engagement involved various meetings, workshops, and outreach activities, which are briefly listed and described in Chapter 2, while, future implementation committees and continued stakeholder engagement efforts are described in Chapter 10. Meeting materials and workshop presentations are included in Volume 9.

LASAN hosted its first annual Earth Day LA on April 23, 2016 to share the importance of water and zero waste.

ES.5 PLAN OUTCOMES

The Plan provides a strategic vision and a collaborative approach to integrated water management through year 2040. Key outcomes include:

- Identification of current and future water-related integration opportunities among City departments, regional agencies, and other stakeholders.
- Identification of strategies and concept options to maximize potable reuse opportunities. Concept options are proposed projects that have been evaluated at the conceptual level and will be considered further in the future.
- Identification of strategies and projects to maximize stormwater capture that consider water quality, flood mitigation, and water supply benefits.
- Policy and program recommendations that help achieve the One Water LA Vision and Objectives.
- Identification of funding sources and mechanisms to further implement the projects, programs, and policies recommended in the Plan.
- Increased stakeholder awareness about the City's water challenges, ongoing collaboration activities, and long-term water management strategies to become a more water-resilient city.
- Increased collaboration between various City departments and regional agencies on water-related projects, programs, and policies due to strengthened and new relationships developed during the One Water LA planning process.

ES.5.1 Integrated Urban Water Cycle

Within the One Water paradigm, all of the City's water sources are linked through the urban water cycle. In the urban water cycle, rain becomes stormwater, which infiltrates into the groundwater basin or becomes urban runoff. Groundwater is pumped for use as potable water. Once water is used in homes and businesses, it is discharged as wastewater, before being treated and reused as recycled water or discharged to the ocean. The Plan identifies projects, programs, and policies to enhance the City's urban water cycle to increase water recycling and stormwater capture opportunities and minimize losses to the ocean while reducing reliance on purchased imported water.

The City has a vision for its urban water cycle that maximizes opportunities to achieve a sustainable One Water future for all Angelenos, as shown on Figure ES.1. Key long-term initiatives to optimize and enhance the urban water cycle include:

- Increasing stormwater capture and recharge in the aquifers through distributed green infrastructure projects and programs.
- Increasing stormwater capture, treatment, and reuse at parcel, neighborhood, sub-watershed, and regional levels.
- Increasing use of the groundwater basins for storage through new recharge projects.
- Expanding recycled water for irrigation, commercial, industrial, and groundwater recharge uses.
- Balancing the City's water supply needs with environmental needs, such as preserving the LA River ecosystem.
- Exploring potential potable reuse options using advanced treated wastewater at each of the City's four water reclamation plants (WRPs).
- Exploring potential potable reuse opportunities outside of the San Fernando Groundwater Basin through inter-agency partnerships.

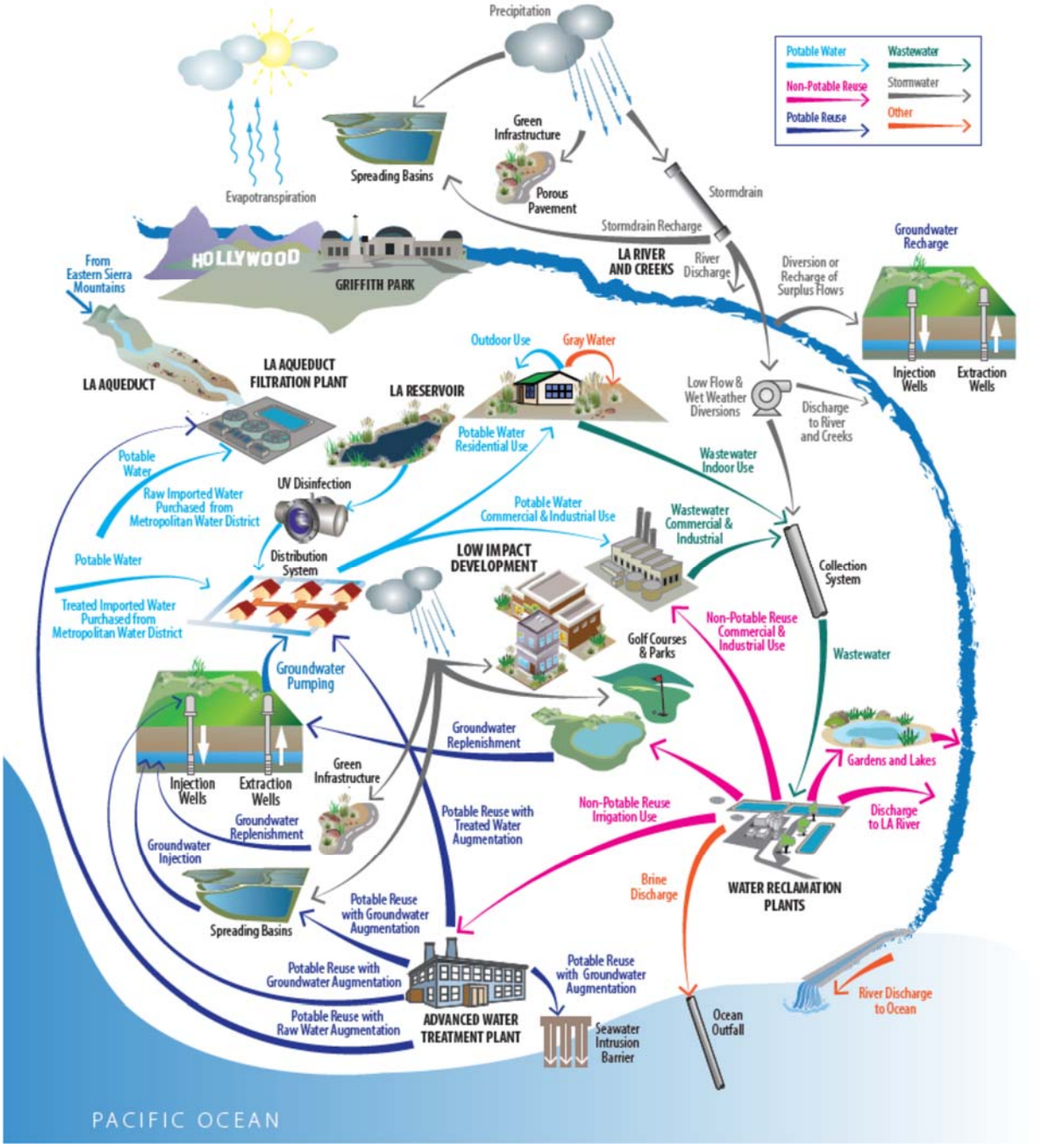


Figure ES.1 - Los Angeles' Future Smart Urban Water Cycle

One Water LA 2040 Plan
Summary Report

ES.5.2 Integration Outcomes and Momentum

The One Water LA team has discussed the City's challenges in water integration, project opportunities, and potential partnerships with City departments and regional agencies to establish a better understanding of how water connects projects, programs, and policies. Discussions were, and continue to be held on how water interfaces with each group's projects and programs and how their studies and designs could manage water differently. Through these interactions, many One Water LA partners have had moments of enlightenment, realizing that water is not ancillary, but an integral component of their designs and practices. City departments and regional agencies immediately started implementing planning, pre-design, and design approaches in their policies, projects, and programs. The key successes and outcomes from the One Water LA team's ongoing participation in multiple efforts are summarized in Chapter 1. Specific changes in business practices demonstrate the impact of the One Water LA team's collaborative efforts.

ES.5.3 Planning for a more Resilient Future

LADWP's 2015 Urban Water Management Plan (UWMP) already addresses multiple new strategies in the future smart urban water cycle. The Plan identifies additional integration opportunities that could be implemented by year 2040 and beyond.

The One Water LA 2040 Plan recommendations focus primarily on water-related projects and programs that require multi-departmental and multi-agency coordination and collaboration. The recommendations consist of select projects, programs, and policies developed to further integrate opportunities that help achieve the One Water LA Vision, Objectives, and Guiding Principles.

These plan recommendations were grouped into the following categories, which are described in greater detail in the following Sections:

- Stormwater projects (see Section ES.6).
- Wastewater projects (see Section ES.7).
- Current integration opportunities (see Section ES.8).
- Future integration opportunities (see Section ES.9).
- Policies and programs (see Section ES.10).

ES.6 STORMWATER AND URBAN RUNOFF FACILITIES PLAN

The Stormwater and Urban Runoff Facilities Plan (SWFP) was prepared under the Plan to help City staff, stakeholders, and policymakers better understand the needs of the stormwater infrastructure system over the next 25 years. The SWFP is included in Volume 3 of the Plan, and a comprehensive summary is provided in Chapter 8.

Stormwater and urban runoff facilities are the infrastructure (green and grey) needed to convey or collect wet-weather and dry-weather runoff into, from within, and throughout the city. Collectively, these facilities manage flood risks, meet water quality requirements, recharge the groundwater basins, and provide a local water supply.

ES.6.1 Stormwater and Receiving Water Quality Goals

Stormwater and urban runoff from within the City are subject to many regulations, directives, and policies. To manage these regulations, the City has developed master plans, ordinances, directives, and other documents over the years. These documents help implement these goals and targets at the local level to improve stormwater runoff quality, flood protection, and water supply benefits.

Total Maximum Daily Loads (TMDLs) drive stormwater quality goals, specifying the maximum amount of a pollutant a discharger can discharge into a water body without affecting the designated beneficial uses. These TMDLs also have interim and final compliance milestones. The Stormwater and Urban Runoff Facilities Plan provides guidance to meet the TMDL requirements within the specified timelines.

Currently, 22 TMDLs govern all receiving water bodies within the City. The Stormwater Improvement Program (SIP) projects are grouped and phased according to the various compliance deadlines they must meet and their watershed.

The timeline illustrates the TMDL compliance deadlines by watershed.

ES.6.2 Stormwater Planning Approach

Building from significant previous stormwater infrastructure planning efforts, the Stormwater and Urban Runoff Facilities Plan evaluates various types of studies, plans, projects, and programs. In addition, the plan used a "Three-Legged-Stool" approach to integrate water quality, water supply, and flood risk mitigation where possible.

- **Water Quality Improvement** – These projects improve the health of local watersheds by reducing impervious cover, restoring ecosystems, decreasing pollutants in the waterways, and providing environmental and habitat benefits. Stormwater improvement projects intended to improve the quality of a downstream waterbody are typically driven by regulations such as TMDLs and/or 303(d) listings.
- **Water Supply Augmentation** – These projects capture runoff to help offset potable water use through direct use projects. They also increase water supply through groundwater augmentation and capture and use wet-weather/dry-weather runoff to offset potable water demand and/or enhance environmental and habitat conditions.
- **Flood Risk Mitigation** – These projects protect life and safety and mitigate local flood impacts. Stormwater improvement projects intended to reduce flood risks are typically driven by asset-specific needs, such as whether an asset is located near a known or anticipated area of flooding; insufficient capacity; asset deterioration or expiration of useful life based on age; and known or anticipated impacts from sea level or groundwater rise.

Three-Legged Stool Approach promotes implementation of projects that achieve benefits from these three areas.

Ideally, all projects have some level of flood risk mitigation, water quality improvement, and water supply augmentation, and the SWFP attempts to select projects that achieve benefits in all three areas. Projects were prioritized based on these three benefits, with projects that mitigate flood risks, improve water quality, and augment water supply given the highest priority, followed by projects that achieve only two of these three benefits, etc. In addition to prioritizing a project based on these three benefits, projects that meet stormwater quality deadlines were also prioritized. The majority of projects (95 percent) provide two or more of these benefits. Projects that provide all three benefits also represent the majority (59 percent) of the total SIP cost. In addition to these three benefits, the City recognizes the multitude of quantitative and qualitative benefits that stormwater projects provide.

Implementing an integrated, multi-benefit approach to stormwater management is expected to lower costs in the long run for the following reasons:

- The cost of one multiple-benefit project is anticipated to be less than the cost of multiple single-benefit projects that achieve the same goals.
- Fewer projects may be necessary to meet local goals, leading to long-term savings.

Stormwater project can provide a wide range of benefits to make Los Angeles a more resilient city.

ES.6.3 Stormwater Improvement Program

To help the City meet its stormwater and urban runoff management needs over the next 25 years, a comprehensive Stormwater Improvement Program (SIP) was developed. Building on previous planning efforts, the recommended SIP includes approximately 1,142 stormwater projects and programs that will help meet water quality regulations, address flooding risks, and provide water supply benefits by recharging groundwater in underlying aquifers or offsetting potable water use. The stormwater recommendations are condensed into a comprehensive database and organized into various project categories, as described below.

ES.6.3.1 Stormwater Project Database

As a key component to the stormwater management aspect of the One Water LA 2040 Plan, a single database of planned and potential projects was developed to compile ongoing stormwater management efforts from multiple agencies operating within the City. The database is foundational to the development of the SIP as it provides a common platform to evaluate all projects against standardized stormwater project selection criteria. The database includes approximately 1,201 regional and distributed stormwater project opportunities of which 1,142 are located within the City. Note, the total quantity and estimated cost of stormwater projects provided in Volume 1 is based on the 1,142 projects within the City only.

The projects were aggregated from the EWMPs, LADWP's SCMP, remaining Prop O projects, LASAN's five-year CIP projects, and LA County's projects. The entire stormwater project list is included in Appendix D.

To align project phasing with TMDL milestones, the stormwater projects were organized according to each of the City's four major watersheds. As shown on Figure ES.2, the major watersheds are:

- Upper LA River.
- Ballona Creek.
- Dominguez Channel.
- Santa Monica Bay/Marina Del Rey. (Due to the Marina Del Ray Watershed's size and location, the Plan combined it with the Santa Monica Bay Watershed.)

The vast majority of the projects in the stormwater database are Green Streets projects, which are critical to the City's stormwater management system since they allow distributed stormwater projects to be further developed. Green Streets recommendations were organized in groups called "blocks" (Blocks A, B, C, and D) to help select project phasing to meet each watershed's TMDL milestones. A total of 445 Green Streets block programs were developed, representing a combined length of approximately 225 miles of Green Streets.

ES.6.3.2 Stormwater Project Categories

The stormwater database includes projects that provide flood risk mitigation, water quality improvement, and/or water supply augmentation benefits throughout the city. These projects are also grouped in the following three project categories:

Elmer Paseo is one the City's "Green Alley" projects, capturing stormwater for infiltration and recharge of groundwater.

- **Distributed Green Infrastructure Projects –** Green infrastructure consists of both nature-based and mechanical systems designed to mimic natural processes. These projects retain, infiltrate, or treat runoff, offering multiple benefits such as flood protection, water quality improvement, and water supply benefits.

  Distributed green infrastructure projects include site-scale detention, porous pavement, infiltration trenches, drywells, cisterns, nature-inspired systems (e.g., bioretention/biofilter cells, bioswales, and green roofs), flow-through BMPs (e.g., downspout filters, flow-through planters, and proprietary units), and source controls (e.g., catch basin retrofits, proprietary units). Examples of distributed green infrastructure projects in the City are Elmer Paseo, Broadway Neighborhood Stormwater Greenway, Woodman Avenue Greenway, Ed P. Reyes Parkway, and Manchester Neighborhood greenway.

  Parcel-based solutions are also an important part of the distributed green infrastructure program to help the City accomplish its stormwater goals. Many of the Plan's recommended policies, summarized in Table ES.2 (see page 46) are intended to increase implementation and improve the performance of distributed BMPs.

- **Regional Green Infrastructure Projects –** Regional green infrastructure projects include retention/infiltration, capture-storage-use systems, nature-inspired flow-through treatment wetlands, and low-flow diversions to other regional green infrastructure projects. Examples of regional green infrastructure projects in the City are Hansen Spreading Grounds, Penmar Park, Rory M. Shaw, South LA Wetlands Park, Machado Lake Wetlands park, Harbor City Greenway also known as Wilmington Drain.

The Groundwater Replenishment Project will recharge up to 30,000 acre-feet of purified recycled water per year into the San Fernando groundwater basin at the Hansen Spreading Grounds (shown) and Pacoima Spreading Grounds for percolation.

- **Regional Grey Infrastructure Projects** – Grey infrastructure is stormwater conveyance and detention infrastructure historically designed to provide flood protection by collecting runoff, detaining collected runoff to attenuate peak discharge rates when necessary, and ultimately conveying runoff to downstream receiving waters and away from City property. These receiving waters include oceans, reservoirs, and groundwater aquifers. Examples of grey infrastructure include storm drains and open channels, outfalls, Los Angeles Department of Transportation (LADOT) street profiles (road curbs, gutters, and catch basins), pump stations, low-flow diversion structures that divert flows to the sewer system, debris basins, reservoirs, and dams. Examples of regional grey infrastructure projects in the City are the LA Zoo Pumping Plant Facility and the Venice Pumping Plant Facility.

Venice Low Flow Diversion Pump Station

Climate resilience infrastructure projects are also included in the Regional Grey project category. Examples of these projects are the Venice LFD Climate Resilience Retrofit and Tuxford Pumping Plant No.614 Low Flow Diversion Climate Resilience Retrofit. Detailed information on the climate risk assessment for stormwater infrastructure, and the associated recommendations can be found in Volume 5 of the Plan.

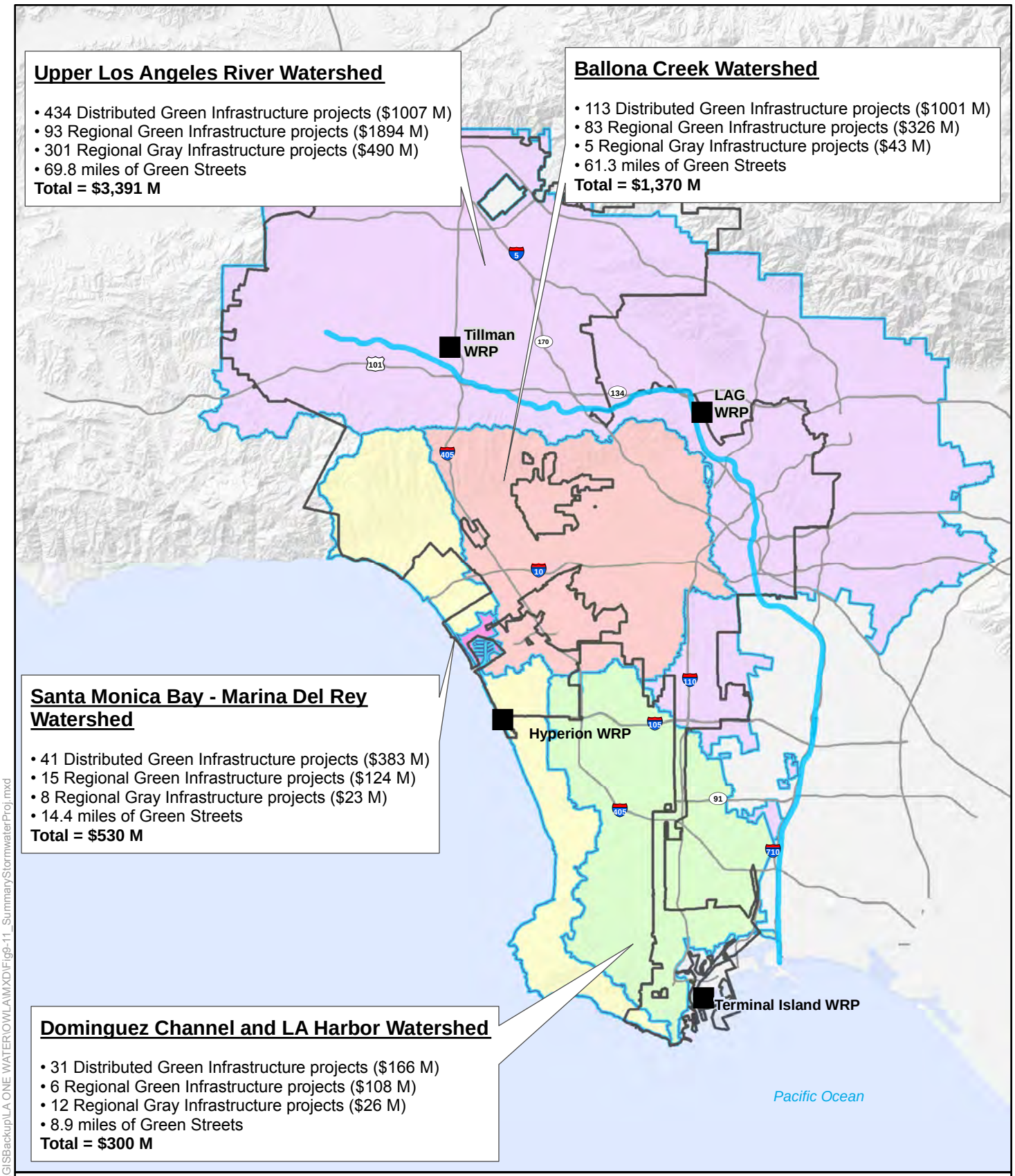


Figure ES.2
Summary of Stormwater Projects by Watershed
One Water LA 2040 Plan
Summary Report

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ES.6.4 Stormwater and Urban Runoff Facilities Plan Recommendations

To develop the SIP, results from multiple watershed planning efforts from both public and private agencies within the City's jurisdiction were compiled. Projects proposed within the City's jurisdiction from previous watershed planning efforts were gathered and evaluated using the "three-legged stool" evaluation criteria. Only City-involved projects (either as lead agency or partnering with other agencies) were included in the SIP.

Estimated costs are shown on Figure ES.2 according to their watershed. Stormwater projects are summarized on Figure ES.3 according to their project type relative to their respective watershed. As shown, most projects are located in the Upper LA River Watershed, followed by the Ballona Creek Watershed.

The estimated capital cost distribution of stormwater projects, organized by project type, is shown on Figure ES.3. As shown, the SIP's total estimated capital cost is $5.6 billion, with the vast majority (90 percent) allocated to regional and distributed green infrastructure. Only 10 percent of the SIP is allocated to regional grey stormwater infrastructure projects.

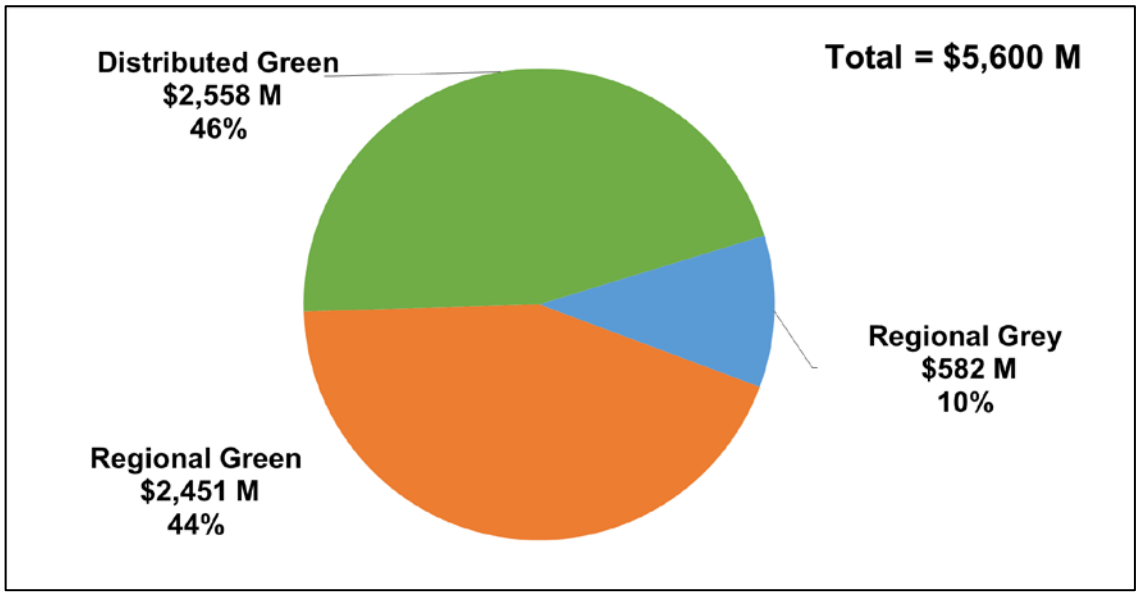


Figure ES.3 Estimated Cost Distribution of Stormwater Projects by Project Type

Green Streets projects make up the vast majority of the 1,142 projects included in the SIP. Green infrastructure also represents approximately 90 percent of the estimated cost. More details on the proposed SIP are included in Chapter 8.

ES.6.4.1 Stormwater Related Policy Recommendations

In addition to the stormwater projects included in the database and SIP, parcel-based solutions are an important part of the distributed green infrastructure program. Many of the Plan's recommended policies are intended to increase the likelihood of implementation and improve the performance of distributed BMPs.

One Water LA policies outline strategies to simplify processes and remove barriers to install green infrastructure, develop incentives and property owner recognition programs, increase training and education, develop maintenance protocols, and increase partnership opportunities with non-profit partners. One of the recommended policies (#5) is to develop robust stormwater pollution source control education measures to increase awareness and public participation. Stakeholders also identified specific recommended action items (AC1 and AC6) related to source control. These policies are summarized in Table ES.2 (see page 46). A full list of the policies and action items can be found in Chapter 9 and Appendix E.

ES.7 WASTEWATER FACILITIES PLAN

The Wastewater Facilities Plan (WWFP) guides LASAN's decisions on implementing system improvements to its wastewater collection and treatment facilities. The WWFP provides the underlying documentation to make informed decisions on investments to repair, replace, or enhance existing facilities and construct new conveyance or treatment facilities through year 2040.

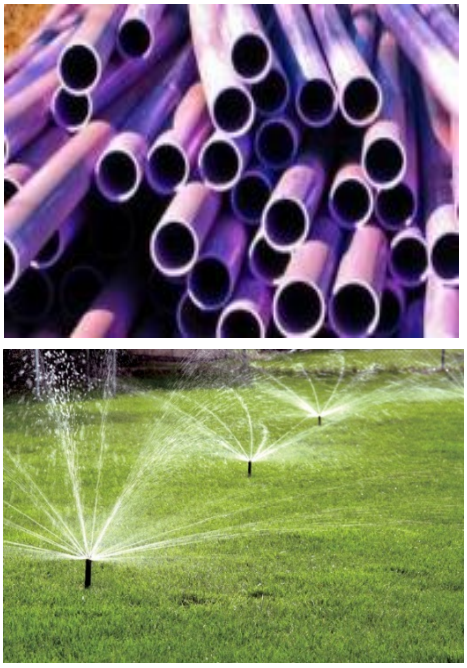
The WWFP is anticipated to be updated in approximately 10 years to incorporate system modifications and changes in flow conditions, regulatory framework, and overall vision for wastewater system operations and water reuse. The WWFP is included in Volume 2 of the Plan, and a comprehensive summary is provided in Chapter 7.

ES.7.1 Potable and Non-Potable Reuse

Water reuse plays an important role in meeting the Mayor's water supply goal of sourcing 50 percent of the City's water supply locally by year 2035. The WWFP recommends ways for each WRP to best reuse water and achieve environmental stewardship. Among the water reuse opportunities explored are:

- Non-potable reuse (NPR).
- Potable reuse with groundwater augmentation.
- Potable reuse with raw water augmentation.
- Potable reuse with treated water augmentation.

A trigger-based capital improvement plan (CIP) was developed for both the WWFP and the overall One Water LA Implementation Strategy to help the City navigate the wide range of future water recycling opportunities. With this approach, the City can adjust the implementation phasing and decisions based on future circumstances, such as changes in wastewater flows, regulatory, institutional, and other conditions.



Expanding the City's non-potable water distribution system is one of many water recycling opportunities evaluated in the Plan.

ES.7.2 Water Reclamation Plants

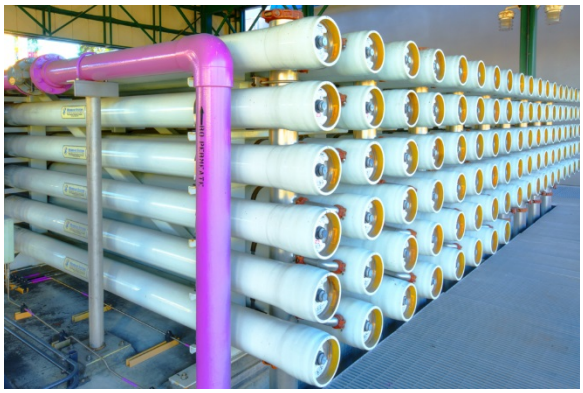
The WWFP study area coincides with the City's wastewater system service area. Within the wastewater system service area, the City owns and operates four WRPs that serve as a source for non-potable and potable reuse opportunities.

The locations of the WRPs and the seven major sewersheds are shown on Figure ES.4. The two inland water reclamation plants, Donald C. Tillman Water Reclamation Plant (DCTWRP) and Los Angeles-Glendale Water Reclamation Plant (LAGWRP), discharge solids and bypass flows to the Hyperion Water Reclamation Plant (HWRP). Treated flows that are not reused are ultimately discharged to the Pacific Ocean.

Based on the design capacities and the projected future flows of each plant through year 2040, all existing WRPs were confirmed to have sufficient capacity to manage the wastewater flows. Nonetheless, advanced treatment facilities would need to be constructed to maximize the reuse opportunities at each plant.

ES.7.3 Wastewater System Planning Approach

The WWFP analyzed the treatment plant modifications needed for potential potable or non-potable reuse strategies included in the future integration opportunities evaluation (see Section ES.9). This analysis involved preliminary sizing of treatment process modifications, locating the processes, identifying conveyance needs, and making preliminary cost estimates.



Water is forced through reverse osmosis membranes to remove salt, dissolved chemicals, and viruses (photo from TIWRP).

As shown on Figure ES.7 (see page 34), 16 recycled water concept options were considered for the future integration opportunities evaluation to increase local supply availability and achieve water quality objectives. These options involve various types of water reuse from any of the four water reclamation plants (WRPs), as well as flow-management strategies to increase influent flows to the plants to maximize water recycling opportunities.

The WWFP provides a phased list of recommendations for each WRP. The WWFP also describes the existing wastewater collection system and evaluates potential future WRPs, on-site treatment, and solids handling facility needs. All recommendations in the WWFP were included in a phased wastewater facilities plan capital improvement program (WWFP CIP).

ES.7.4 Wastewater System Recommendations by Plant

The wastewater system and water recycling improvements combined in the comprehensive WWFP CIP can be grouped into the following project categories:

- Capital projects from LASAN's Wastewater Capital Improvement Plan (WCIP).
- Rehabilitation and replacement (R&R) projects from the WCIP.
- Wastewater conveyance projects from the conveyance capacity analysis.
- Climate resiliency projects identified from a separate climate risk assessment study conducted for the Plan (see Volume 6).
- Projected capital and R&R projects beyond the WCIP horizon to year 2040.
- Treatment modifications to accommodate future concept options identified in the future integration opportunities analysis.

A summary of the planned and potential WWFP CIP improvements for each of the City's four WRPs and the collection systems are shown on Figure ES.4. Collectively, these wastewater improvement projects are sized to address existing deficiencies and meet future system needs.

Many of these concept options identified in the future integration opportunities analysis depend on certain triggers, such as regulatory conditions or institutional arrangements, and thus require more detailed feasibility studies. To provide Plan recommendations that can adjust to future changing conditions, a trigger-based implementation strategy was developed for each of the four WRPs. The options identified as Priority A for each WRP coincide with those in the preferred portfolio described in Section ES.9. A detailed discussion of the various triggers and prioritization of the concept options is included in Chapter 9 of Volume 1 and briefly summarized below for each plant.

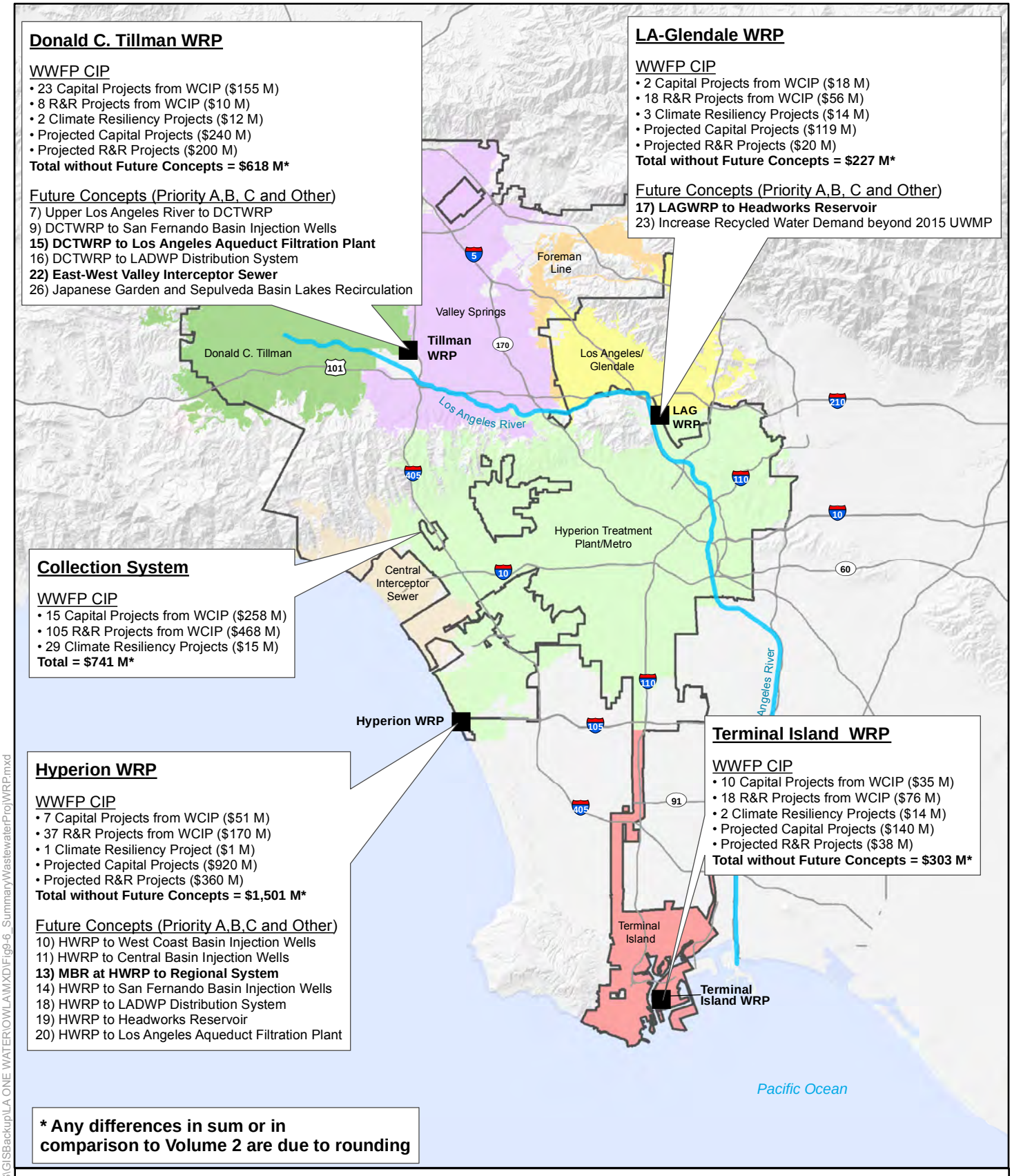


Figure ES.4
Summary of Wastewater Projects by WRP
One Water LA 2040 Plan
Summary Report

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One Water LA

ES.7.4.1 Hyperion Water Reclamation Plant

As shown on Figure ES.4, the WWFP's CIP includes 48 projects with a combined estimated cost of $1,501 million for the HWRP. Seven concept options were also identified for HWRP. The top four most-beneficial concept options to maximize water recycling from the HWRP, in order of priority, are as follows:

- **Priority A: Concept Option #13** – MBR at HWRP to regional system.
- **Priority B: Concept Option #18** – Potable reuse with treated water augmentation from HWRP to distribution system.
- **Priority C-1: Concept Option #10** – Potable reuse with groundwater augmentation in West Coast Basin
- **Priority C-2: Concept Option #11** – Potable reuse with groundwater augmentation in Central Basin.

The most critical trigger to implement the Priority A Concept Option #13 (Potable reuse from HWRP to regional system) is establishing an institutional agreement with a regional project partner, such as Metropolitan Water District of Southern California (MWD), the Water Replenishment District (WRD), Los Angeles County Sanitation Districts (LACSD), and/or West Basin Municipal Water District (WBMWD). If such an agreement does not materialize, the Priority B and C options should be considered.

The City is assessing a wide variety of options to maximize recycling through regional collaboration and partnerships at Hyperion, the City's largest Water Reclamation Plant.

The most critical trigger for the Priority B Concept Option #18 is adopting potable reuse with treated water augmentation regulations that would allow for this type of water reuse practice. If the potable regulations are not adopted within the desired timeframe, or the City prefers a more conventional form of water reuse, the third-best potable reuse options from the HWRP are Concept Options #10 and #11. These options consist of groundwater augmentation in the West Coast Basin and Central Basin, respectively. Both options require an institutional agreement with the Water Replenishment District (WRD), which acts as the Watermaster of both groundwater basins. The capacities identified for these concept options can be modified as long as the combined capacity does not exceed the estimated recycled water availability of 95,000 acre-feet per year (AFY) by year 2040.

ES.7.4.2 Donald C. Tillman Water Reclamation Plant

As shown on Figure ES.4, the WWFP's CIP includes 36 projects with a combined estimated cost of $618 million for the DCTWRP. Six concept options were also identified for DCTWRP. The top three most-beneficial concept options to maximize water recycling from DCTWRP are as follows, in order of priority:

- **Priority A: Concept Option #15** – Potable reuse with raw water augmentation from DCTWRP to the Los Angeles Aqueduct Filtration Plant (LAAFP). This concept also requires implementation of **Concept Option #22** – East-West Valley Interceptor Sewer (EWVIS) or another flow management strategy that increases flows at DCT WRP.
- **Priority B: Concept Option #16** – Potable reuse with treated water augmentation from DCTWRP to distribution system.
- **Priority C: Concept Option #9** – Potable reuse with groundwater Augmentation from DCTWRP to San Fernando Basin Injection Wells.

The most critical trigger for implementing the Priority A Concept Option #15 (Raw water augmentation from DCTWRP to LAAFP) is the ability to increase wastewater flow to DCTWRP, which will in turn increase the potential for recycled water. Because of LADWP's water conservation program's success, wastewater flows have reduced. Furthermore, the recycled water produced at DCTWRP is already accounted for by existing and planned non-potable reuse customers as well as the planned GWR project. For these reasons, the first trigger is a decision to pursue and implement a flow management project, such as the EWVIS or the Japanese Garden & Sepulveda Basin Lakes Recirculation concept. For details on these flow management concepts see Appendix B or TM 5.2 in Volume 5. The next most critical trigger for the Priority B concept option relates to adopting potable reuse regulations.

The highest-ranked potable reuse opportunity, Concept Option #15 (the DCTWRP to the LAAFP), requires potable reuse with raw water augmentation regulation approval, while the second-highest concept option, Concept Option #16 (the DCTWRP to LADWP's Distribution System), requires potable reuse with treated water augmentation regulation approval. If the potable regulations are not in effect within the desired timeframe, or the City prefers a more conventional form of water reuse, the third-best potable reuse option from the DCTWRP is Concept Option #9 (Groundwater Augmentation from the DCTWRP to the San Fernando Basin Injection Wells).

The Donald C. Tillman WRP supplies the Japanese Gardens with advanced treated recycled water.

ES.7.4.3 LA-Glendale Water Reclamation Plant

As shown on Figure ES.4, the WWFP's CIP includes 25 projects with a combined estimated cost of $227 million for the LAGWRP. Two concept options were also identified for the LAGWRP. These concept options, in order of priority, are as follows:

- **Priority A: Concept Option #17 –** Potable reuse with treated water augmentation from LAGWRP to Headworks Reservoir.
- **Priority B: Concept Option #23 –** Non-potable reuse from LAGWRP to increase NPR demand beyond 2015 UWMP.

The most critical trigger for implementing the Priority A Concept Option #17 (LAGWRP to Headworks Reservoir) is adopting potable reuse with treated water augmentation regulations that would allow this type of water reuse practice.

To increase water recycling at LAGWRP key modifications are in the planning stage such as providing additional equalization capacity.

If the potable regulations are not approved within the desired timeframe, or the City prefers a more conventional form of water reuse, the Priority B Concept Option #23 (Increase NPR demand beyond 2015 UWMP) could be considered for the remaining available flows. The most critical trigger for this option is new customer demand that is cost-effective to serve, considering the customer's location, demand size, demand variability, and water quality requirements.

ES.7.4.4 Terminal Island Water Reclamation Plant

As shown on Figure ES.4, the WWFP's CIP includes 32 projects with a combined estimated cost of $303 million for the TIWRP. One concept option was initially identified and evaluated for the TIWRP as part of the plant's future integration opportunities, namely Concept Option #23. This option involves expanding the NPR from the TIWRP beyond the forecasts identified in the 2015 UWMP. However, the majority of the current plant flow is already reused and future tributary flow increases are limited.

The advanced treatment capacity at TIWRP was recently expanded to 12 mgd enabling TIWRP to recycle 100 percent of its wastewater with advanced water purification.

Moreover, installing additional treatment facilities at the TIWRP is not recommended, because the plant was recently upgraded with a 12 million gallons per day (mgd) advanced treatment facility, and there could be conflicts with the conditional discharge requirements during low-demand. As a result, no concept options were recommended for TIWRP.

ES.7.5 Recommended Wastewater Projects

The WWFP's CIP combines capital improvement projects for the wastewater collection system and the four WRPs, as well as in-progress projects, current integration opportunities, future integration opportunities (concept options) pertaining to the wastewater system, and climate resiliency projects. To avoid including projects twice, the Executive Summary's CIP for wastewater projects is limited to the estimated cost of wastewater improvement projects associated with the four WRPs and the collection system.

The total estimated cost of wastewater improvement projects associated with the City's existing four WRPs and the collection system is $3.4 billion. As shown on Figure ES.5, improvements associated with the Hyperion WRP account for nearly half (44 percent) of the WWFP's CIP, totaling $1.5 billion. The improvements associated with Donald C. Tillman WRP and the collection system account for a similar share (40 percent), with $1.4 billion. The remaining $0.5 billion is associated with improvements at the LA-Glendale WRP and Terminal Island WRP. The WWFP's CIP also includes 37 projects resulting from the climate resiliency analysis with a combined estimated capital cost of $56 million.

More details on the proposed WWFP's CIP are included in Chapter 7, while the complete WWFP CIP is provided in Appendix C.

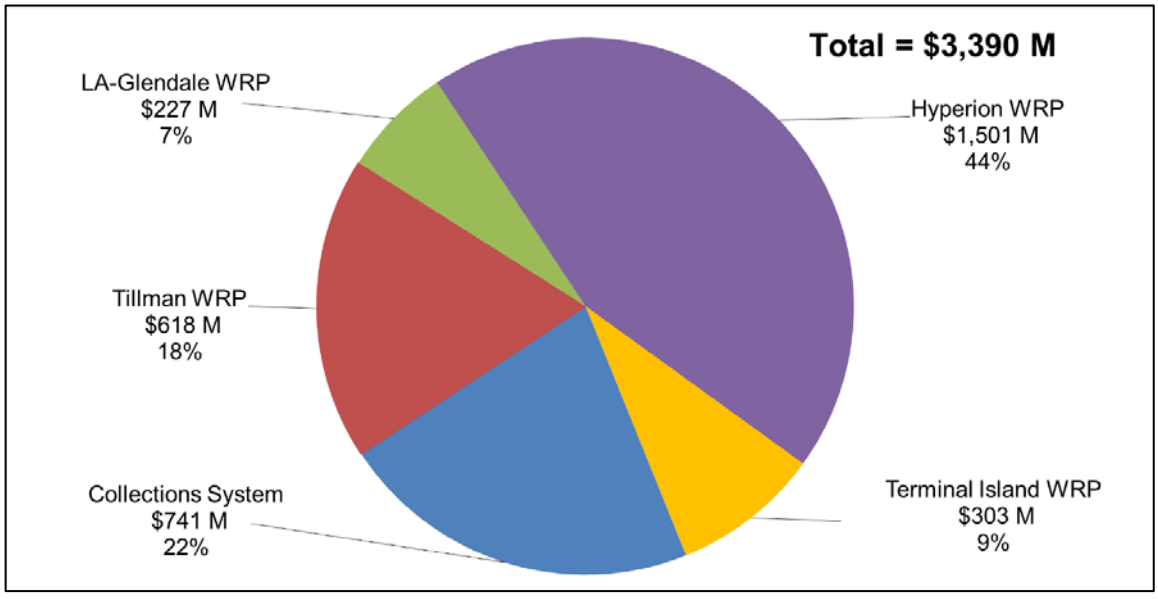


Figure ES.5 Estimated Cost Distribution of Wastewater Projects by WRP

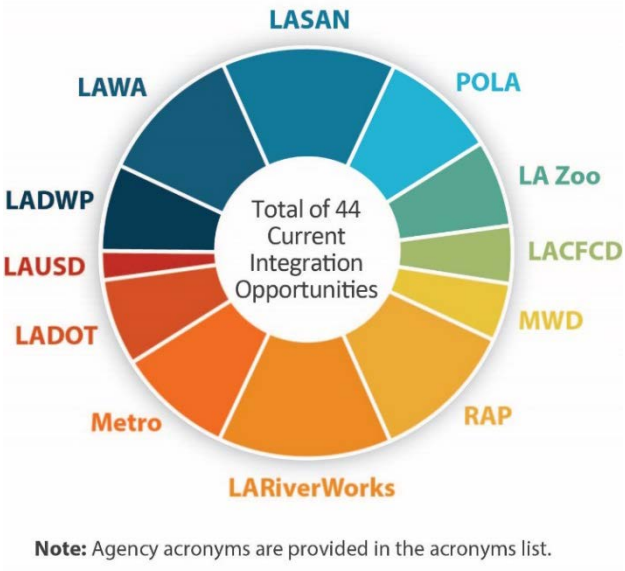
ES.7.5.1 Wastewater Related Policy Recommendations

In addition to the existing wastewater projects and the recommended concept options, the One Water LA policies outline strategies for developing guidelines for on-site treatment facilities (OSTFs). Two of the recommended policies for these OSTFs include (1) developing guidelines that protect public health and outline operations of wastewater and recycled water systems (#38), and (2) providing a fee structure and payment guidelines that reflect collection and treatment system impacts and costs (#39). Stakeholders also recommended expanding education and engagement programs on Potable Reuse (#35).

The recommended wastewater related policies are summarized in Table ES.2. A full list of the policies and action items can be found in Chapter 9 and Appendix E.

ES.8 CURRENT INTEGRATION OPPORTUNITIES

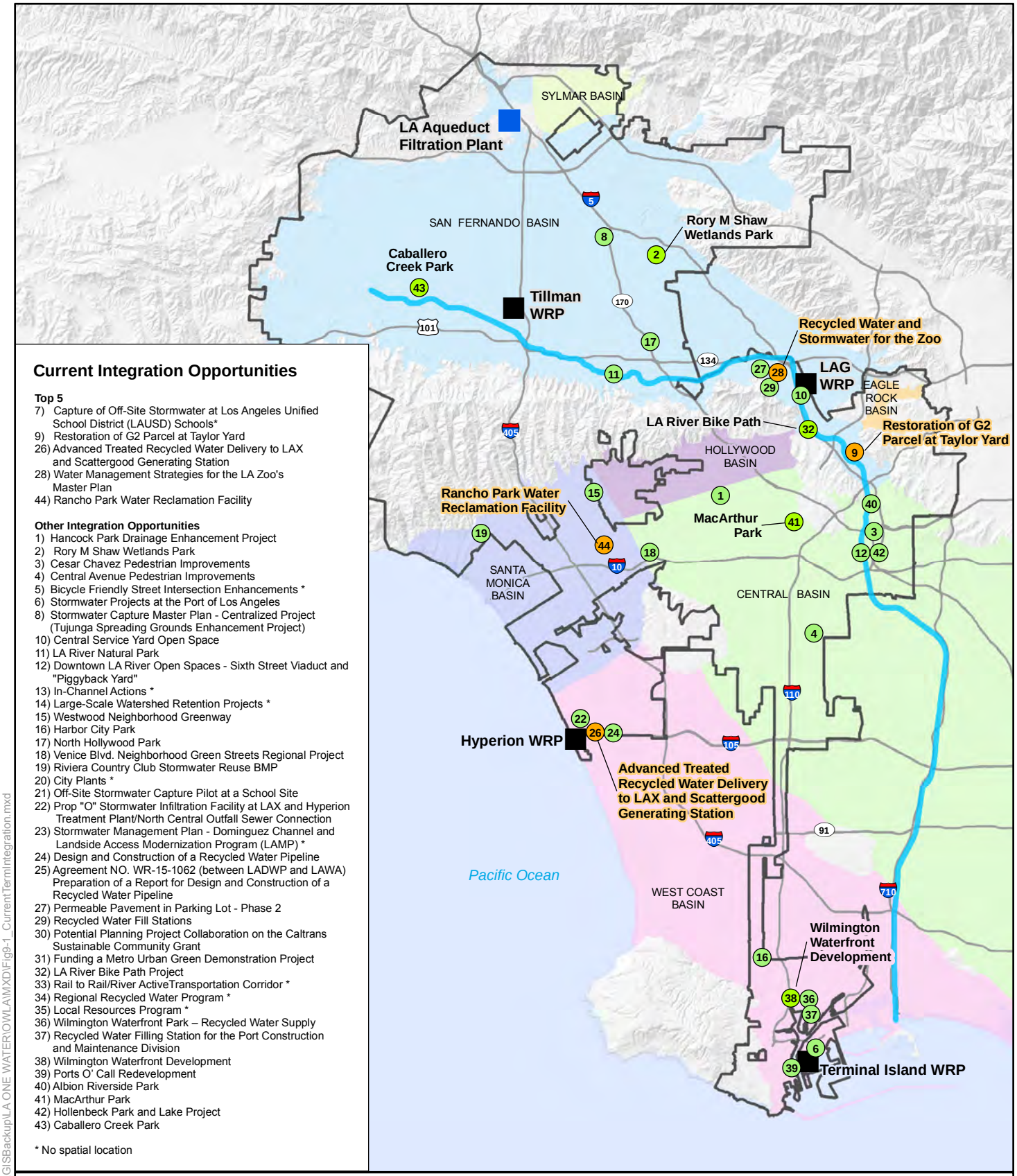
The One Water LA team asked its steering committee members for a list of their top 3 to 5 current projects or planning efforts that provide opportunities for collaboration with other departments or agencies. The purpose is to identify opportunities to integrate water elements and improve the projects' efficiency, cost effectiveness, and sustainability.



A total of 44 water-related current integration opportunities were identified by 12 different steering committee members.

The One Water LA team obtained this list to create practical examples of interdepartmental and interagency collaboration, identify agreements and policies needed to resolve complexities hindering project implementation, and to highlight One Water LA "quick success" stories that provide multiple benefits. A total of 44 water-related projects or planning efforts were received from 12 different departments/agencies of the steering committee. The approximate locations of these 44 current integration opportunities with a spatial location are depicted on Figure ES.6, along with the top 5 opportunities.

The 44 current integration opportunities were narrowed down to 10 using a screening criteria process. To enable prioritization, additional information was gathered. The top five current integration opportunities were then further developed as case study examples for interdepartmental and interagency collaboration. Three of these five case studies have gained momentum and are already moving forward, namely: Advanced Treated Recycled Water Delivery to LAX and Scattergood Generating Station, Restoration of G2 Parcel at Taylor Yard, and Water Management Strategies for the LA Zoo's Master Plan,



Current Integration Opportunities

Top 5

7) Capture of Off-Site Stormwater at Los Angeles Unified School District (LAUSD) Schools*
9) Restoration of G2 Parcel at Taylor Yard
26) Advanced Treated Recycled Water Delivery to LAX and Scattergood Generating Station
28) Water Management Strategies for the LA Zoo's Master Plan
44) Rancho Park Water Reclamation Facility

Other Integration Opportunities

1) Hancock Park Drainage Enhancement Project
2) Rory M Shaw Wetlands Park
3) Cesar Chavez Pedestrian Improvements
4) Central Avenue Pedestrian Improvements
5) Bicycle Friendly Street Intersection Enhancements *
6) Stormwater Projects at the Port of Los Angeles
8) Stormwater Capture Master Plan - Centralized Project (Tujunga Spreading Grounds Enhancement Project)
10) Central Service Yard Open Space
11) LA River Natural Park
12) Downtown LA River Open Spaces - Sixth Street Viaduct and "Piggyback Yard"
13) In-Channel Actions *
14) Large-Scale Watershed Retention Projects *
15) Westwood Neighborhood Greenway
16) Harbor City Park
17) North Hollywood Park
18) Venice Blvd. Neighborhood Green Streets Regional Project
19) Riviera Country Club Stormwater Reuse BMP
20) City Plants *
21) Off-Site Stormwater Capture Pilot at a School Site
22) Prop "O" Stormwater Infiltration Facility at LAX and Hyperion Treatment Plant/North Central Outfall Sewer Connection
23) Stormwater Management Plan - Dominguez Channel and Landside Access Modernization Program (LAMP) *
24) Design and Construction of a Recycled Water Pipeline
25) Agreement NO. WR-15-1062 (between LADWP and LAWA) Preparation of a Report for Design and Construction of a Recycled Water Pipeline
27) Permeable Pavement in Parking Lot - Phase 2
29) Recycled Water Fill Stations
30) Potential Planning Project Collaboration on the Caltrans Sustainable Community Grant
31) Funding a Metro Urban Green Demonstration Project
32) LA River Bike Path Project
33) Rail to Rail/River ActiveTransportation Corridor *
34) Regional Recycled Water Program *
35) Local Resources Program *
36) Wilmington Waterfront Park – Recycled Water Supply
37) Recycled Water Filling Station for the Port Construction and Maintenance Division
38) Wilmington Waterfront Development
39) Ports O' Call Redevelopment
40) Albion Riverside Park
41) MacArthur Park
42) Hollenbeck Park and Lake Project
43) Caballero Creek Park

* No spatial location

Legend

- Existing Water Reclamation Plant (WRP)
- Existing Water Filtration Plant
- City of Los Angeles
- Groundwater Basin
  Source: LACDPW
- Current Integration Opportunity Project Location
  - Top 5
  - Other Integration Opportunities

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Hillshade Source: CalAtlas
http://www.atlas.ca.gov

Figure ES.6
Location of Current Integration Opportunities
One Water LA 2040 Plan
Summary Report

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One Water LA

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- **Advanced Treated Recycled Water Delivery to LAX and Scattergood Generating Station –** Under this project, a new advanced water purification facility will be added at the HWRP to deliver advanced treated recycled water to the Los Angeles International Airport (LAX) and the Scattergood Power Plant Generating Station. The project involves collaboration between LASAN, LADWP, and Los Angeles World Airports (LAWA). The multiple benefits provided by this project are as follows:

  - Offsets potable water demands by converting all landscape areas to recycled water irrigation, discontinuing irrigation in non-public areas, and converting turf to bark/stone.
  - Provides opportunities for extensive educational outreach due to LAX's high passenger count.
  - Uses product water from the Advanced Treatment Facility Pilot at HWRP.

- **Capture of Off-Site Stormwater at Los Angeles Unified School District (LAUSD) Schools –** This pilot study involves capturing and treating off-site stormwater for recharge or reuse at a school site as a demonstration for other LAUSD school sites. This concept option augments stormwater use at school sites, since the LAUSD is already responsible for capturing its on-site stormwater.

  The LAUSD would lead the project, while the LASAN, LADWP, and Division of State Architect (DSA) would be supporting agencies. The project would provide the following benefits:

  - Removes trash and solids from stormwater diverted from a local storm drain.
  - Conveys diverted stormwater onto the selected school site and uses it for either infiltration or irrigation.
  - Focuses on areas where regional stormwater facilities could optimize infiltration and on-site use while meeting multiple objectives and benefits.

- **Rancho Park Water Reclamation Facility –** Under this project, one or multiple satellite water reclamation facilities would be added to produce recycled water. The recycled water would be augmented with dry weather runoff and stormwater, when available, to serve non-potable water demands near Rancho Park (West LA).

  LASAN would lead the project, while LADWP and Los Angeles Department of Recreation and Parks (RAP) would be supporting agencies. This project provides the following benefits:

  - Produces recycled water to meet substantial non-potable demands in the Westside area, including industrial uses and irrigation for the UCLA campus, the City's largest municipal golf course, and several other users.

- Captures stormwater to retain, treat, and remove pollutants such as trash, metals, and bacteria.
- Increases climate resiliency and reliability of water supply by being locally sourced.

- **Restoration of G2 Parcel at Taylor Yard** – This project involves developing an approximately 41-acre former rail yard site consisting of stormwater BMPs, potentially using recycled water, and completing site remediation.

The LA River Works office (part of the Los Angeles Bureau of Engineering [BOE]) is the project lead, while LADWP, LASAN, and RAP are the supporting agencies. This project provides the following benefits:

–Implements stormwater BMPs.

–Meets substantial non-potable demands.

–Remediates a large former rail yard site for beneficial uses.

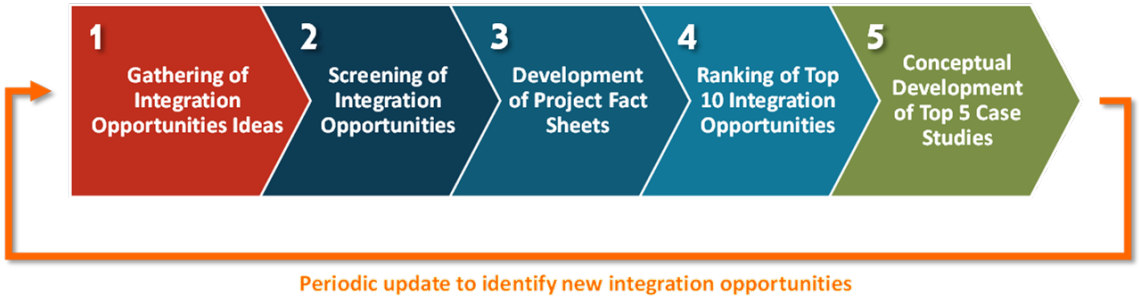
- **Water Management Strategies for the LA Zoo's Master Plan** – This project includes considering stormwater and recycled water in the LA Zoo Master Plan to promote using stormwater BMPs and recycled water for animal exhibits, washdown, and irrigation at the LA Zoo.

The LA Zoo would lead the project, while LADWP, LASAN, and RAP would be supporting agencies. This project provides the following benefits:

- Decreases the LA Zoo's potable water use.
- Identifies information gaps, water quality requirements for using recycled water in animal exhibits, funding opportunities, and other steps necessary to evaluate recycled water and stormwater capture uses.
- Applies information collected from this effort to other zoos and animal shelters in the region and country.

ES.8.1 Recommended Current Integration Opportunities

In addition to the 44 current integration opportunities, other projects emerged while the Plan was developed, some of which stakeholders provided. The One Water LA team recommends conducting a periodic review and update of the "living" list of integration opportunities to solicit new ideas and identify any missing projects. During these updates, it would also be important to reexamine the current list and further explore or accelerate the most beneficial projects.



The current integration opportunities case studies were developed in a five step process and it is recommended to periodically assess new integration opportunities.

Since most of these projects are still in the early planning stages, it was assumed that some of the 44 current integration opportunities would not be implemented due to new conditions, cost-effectiveness, or other implementation concerns. As a result, it was assumed that approximately 80 percent of the opportunities would actually be implemented within the planning horizon of 2040. The total estimated cost associated to implement approximately 80 percent or 35 of the 44 near-term integration opportunities is $1.8 billion. Detailed discussions of the current integration opportunities are included in Chapter 5.

ES.9 FUTURE INTEGRATION OPPORTUNITIES

Future integration opportunities were developed to identify long-term strategies that help achieve the Sustainable City pLAn goals relating to water quality and water supply, and that are also in alignment with the One Water LA Objectives and Guiding Principles.

ES.9.1 Water Management Strategies

Through a series of workshops, stakeholder meetings, and engagement with the One Water LA team, various existing and future water management strategies were identified. For each strategy, one or more new projects (concept options) were identified and developed to a conceptual level. After evaluating 27 concept options and receiving input from stakeholders, recommended future integration opportunities and associated water management strategies were identified. The recommended concept options include eight different water management strategies, as shown on the graphic to the right. The only strategy that is not included in the Plan recommendations is ocean desalination. Ocean desalination was eliminated because stakeholder surveys indicated desalination as the least favored option and the City has many more attractive potable reuse alternatives and stormwater strategies available that collectively can provide sufficient local supplies while avoiding environmental concerns, such as harm to marine life and the high carbon footprint associated with ocean desalination.

The Plan recommendations include a variety of project concepts that represent eight different water management strategies.

The prioritized list of future integration opportunities was developed to help the City decide which water management strategies and concept options are most viable for further study and could be implemented by 2040 or beyond. Currently, all concepts are still being evaluated and the City has not yet committed to implementation of any of the concept options described.

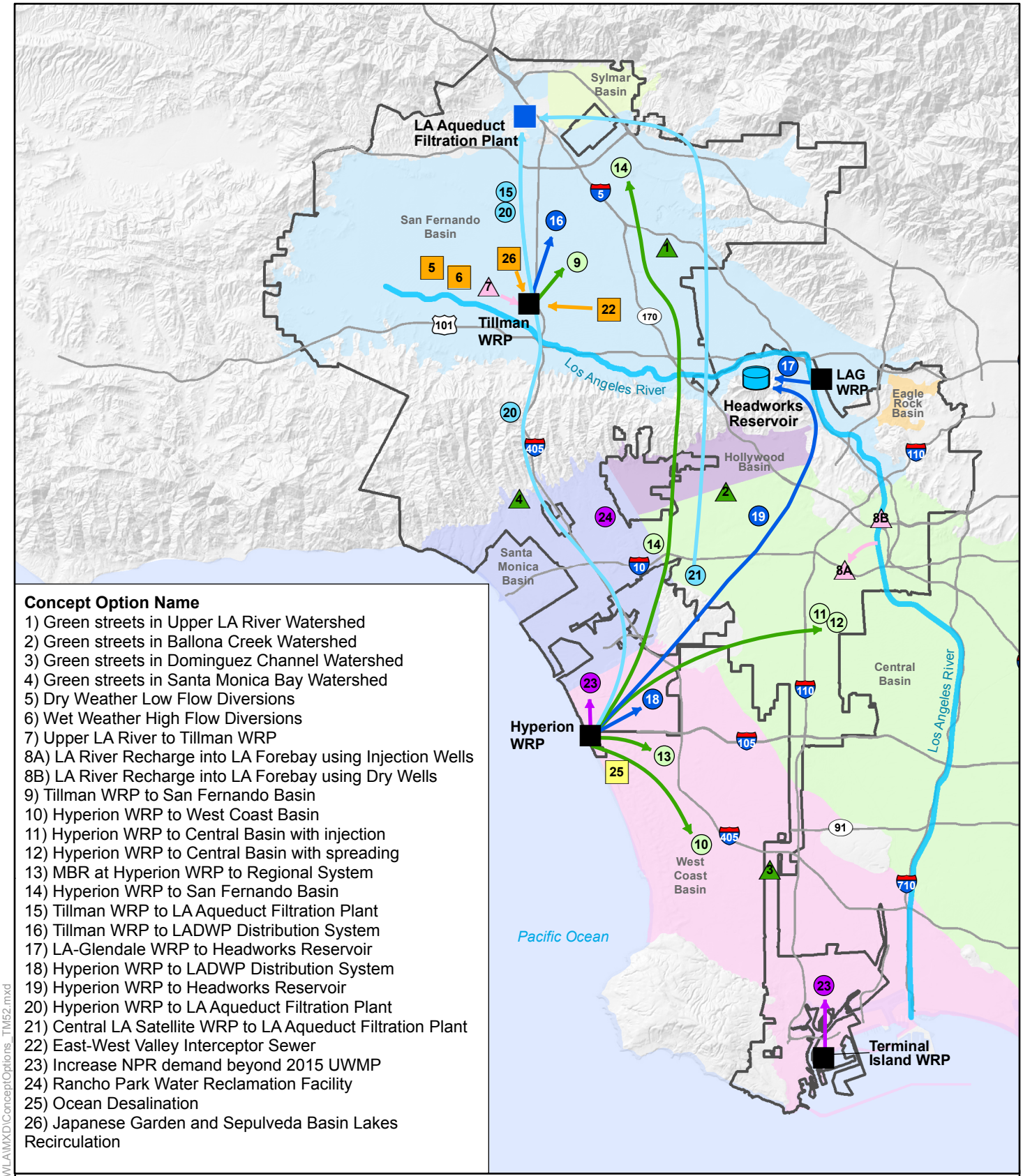
ES.9.1.1 Concept Options

The Plan's 27 concept options are a mix of projects and programs that maximize recycled water use, enhance stormwater capture, contribute to supply sustainability, and provide multiple water quality benefits. A map of each concept and its respective conceptual water routing location is shown on Figure ES.7. A detailed description of the concept development, evaluation, and prioritization process is included in Chapter 6.

ES.9.1.2 Portfolio Evaluation

The concept options from Figure ES.7 were grouped into themed portfolios based on a possible extreme future scenario ("theme"). For example, if in the future the City decides to only implement projects that maximize environmental benefits, then the concept options that maximize environmental benefits would be prioritized first. The four themes assessed were: 1) minimizing cost, 2) maximizing environmental benefits, 3) maximizing institutional collaboration, and 4) maximizing local water supplies. A scenario planning analysis was conducted to develop a list of the most beneficial concept options under each of the four different themes. The most beneficial concept options from each themed portfolio were then combined into a preferred portfolio.

Although several concept options are not included in the preferred portfolio, some concepts remain strong, viable alternatives if certain decisions anticipated in the future ("triggers") do not materialize. Detailed discussions of the concept options and implementation triggers, are included in Chapters 6 and 9, respectively.



Concept Option Name

1) Green streets in Upper LA River Watershed
2) Green streets in Ballona Creek Watershed
3) Green streets in Dominguez Channel Watershed
4) Green streets in Santa Monica Bay Watershed
5) Dry Weather Low Flow Diversions
6) Wet Weather High Flow Diversions
7) Upper LA River to Tillman WRP
8A) LA River Recharge into LA Forebay using Injection Wells
8B) LA River Recharge into LA Forebay using Dry Wells
9) Tillman WRP to San Fernando Basin
10) Hyperion WRP to West Coast Basin
11) Hyperion WRP to Central Basin with injection
12) Hyperion WRP to Central Basin with spreading
13) MBR at Hyperion WRP to Regional System
14) Hyperion WRP to San Fernando Basin
15) Tillman WRP to LA Aqueduct Filtration Plant
16) Tillman WRP to LADWP Distribution System
17) LA-Glendale WRP to Headworks Reservoir
18) Hyperion WRP to LADWP Distribution System
19) Hyperion WRP to Headworks Reservoir
20) Hyperion WRP to LA Aqueduct Filtration Plant
21) Central LA Satellite WRP to LA Aqueduct Filtration Plant
22) East-West Valley Interceptor Sewer
23) Increase NPR demand beyond 2015 UWMP
24) Rancho Park Water Reclamation Facility
25) Ocean Desalination
26) Japanese Garden and Sepulveda Basin Lakes Recirculation

Legend

- Existing Water Reclamation Plant (WRP)
- Existing Reservoir
- Existing Water Filtration Plant
- Groundwater Basin Source: LACDPW
- City of Los Angeles

Strategy Category

- Non-Potable Reuse
- Potable Reuse with Groundwater Augmentation
- Potable Reuse with Raw Water Augmentation
- Potable Reuse with Treated Water Augmentation
- LA River Storage and Use
- Flow Management
- Already Proposed Stormwater Management Projects
- Ocean Desal Plant

Hillshade Source: CalAtlas http://www.atlas.ca.gov

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Figure ES.7
Concept Options Overview Map
One Water LA 2040 Plan
Summary Report

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One Water LA

ES.9.1.3 Preferred Portfolio

The preferred portfolio is the recommended group of concept options. By implementing these concept options, the preferred portfolio supports the stormwater and receiving water quality as well as major water-related Sustainable City pLAn goals.

The preferred portfolio also includes existing supply sources, projects that are already in progress (as of November 2016), stormwater management projects that had already been proposed, and six new concept options. These new concept options and the estimated new local water supply yield, estimated capital cost, and yield-weighted unit cost expressed in dollars per acre-foot ($/AF) are summarized in Table ES.1.

Table ES.1 New Concept Options of Preferred Portfolio Summary Report One Water LA 2040 Plan

#	Concept Option Name	Estimated New Yield (AFY)	Estimated New Yield (mgd)	Estimated Capital Cost ($M)	Yield-Weighted Unit Cost ($/AF)
New Concept Options					
5	Dry Weather Low Flow Diversions	6,200	5.5	$110	$1,000
8A	LA River Recharge into LA Forebay using Injection Wells	25,000	22	$980	$2,100
13	Potable Reuse Groundwater Augmentation - MBR at HWRP to Regional System(1)	95,000(2)	85	$900	$1,500
15	Potable Reuse Raw Water Augmentation - DCTWRP to LA Aqueduct Filtration Plant(2)	15,000	14	$310	$1,500
17	Potable Reuse Treated Water Augmentation - LAGWRP to Headworks Reservoir(1)	6,000(2)	3.2	$140	$1,500
22	East West Valley Interceptor Sewer	n/a(3)	11.4(3)	$85	$430
	Totals of New Concept Options Only(4)	**147,200**	**136**	**$2,525**	**$1,600**

Notes:

(1) The estimated yield of Concept Options #13 and #17 could not be fully utilized during normal and wet year conditions with the supply mix assumptions obtained from the 2015 UWMP.
(2) Requires the East-West Valley Interceptor Sewer (Concept Option #22) or other flow management option to increase flows to DCTWRP.
(3) Estimated capacity of EWVIS is 11.4 mgd and does not provide a new supply, but only a flow increase to DCTWRP due to rerouting.
(4) Excludes new yield and cost estimates associated with Benchmark Portfolio projects and programs.

As shown in Table ES.1, the new concept options in the preferred portfolio have an estimated combined yield of 147,200 AFY, excluding the capacity of Concept Option #22 (East-West Valley Interceptor Sewer), since it is merely a flow management concept that does not generate new supply on its own. The Japanese Garden and Sepulveda Basin Lakes Recirculation concept (Concept Option #26) could be an alternative or addition to the EWVIS, see Appendix B for details on Concept Option #26.

The following sections briefly summarize the recommended concept options included in the preferred portfolio. Schematics of all 27 concept options are included in Appendix B. Individual concept description sheets are included in Appendix C of TM 5.2 in Volume 5.

Concept Option 5: Dry Weather Low Flow Diversions

This concept option proposes collecting low flows from the stormwater system and transferring them to the sewer system for treatment. Under normal year conditions, the estimated yield from city-wide implementation is 6,200 AFY, while the yield-weighted unit cost is roughly $1,000 per AF. The concept flow schematic is shown on Figure ES.8.

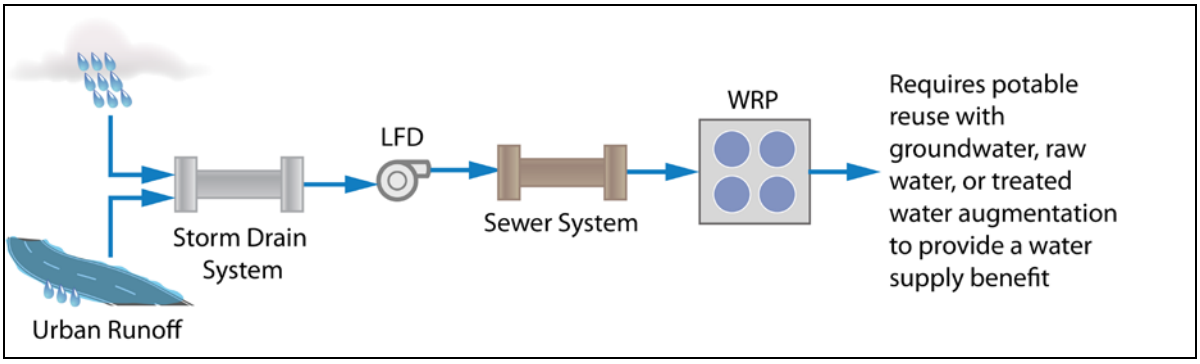


Figure ES.8 Dry Weather Low Flow Diversions

The key benefits associated with this concept option include, but are not limited to:

- Minimizes or eliminate the discharge of potentially polluted dry-weather flow runoff from receiving waters.
- Diverts dry-weather runoff in the stormwater collection system to the sewer collection to be conveyed to a water reclamation plant for treatment and reuse.

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Improve health of local watersheds.
- Improve local water supply reliability.
- Integrate management of water resources and policies.
- Balance environmental, economic, and societal goals.

Concept Option 8A: LA River Recharge into LA Forebay using Injection Wells

This concept option proposes diverting flows from the LA River to the LA Forebay to recharge Central Basin. Under normal year conditions, the estimated yield is 25,000 AFY, while the yield-weighted unit cost is roughly $2,100 per AF. The concept flow schematic is shown on Figure ES.9. For additional details regarding the LA River refer to the LA River Flow Study, Volume 4 of the Plan.

The key benefits associated with this concept option include, but are not limited to:

- Extracts and reuses water that would otherwise be lost to the ocean.
- Replenishes the Central Basin groundwater aquifer.

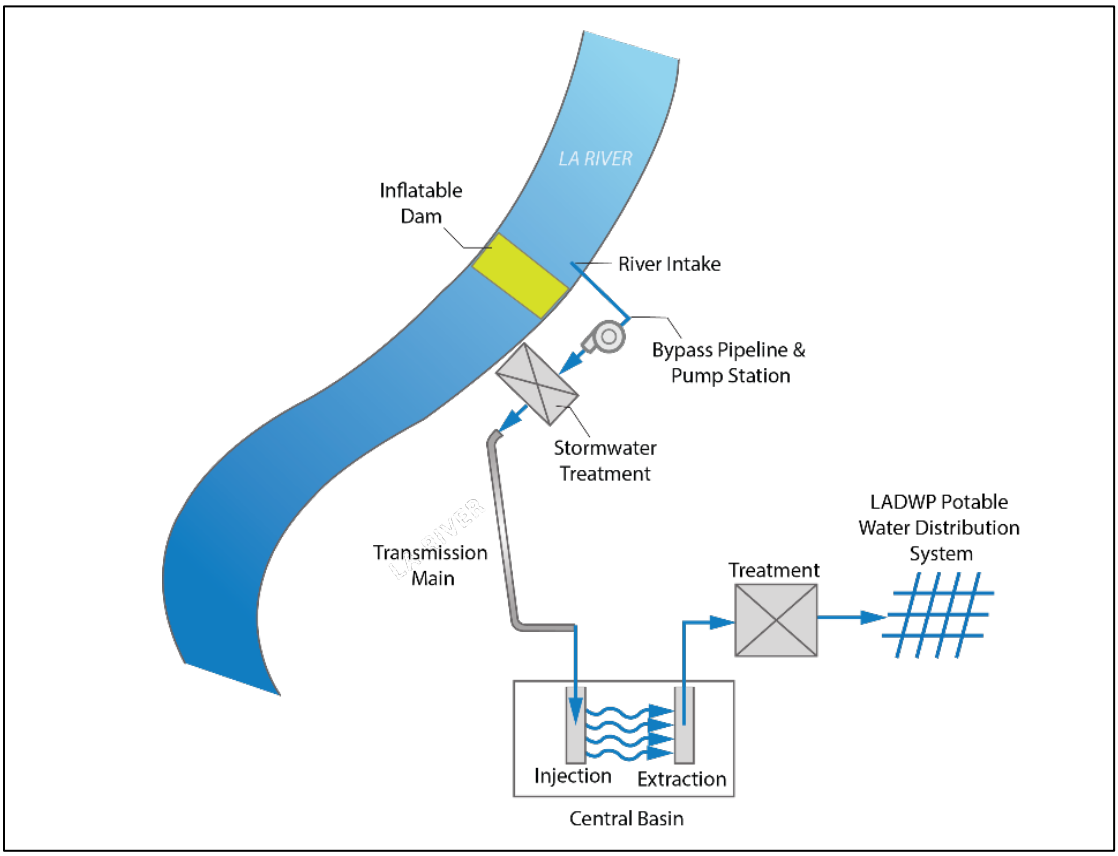


Figure ES.9 LA River Recharge into LA Forebay using Injection Wells

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Improve local water supply reliability.
- Increase climate resilience.
- Increase community awareness and advocacy for sustainable water.

Concept Option 13: Potable Reuse - MBR at Hyperion WRP to Regional System

This concept proposes treating HWRP effluent with a membrane bioreactor (MBR) and delivers water to a regional system for recharge into a groundwater basin, which will be extracted for potable use by other regional systems. This project may also be used in the future for potable reuse with raw water augmentation. Advanced treatment by the regional system will be required. The LADWP could purchase this water from a regional system for potable use.

Under normal year conditions, the estimated yield is 95,000 AFY, while the yield-weighted unit cost is roughly $1,500 per AF. The concept flow schematic is shown on Figure ES.10.

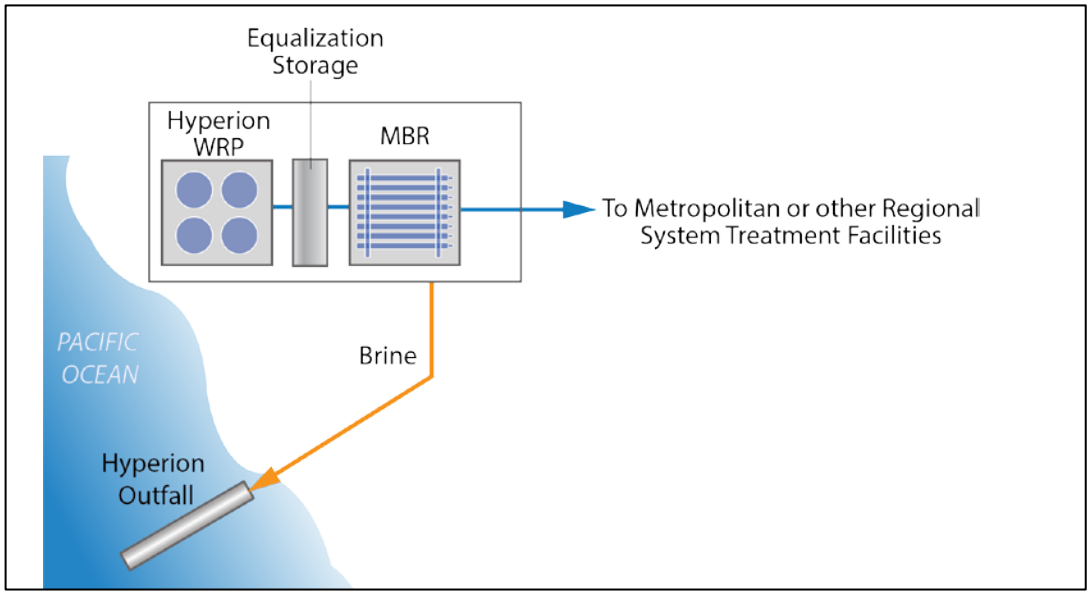


Figure ES.10 Potable Reuse - MBR at Hyperion WRP to Regional System

The key benefits associated with this concept option include, but are not limited to:

- Uses 100 percent of Hyperion Water Reclamation Plant flows for recycling eliminating discharge to the ocean.
- Promotes collaboration with regional partners.
- Delivers water to a regional system for recharge into a groundwater basin, which will be extracted for potable reuse and sold to water retailers at full service rates.

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Implement, monitor, and maintain a reliable wastewater system.
- Improve local water supply reliability.
- Integrate management of water resources & policies.
- Increase climate resilience.

Concept Option 15: Potable Reuse Raw Water Augmentation - Donald C. Tillman WRP to Los Angeles Aqueduct Filtration Plant

This concept option proposes expanding the DCTWRP Advanced Water Purification Facility (AWPF) and conveys potable reuse flows with raw water augmentation to the Los Angeles Aqueduct Filtration Plant (LAAFP), and then to LADWPs system for distribution.

Under normal year conditions, the estimated yield is 15,000 AFY, while the yield-weighted unit cost is roughly $1,500 per AF. The concept flow schematic is shown on Figure ES.11.

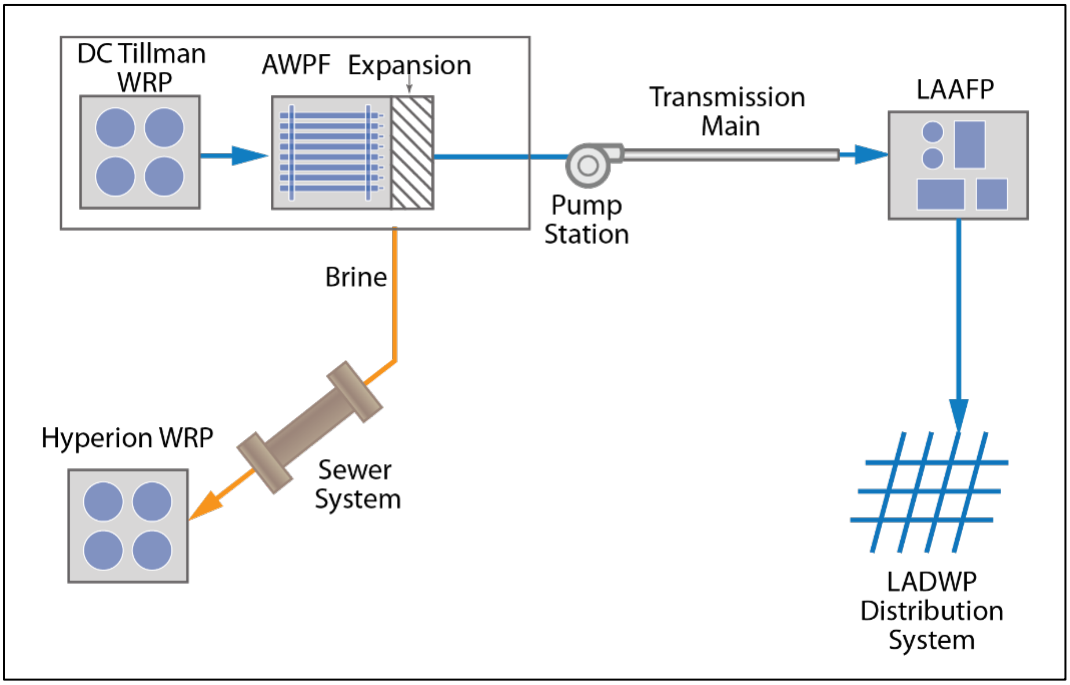


Figure ES.11 Potable Reuse Raw Water Augmentation - Tillman WRP to Los Angeles Aqueduct Filtration Plant

The key benefits associated with this concept option include, but are not limited to:

- Expands use of potable reuse with raw water augmentation.
- Increases DCTWRP's flows for recycling.

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Implement, monitor, and maintain a reliable wastewater system.
- Improve local water supply reliability.
- Integrate management of water resources and policies.
- Increase climate resilience.

Concept Option 17: Potable Reuse Treated Water Augmentation - LA-Glendale WRP to Headworks Reservoir

This concept option proposes treating LAGWRP effluent at an Advanced Water Purification Facility (AWPF) and pumps water directly into the LADWP distribution system at the Headworks Reservoir. Instead of siting the AWFP at LAGWRP, an AWPF could be sited at the Headworks Reservoir, however, this siting location was not part of this evaluation and further studies are required.

Under normal year conditions, the estimated yield is 3,600 AFY, while the yield-weighted unit cost is roughly $1,500 per AF. The concept flow schematic is shown on Figure ES.12.

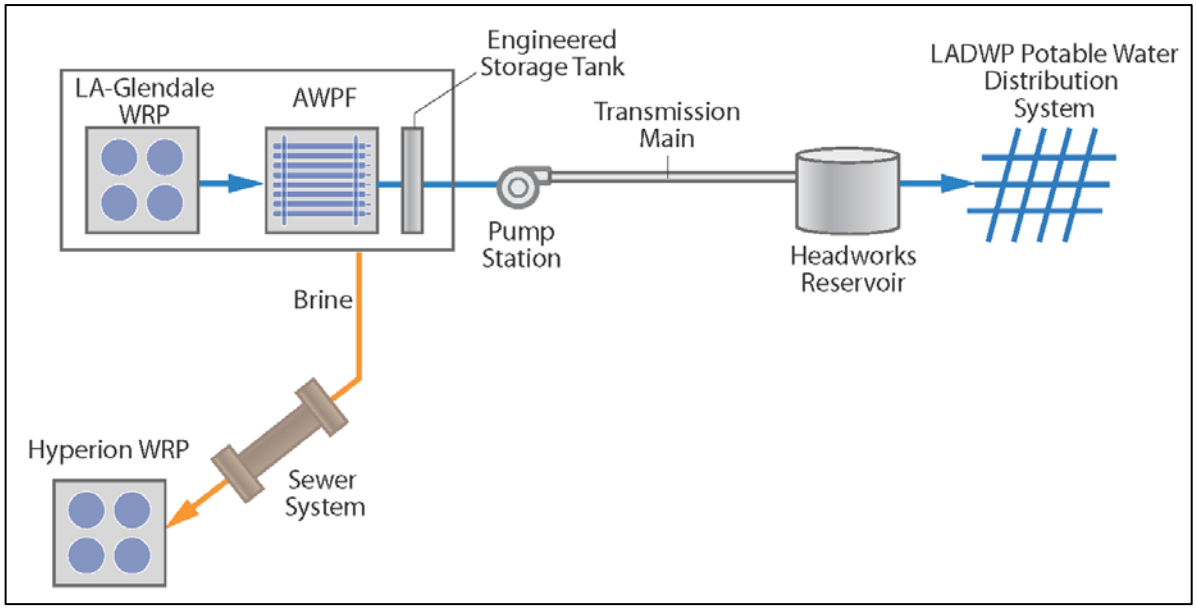


Figure ES.12 Potable Reuse Treated Water Augmentation - LA-Glendale WRP to Headworks Reservoir

The key benefits associated with this concept option include, but are not limited to:

- Expands LAGWRP's treatment technology and increases flows available for recycling.
- Expands use of potable reuse with treated water augmentation.

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Implement, monitor, and maintain a reliable wastewater system.
- Improve local water supply reliability.
- Integrate management of water resources and policies.
- Increase climate resilience.

Concept Option 22: East West Valley Interceptor Sewer

This concept option proposes implementation of the East West Valley Interceptor Sewer (EWVIS) project, which would convey additional wastewater flows from the eastern part of the San Fernando Valley to DCTWRP.

The EWVIS has an estimated capacity of 11.4 mgd and does not provide a new supply. Instead, it merely increases flow to DCTWRP due to rerouting. The yield-weighted unit cost is roughly $430 per AF. The concept flow schematic is shown on Figure ES.13.

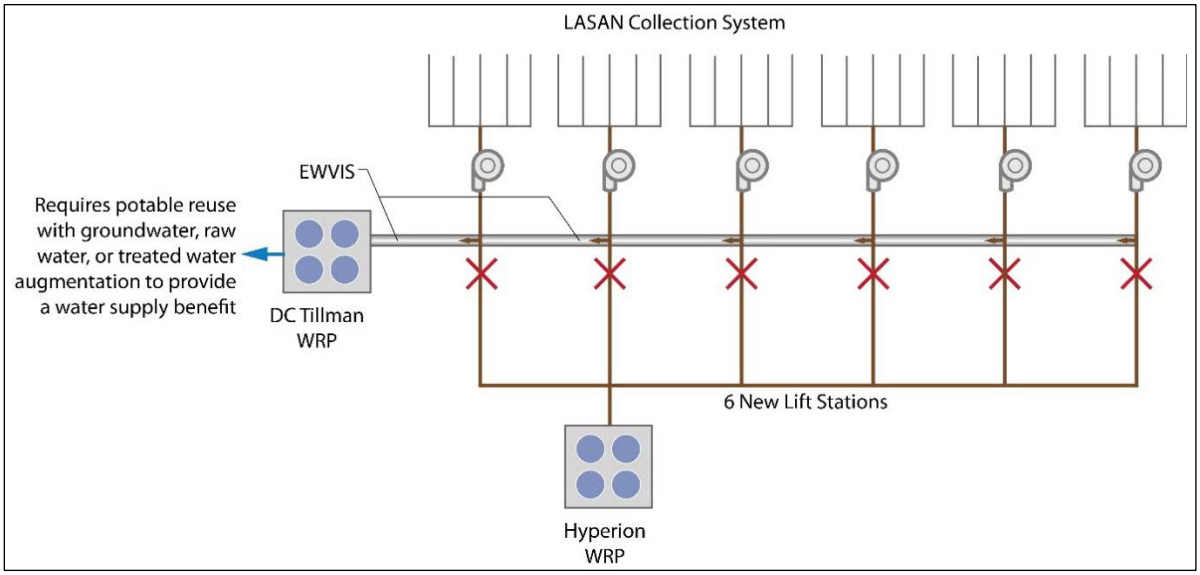


Figure ES.13 East-West Valley Interceptor Sewer

The key benefit associated with the implementation of the EWVIS includes, but is not limited to:

- Maximizing the City water reclamation plants' available production and reuse capacity (i.e. direct water where it is needed) by redirecting wastewater from one sewershed to another.

Moreover, this concept option helps fulfill the following One Water LA objectives and guiding principles:

- Implement, monitor, and maintain a reliable wastewater system.
- Improve local water supply reliability.

ES.9.2 Recommended Future Integration Opportunities

As shown in Table ES.1 and on Figure ES.14, the corresponding estimated cost of the new concept options in the preferred portfolio is approximately $2.5 billion. Their yield-weighted average unit cost is approximately $1,600 per acre-foot, assuming that all projects can be fully used continuously.

As shown on Figure ES.14, most of the costs are associated with Concept Option #8A ($1 billion, or 39 percent) and Concept Option #13 ($900 million, or 36 percent). The remaining five concept options represent a total cost of $1 billion, or 35 percent of the total cost. As shown, the cost contribution of these six concepts ranges from 3 percent to nearly 39 percent of the total costs.

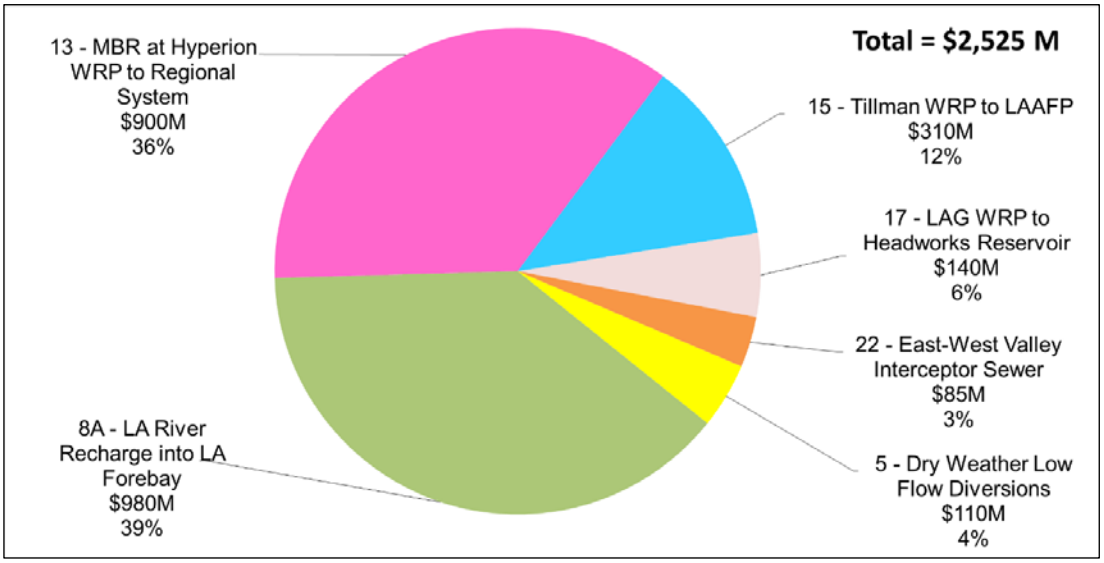


Figure ES.14 Estimated Cost Distribution of Future Integration Opportunities

ES.9.2.1 Trigger-based Implementation Strategy

The future integration opportunities cost phasing described above is based on the concept options in the preferred portfolio. However, as future conditions change, other concept options may become more attractive. To give the City a Plan that adapts to changing conditions, a trigger-based implementation strategy was developed. A trigger-based implementation strategy helps the City decide the best alternate concept options for its needs at a specific time in the future. If certain triggers do not materialize, other concept options could be alternatives to achieve the same overall goals.

As shown on Figure ES.15, the concept options in the preferred portfolio are referred to as Priority A, while alternative concepts are referred to as Priority B and Priority C. The dark blue rectangles indicate concept options providing potable and non-potable reuse solutions, while the light blue rectangles indicate concept options providing flow management solutions. The orange diamonds indicate decision points, called triggers. Each trigger may or may not occur, which is reflected in the "yes" or "no" answers to the question in the orange triangles.

For example, the first trigger question under LA River Storage and Use is "[Is there an] Institutional Agreement with [the] Water Replenishment District (WRD)?" If an agreement is established, one would follow the arrow labeled "yes" to the next trigger. If the City and WRD did not establish an institutional agreement, the arrow labeled "no" would be followed to the end of the flow chart labeled "no change."

City staff can continuously reevaluate all concept option priorities at each decision point (trigger) to account for any future changes in circumstances. In addition, neither project feasibility analyses nor phasing and implementation evaluations have been completed for the concepts. The trigger-based implementation strategy is discussed in detail in Chapter 9.

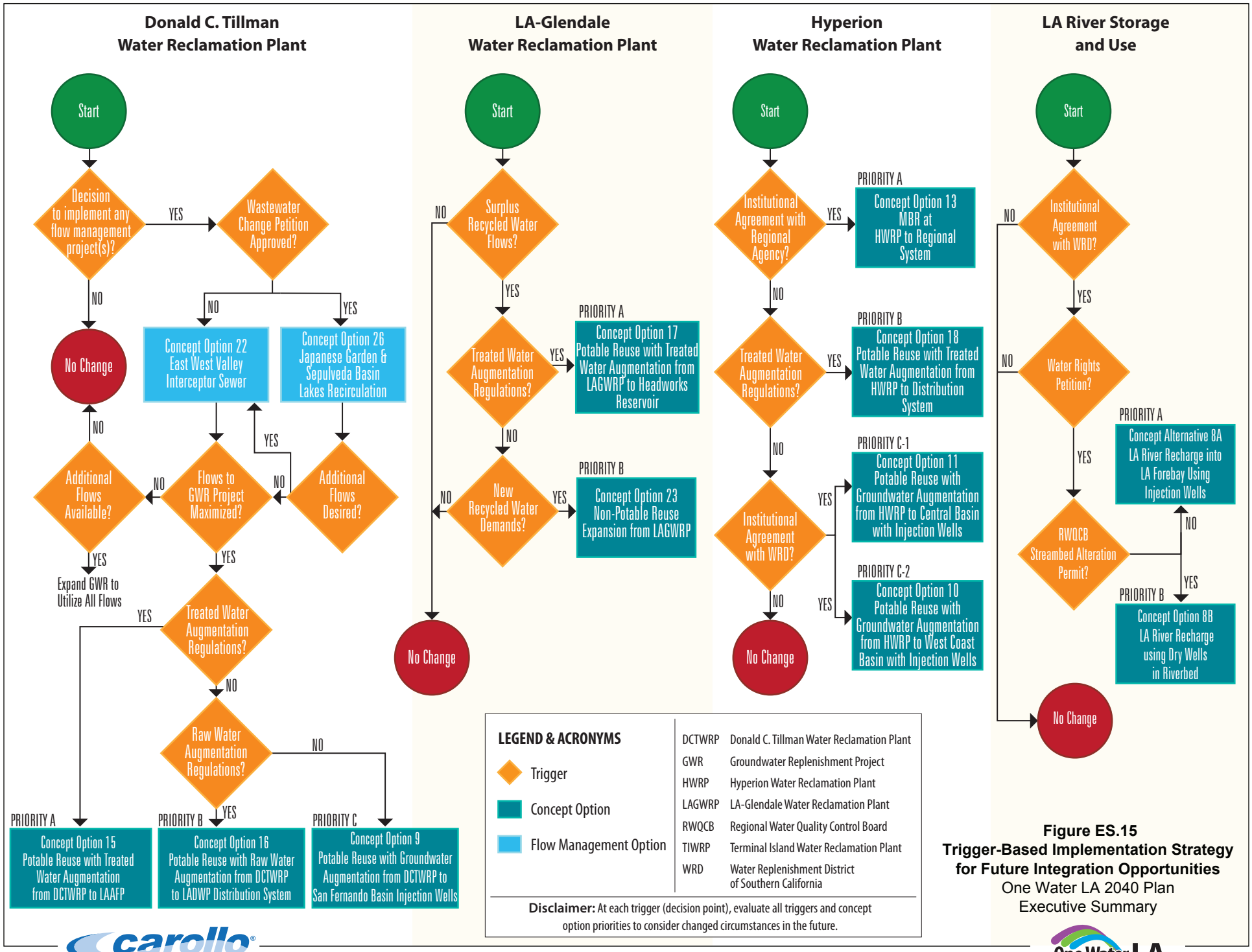


Figure ES.15
Trigger-Based Implementation Strategy for Future Integration Opportunities
One Water LA 2040 Plan
Executive Summary

24-LASAN-TM10-Implementation Strategy_5-18-8.5X11-ES.17

ES.10 POLICIES AND PROGRAMS

The Plan's policies and programs development approach builds on the experience gained and lessons learned during the Water IRP planning effort and One Water LA Phase 1. During One Water LA Phase 1, the steering committee requested "quick-fix" policies to facilitate better communication between departments and agencies and advance One Water LA Objectives and Guiding Principles more effectively. These policies and programs align with One Water LA's vision and are provided in Appendix E.

Under One Water LA Phase 2, the policy and program development process was expanded to include ideas and suggestions from both the steering committee and stakeholders. In total, over 200 policy and program ideas were collected that covered a variety of topics, such as:

- Integrated Planning and Design.
- Stormwater and Urban Runoff Management.
- Training and Education.
- Streamlining Collaboration and Implementation.
- Funding and Partnerships.
- Sustainability and Climate Change.
- Water Conservation.
- Recycled Water.
- LA River Revitalization.

An overview of the policy and program development process is shown on Figure ES.16. The last two steps, Feasibility Analysis and Phasing and Implementation, have not been completed and are ongoing efforts by the City. Chapter 9 includes a detailed explanation of the policy and program solicitation, development, consolidation, and prioritization process.

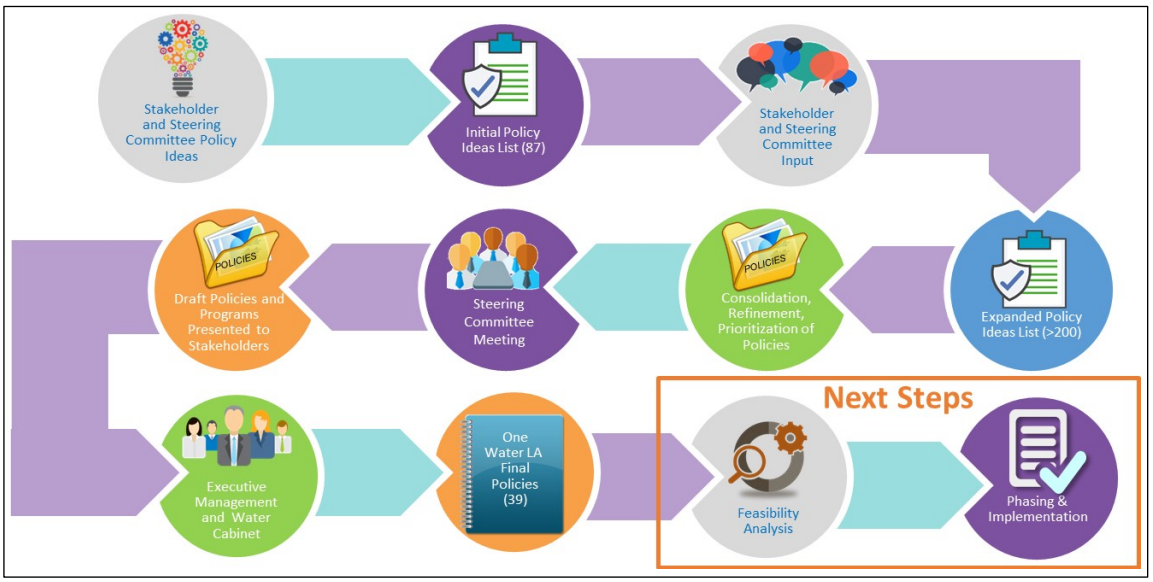


Figure ES.16 One Water LA Policy and Program Development Process

Table ES.2 summarizes the policy or program number, concept language, and lead and support agencies for the 39 recommended policies or programs. Each policy or program has several considerations that provide more context for implementation strategies. A more detailed table, which also includes the considerations, is included in Appendix F. Appendix F also identifies the policy and program prioritization category, the source(s) of the recommendation, if it meets multiple One Water LA Objectives, and if it was recommended to the Water Cabinet.

Policies and programs recommended by multiple sources and meeting multiple objectives were considered a higher priority in the initial prioritization process as they can have the greatest impact on achieving One Water LA Objectives and Guiding Principles and supporting the Sustainable City pLAn Goals.

To help advance policies and programs focused on integration, the One Water LA team presented the top 10 list of integration-related policy and program ideas to Mayor Garcetti's Water Cabinet. The Water Cabinet selected the following three policy and program ideas to champion for further advancement with the associated City departments:

- **Policy #12 –** Maximize opportunities to incorporate integrated water management strategies, including green infrastructure, into ongoing and emerging opportunities.
- **Policy #11 –** Create a citywide database to identify collaborative opportunities for water-related multi-benefit projects.
- **Policy #8 –** Maximize the use of city-owned property for stormwater capture retrofits.

All 39 prioritized policies and programs are intended to remove barriers and increase efficiency. However, continued collaboration with numerous City departments, regional agencies, stakeholders, and elected officials within the City is needed to further refine the policies and conduct thorough feasibility assessments. Implementing the majority of recommended policies and programs will result in cost impacts including rebates, progress monitoring, and administrative support. Future studies on these costs and the anticipated benefits will need to be conducted to help prioritize the policy and program ideas with the greatest benefits. Due to current lack of available cost information, the Plan does not include any cost estimates related to implementing policies and programs. Recognizing that policies and programs are a key component to a One Water approach, the recommended next steps for identifying costs and advancing the policies are described in Chapter 9.

Table ES.2	Summary of Prioritized Policies and Programs Summary Report One Water LA 2040 Plan		
Number	Policy and Program Concept Language	Lead Agencies	Support Agencies
1	Update efficiency requirements in City's retrofit on resale program.	LADBS	LASAN, LADWP
2	Research best method and establish tracking system for graywater installations throughout the city. Consider potential impacts of graywater systems on water supply needs.	LASAN	LADWP, LADBS
3	Develop graywater user education information and signage for areas irrigated with graywater.	LADBS, LASAN, LADWP	County Health
4	Develop best method to encourage drainage water from swimming pools to be discharged into the sewer system rather than a street or storm drain.	LASAN	GSD, RAP, LADWP, and others
5	Develop robust stormwater pollution source control education measures that increase awareness and public participation.	LASAN	Public Works
6	Simplify the process and remove barriers to installing parkway swales and other distributed green infrastructure BMPs in the public right-of-way.	BOE	LASAN, LAFD, BSS, DCP, LADOT
7	Simplify the process and remove barriers to installing distributed green infrastructure BMPs on private properties in the City.	LADBS	LASAN, BOE, DCP, Regional Agencies
8	Maximize use of City-owned property for stormwater capture retrofits.	All City Depts.	LADWP, LASAN
9	Develop templates for standardized maintenance agreements and provide training to ensure maintenance of collaborative stormwater projects in the City.	LASAN	All City Depts., Regional Agencies
10	Maximize water supply opportunities in water quality compliance and improvement projects and programs.	LASAN	All City Depts.
11	Create a city-wide database to identify collaborative opportunities for water-related multi-benefit projects.	LADWP, BOE, LASAN	All City Depts., Regional Agencies
12	Maximize opportunities to incorporate integrated water management strategies, including green infrastructure, into ongoing and emerging opportunities.	LASAN	All City Depts., LACFCD, Other Regional Entities
13	Investigate the development of a stormwater capture retrofit ordinance that would require installing stormwater capture projects in homes upon resale.	LASAN	TBD
14	Update the Street Tree Selection Guide to better address climate change and water concerns.	BSS	LASAN, DCP

Table ES.2	Summary of Prioritized Policies and Programs Summary Report One Water LA 2040 Plan		
Number	Policy and Program Concept Language	Lead Agencies	Support Agencies
15	Identify a sufficient water supply for establishing and maintaining green infrastructure.	LADWP, LASAN	Water Cabinet
16	Create a vehicle that allows for shared operation and maintenance duties between multiple public agencies or public/private entities for stormwater BMPs.	LASAN, LADWP	Water Cabinet, All City Depts.
17	Create a process to expedite approval of public projects that help meet the Sustainable City pLAn, Watershed Management Programs, and One Water LA's objectives.	LASAN, LADWP, LADBS, LADOT, BOE	Water Cabinet
18	Streamline the process and coordinate the timing of approvals for builders implementing LID and Green Building requirements.	DCP	LASAN, DCP, LADBS
19	Identify the process or entity that will coordinate and manage all street and alley improvement efforts in the City.	DCP, BSS, BOE	DOT, LADWP, LASAN
20	Create a vehicle for continued department and regional agency collaboration beyond One Water LA 2040 Plan Development.	LASAN	Water Cabinet, All City Depts.
21	Develop a protocol for when and how private property owners will maintain the City's right-of-way stormwater improvements.	LASAN	BOE, BSS, LADWP
22	Evaluate and implement the most effective methods to incentivize stormwater capture retrofits.	LASAN	LADWP
23	Develop incentive programs to encourage reducing paved areas and increasing permeable pavements.	LASAN	BOE, LADWP
24	Create a "Percent for Green" fund that supports constructing Green Street facilities, and dedicate a minimum percent for green infrastructure.	LASAN	All City Depts.
25	Evaluate the feasibility of a program that allows properties to generate Stormwater Retention Credits (SRCs) for voluntary implementation of green infrastructure that reduces stormwater runoff.	LASAN	LADWP
26	Develop property owner recognition programs to promote and acknowledge stormwater capture retrofits and other sustainable practices.	LASAN	LADWP
27	Create a program to evaluate and facilitate public-private partnerships for water projects.	LADWP, LASAN	All City Depts.

Table ES.2	Summary of Prioritized Policies and Programs Summary Report One Water LA 2040 Plan		
Number	Policy and Program Concept Language	Lead Agencies	Support Agencies
28	Create a program to facilitate partnerships between City departments, regional agencies, and Non-Profit Organizations for water-related projects and programs.	LASAN, LADWP	All City Depts.
29	Develop tools and best methods to facilitate agency cost-sharing for multi-benefit projects and programs.	LASAN	All City Depts.
30	Explore the potential for establishing an Enhanced Infrastructure Financing District or other appropriate funding mechanism to fund capital projects and sustainable operations and maintenance.	LASAN	Mayor's Office (LA RiverWorks, City Services, and Economic Development)
31	Expand partnerships between the City and academia to advance water-related research and innovation.	LADWP, LASAN	Academia
32	Integrate climate adaptation, mitigation, and resilience principles into the planning, design, construction, and operations of water-related projects.	Mayor's Office	All City Depts.
33	Require Green Street implementation to use sustainable elements and native or climate-appropriate flora compatible with local biomes.	BSS, LASAN	All City Depts.
34	Explore the feasibility of requiring the Sustainable Infrastructure Certification program Envision for large projects and create a program for staff certification.	BOE	All City Depts.
35	Expand education and engagement programs on potable reuse.	LADWP, LASAN	none identified
36	Expand "how to" training and education programs to increase understanding of green infrastructure systems, increase implementation participation, and improve performance.	LASAN	All City Depts.
37	Develop BMP training and certification programs for construction industry and landscape professionals.	BOE	LASAN
38	Develop guidelines for On-site Treatment Facilities (OSTFs) that protect public health and outline wastewater and recycled water systems' operation.	LASAN	LADWP
39	Develop a fee structure and payment guidelines for on-site treatment systems that reflect collection and treatment system impacts and costs.	LASAN	none identified

ES.11 ONE WATER LA IMPLEMENTATION STRATEGY

The Plan's recommendations are a compilation of select projects, programs, and policies developed to identify integration and collaboration opportunities that help achieve the One Water LA Vision, Objectives, and Guiding Principles. These plan recommendations are grouped into the following categories:

- Stormwater Projects (see Section ES.6 for details)
- Wastewater Projects (see Section ES.7 for details)
- Current Integration Opportunities (see Section ES.8 for details)
- Future Integration Opportunities (see Section ES.9 for details)
- Policies and Programs (see Section ES.10 for details)

The following sections summarize the phasing periods, plan recommendations, and funding strategies of the Plan.

ES.11.1 Phasing Periods

The recommended projects and programs identified in the Plan are grouped into three separate phases that cover the 23-year period from 2018 to the planning horizon of 2040. The three project phases identified for the Plan are:

- Near-Term Phase: 2018-2020
- Mid-Term Phase: 2021-2030
- Long-Term Phase 2031-2040

Note that the phasing presented in the Plan is subject to change due to the wide range of uncertainty and factors. Underlying assumptions, system conditions, funding opportunities, and regulatory conditions are also likely to change in the coming decades, which could influence future project needs and implementation.

ES.11.2 Plan Recommendations

The potential fiscal impacts of the Plan's recommendations are summarized in Table ES.3 based on the project category and phasing. The potential fiscal impact of all projects recommended in the Plan is $13.3 billion.

Table ES.3 Potential Fiscal Impacts for Plan Recommendations Summary Report One Water LA 2040 Plan

Project Category	Near-Term 2018 - 2020 ($M)	Mid-Term 2021-2030 ($M)	Long-Term 2031-2040 ($M)	Total 2018-2040 ($M)
Stormwater Projects[1]	**$2,538**	**$761**	**$2,292**	**$5,591**
Regional Grey	$106	$0	$476	$582
Regional Green	$739	$383	$1,329	$2,451
Distributed Green	$1,693	$378	$487	$2,558
Wastewater Projects[2]	**$1,030**	**$423**	**$1,937**	**$3,390**
Donald C Tillman WRP	$146	$121	$350	$618
LA-Glendale WRP	$72	$75	$80	$227
Hyperion WRP	$106	$116	$1,280	$1,501
Terminal Island WRP	$65	$33	$204	$303
Collection System	$641	$78	$22	$741
Current Integration Opportunities[3]	**$297**	**$1,000**	**$500**	**$1,797**
Top 5	$297	$0	$0	$297
30 Other	$0	$1,000	$500	$1,500
Future Integration Opportunities[4]	**$85**	**$1,090**	**$1,350**	**$2,525**
5 - Dry Weather Low Flow Diversions	$0	$110	$0	$110
8A - LA River Recharge into LA Forebay	$0	$980	$0	$980
13 - MBR at HWRP to Regional System	$0	$0	$900	$900
15 - Donald C Tillman WRP to LAAFP	$0	$0	$310	$310
17 – LAGWRP to Headworks Reservoir	$0	$0	$140	$140
22 - East-West Valley Interceptor Sewer	$85	$0	$0	$85
Policies and Programs[5]	**TBD**	**TBD**	**TBD**	**TBD**
Total	**$3,950**	**$3,274**	**$6,079**	**$13,303**

Notes:

(1) A complete listing of the Stormwater Improvement Program is included in Appendix D.
(2) A complete listing of the Wastewater Capital Improvement Program is included in Appendix C.
(3) A complete listing of the Current Integration Opportunities is included in Chapter 5.
(4) A complete listing of the Future Integration Opportunities is included in Chapter 6 and Appendix B.
(5) A complete listing of the prioritized policies, programs, action items, and research ideas are included in Appendix E.

Note the following regarding the information in Table ES.3.

- The Plan's recommendations are not intended as a city-wide capital improvement plan. Many water-related projects planned to be implemented by individual city departments, without the need for extensive collaboration, are not included.
- The Plan's recommendations include projects from other plans, such as the EWMPs and SCMP. The total estimated cost is thus not an entirely new capital improvement program that would require new funding. Instead, many projects, such as the green streets programs, overlap with the City's previous commitments.
- A large portion of the future integration opportunities consist of major water recycling projects, which also include advanced treatment facilities that would need to be constructed at the City's WRPs. To avoid double-counting, the cost associated with the concept options are only included in the future integration opportunities and not included in the wastewater CIP cost presented in Table ES.3.
- All cost estimates are based on high-level planning assumptions and need to be updated and refined as the planning process evolves from conceptual to design.
- The project layout, timing, and sizing of many of the Plan's recommendations come with significant uncertainty. Some project components might not be implemented within the Plan's planning horizon.
- Due to the current lack of available cost information, the Plan does not include any cost estimates related to implementing policies and programs. A thorough feasibility assessment and cost-benefit analysis for each suggested policy and program is planned so the estimated cost can be included in future Plan updates.

The distribution of potential fiscal impacts by project category is shown graphically on Figure ES.17. As shown, stormwater projects and programs contribute to the largest portion of the total cost ($5.6 billion or 42 percent), followed by wastewater projects ($3.4 billion or 25 percent) and future integration opportunities and strategies ($2.5 billion or 19 percent). The smallest cost category is the current integration opportunities ($1.8 billion or 14 percent).

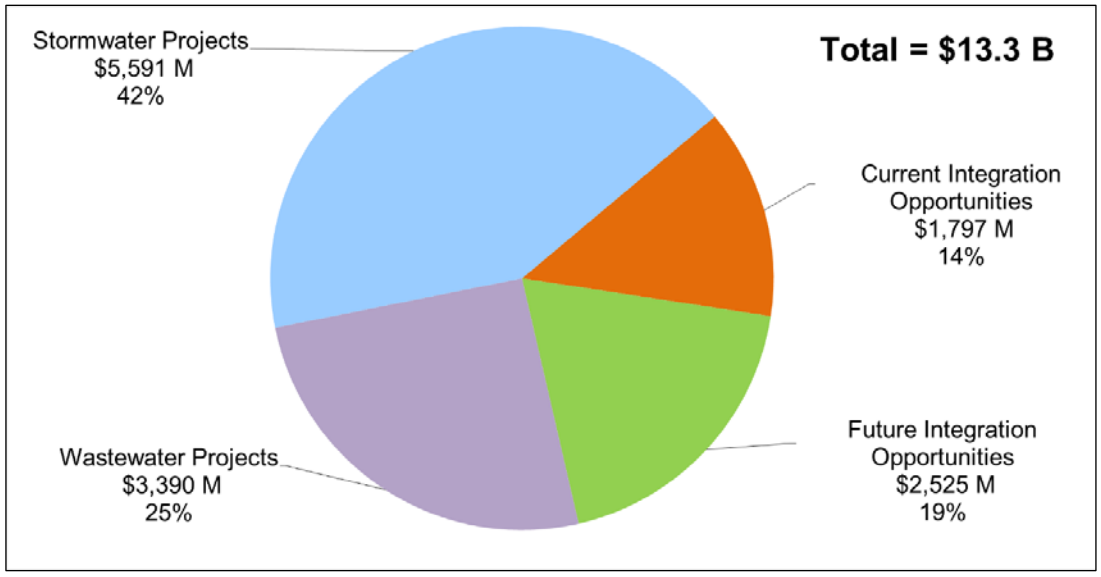


Figure ES.17 Potential Fiscal Impact by Project Category

Given the Plans' adaptive and trigger-based nature, the $13.3 billion does not necessarily represent a total cost incurred by the City. Instead, it represents the potential fiscal impact of all recommended projects and programs. Because some of these projects may not come to fruition due to trigger monitoring and future conditions, the total cost incurred by the City is likely to differ from the totals presented.

The phasing of potential fiscal impacts by project category is shown on Figure ES.18. As shown, the potential fiscal impact breakdown by phase is as follows:

- $3.9 billion for the near-term phase
- $3.3 billion for the mid-term phase
- $6.1 billion for the long-term phase

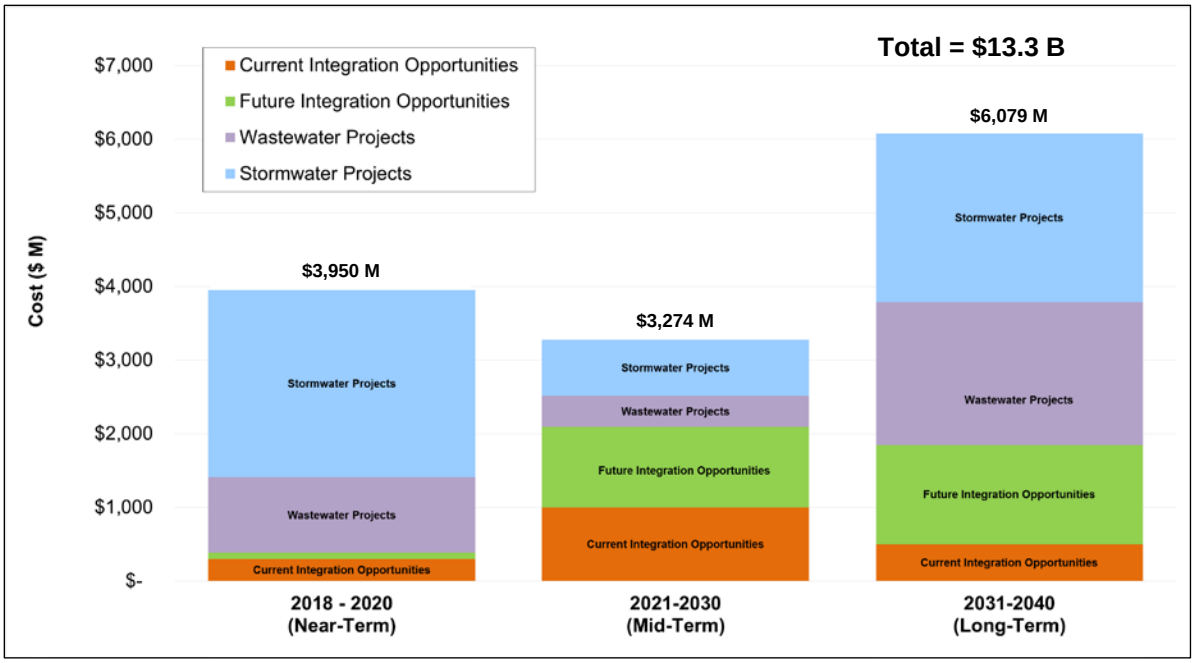


Figure ES.18 Potential Fiscal Impact by Phase and Project Category

In the planning process, several projects might be either infeasible or not required under future circumstances. Furthermore, when reviewing the phasing of projects, programs, and concept options, several events and conditions (known as "triggers") can affect the timing of the recommendations in the Plan.

Due to the complexity and magnitude of the One Water LA 2040 Plan development, a large number of unforeseen conditions and trigger events are possible. As a result, the planned phasing should be considered preliminary and likely to change. Also, phasing the stormwater improvement program (SIP) is heavily front-loaded due to the rapidly approaching TMDL compliance deadlines, which are the primary trigger for most of the SIP projects.

ES.11.3 Funding Needs and Recommendations

The total estimated cost of the projects and programs developed for the Plan is roughly $13 billion, excluding the recommended policies as noted in Section ES.10. Because a portion of the Plan recommendations supplement the CIPs of individual departments, implementing the Plan would require funding beyond the City's currently planned projects and operations and maintenance (O&M) expenditures.

When the total estimated fiscal impacts of the Plan recommendations is evenly distributed over the next 25 years, the $13 billion of capital projects equates roughly to $500 million per year in 2017 dollars, not including the additional O&M costs associated with the new projects. The stormwater improvement program alone is estimated to add another $250 million in O&M costs annually by 2040. Implementation of these projects will be determined by regulatory requirements, available funding, and resources.

To address the Plan's funding needs, ideas and recommendations were gathered from discussions between City staff and a wide range of stakeholders during the Plan's development. The recommendations related to funding are described in Chapter 10.

ES.11.4 Funding Strategies

The Plan's recommended projects and programs could have access to diverse funding sources. For some funding sources, limitations or restrictions could affect the availability of funding. Consequently, understanding the grants, loans, tax measures, and rate revenue sources available to each participating City department and regional entity provides the first step toward optimizing the use of the sources and selecting the appropriate funding approach.

Departments that participate in the comprehensive One Water LA planning process must also consider how much staff time must be invested. Furthermore, to secure funds, a more involved application and role in dispersing funds are required. Overall, participating agencies must consider their return on the investment that each funding source provides. To provide a foundation for the selection process and approach to pursuing the appropriate source, a list of funding sources available to City departments and regional agencies was compiled. The funding sources include, but are not limited to, the following:

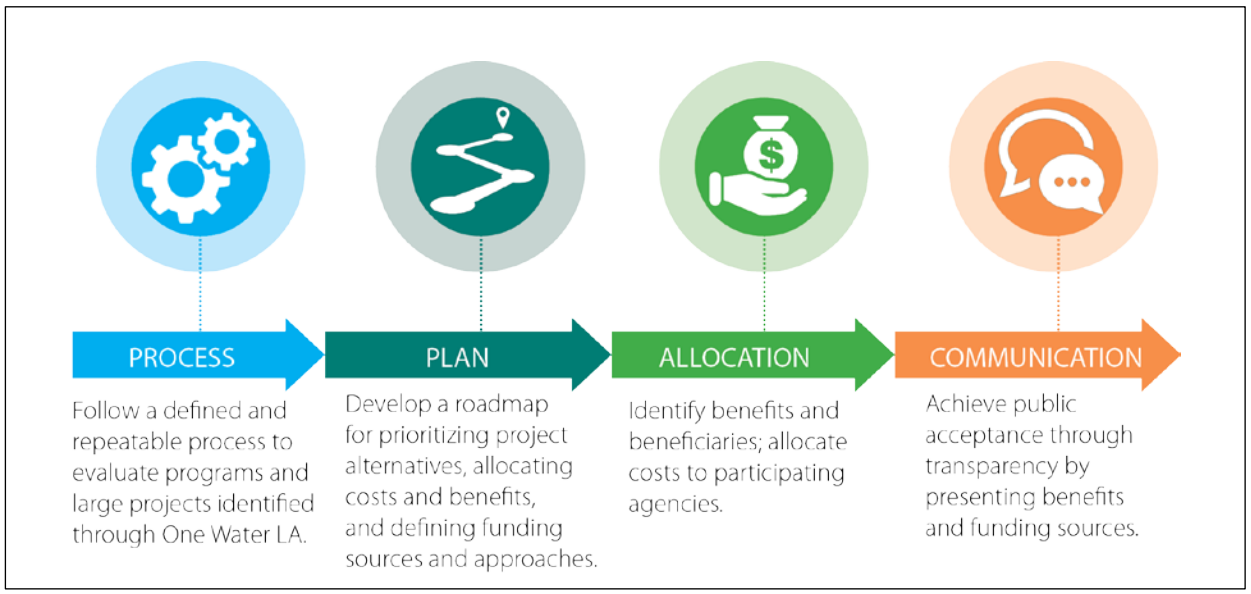
- Existing Utility Revenue
- Voter-Approved Tax Measures (includes Measure A and Measure M)
- Grants and Loan Programs
- Regional Partnerships:
  - Public Private Partnerships
  - Partnerships with private owners and volunteers
- Additional Alternatives

Central to a funding strategy is a discussion of how participating agencies shall fund programs. Due to the integrated nature and regional benefit of the projects identified through One Water LA, many secondary and indirect beneficiaries are anticipated.

Any agency that chooses to receive a benefit and would like to participate in the project may or may not have allocated project costs based on their share of the project benefits. Each participating party's contributions shall be determined on a project- or program-specific basis. Cost-sharing requires a process that will involve some of the following factors:

- Benefits to the respective agency.
- Other secondary partner agencies that might also benefit from the project, either directly or indirectly.
- The ability to participate in and fund the agency's respective share of the program.

As part of the Plan's development, a series of Special Topic Group meetings involved discussing "Funding Strategies." A cost-sharing process was then developed to implement a repeatable and transparent plan for each program or project. The cost-sharing process is shown below, with a more detailed description and considerations for a benefit-based cost allocation of both capital and O&M costs described in Chapter 10.



City staff and stakeholders developed a repeatable and transparent cost-sharing process that each program or project could follow.

ES.12 NEXT STEPS

The One Water LA 2040 Plan is intended to be more than a plan -- it's a comprehensive strategy for managing water in an integrated way to achieve the One Water LA Vision.

The City will undertake a number of immediate and near-term steps to start implementing the findings and recommendations presented in the Plan. These steps are described below and include the following:

1. Prepare a Programmatic Environmental Impact Report (PEIR).
2. Continue Inter-Departmental Collaboration and Coordination.
3. Continue Stakeholder Engagement and Public Outreach.
4. Further assess and develop policies and programs.
5. Pursue funding strategies to implement the Plan.
6. Complete Future One Water LA Plan Updates and Reporting.

These activities are critical to One Water LA's success, identifying multi-departmental and multi-agency integration opportunities to efficiently, cost-effectively, and sustainably manage water. The One Water LA 2040 Plan represents the City's continued and improved commitment to collaboration and integrated management of all its water resources and implementation of innovative solutions. The Plan will help guide future strategic decisions when prioritizing and implementing integrated water, wastewater, and stormwater infrastructure projects, programs, and policies within the City.

Adel Hagekhalil (LASAN's Assistant Director) and Marty Adams (LADWP's Chief Operating Officer) led the regional collaboration at a VerdeExchange Water Charette (June, 2017)

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Shawn Warren	Friends of the Los Angeles River
Sherri Akers	Mar Vista Community Council
Sherry Sidick	California State University Northridge
Shona Ganguly	The Nature Conservancy
Sonia Lopez	Individual
Stephanie Barton	SLRC
Stephanie Pincetl, PhD	UCLA, Institute of the Environment
Stephanie Taylor	Green LA Coalition
Stephen Mejia	Friends of the Los Angeles River
Steve Johnson	Heal the Bay
Steven Quat	Studio City Neighborhood Council
Steven Williams	Selva International-Eco Gardens; Surfrider Foundation -Eco Friendly Gardens
Sue Ann Ballat	Gang Alternatives Project
Susan Brownstein	California Department of Public Health
Suzanne Sharkey	NWRI
Tamsyn Hunnewell	Sustainable Works
Tawny Valencia	DigDeep
Theresa Deitlin	Individual
Tom Persons	Habitat Works
Tom Williams, M.S., Ph.D.	Citizens Coalition for a Safe Community/Sierra Club Water Committee
Tony Wilkinson	Neighborhood Council MOU Oversight Committee
Tracy Quinn	Natural Resources Defense Council
Tracy Seligman	Individual
Ty Teissere	Greywater Action
Vanessa Thompson	Arup
Vera Padilla	Lincoln Heights Neighborhood Council
Veronica Padilla	Pacoima Beautiful
Walker Foley	Food and Water Watch
Wendy Ramallo	Council for Watershed Health
Wendy Talaro	Biomimicry Los Angeles
Yareli Sanchez	Council for Watershed Health

* Over three hundred additional stakeholders received meeting invitations and informational updates.

ATTACHMENT B: GLOSSARY

Aqueduct	A pipe, conduit, or channel designed to transport water from a remote source, usually by gravity.
Aquifer (Confined)	Soil or rock below the land surface that is saturated with water. There are layers of impermeable material both above and below it and it is under pressure so that when the aquifer is penetrated by a well, the water will rise above the top of the aquifer.
Aquifer (Unconfined)	An aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall.
Artificial Recharge	Any process where water is put back into ground-water storage from surface-water supplies such as irrigation, or induced infiltration from streams or wells.
Augmentation	The process of adding recycled/ reclaimed water that has received advanced treatment to an existing raw water supply (such as a reservoir, lake, river, wetland, and/ or groundwater basin) that could eventually be used for drinking water after further treatment.
Base flow	Sustained, low flow discharge rate in a stream derived from groundwater discharge into the stream channel. During extended periods of low precipitation, base flow may account for most, or all, of the stream flow.
Beneficial uses	Designations for water bodies that (in California) Regional Water Quality Control Boards establish so appropriate water quality objectives can be established for that water body.The designated beneficial uses, together with water quality objectives form water quality standards. Such standards are mandated for all water bodies within the state under the California Water Code. In addition, the federal Clean Water Act mandates standards for all surface waters, including wetlands. In the Los Angeles Region, there are 24 Beneficial Use designations. Example designations include Municipal and Domestic Supply (MUN), Water Contact Recreation (REC-1), Wetland Habitat (WET), and Marine Habitat (MAR).
Central Basin	The groundwater basin underlying Central Basin Area.
Collection system	The network of piping and pumping stations that conveys raw wastewater (sewage) from homes, businesses, etc., to a facility for treatment.
Conservation	Act of using the resources only when needed for the purpose of protecting from waste or loss of resources.
Council	The City Council of Los Angeles
Discharge	The volume of water that passes a given point within a given period of time. It is an all-inclusive outflow term, describing a variety of flows such as from a pipe to a stream, or from a stream to a lake or ocean.
Downstream	In the direction of a stream's current. For example, in the City of Los Angeles Hyperion Wastewater Treatment Plant is downstream to Donald C. Tillman Plant and the Los Angeles-Glendale Water Reclamation Plant; these plants are able to provide critical hydraulic relief to the City's major sewers downstream
Drought	A long period of below-average precipitation.
Dry Weather Urban Runoff	Runoff to the storm drain system that occurs when there is no measurable precipitation. Typically includes flows from car washing, landscape irrigation, street washing, dewatering during construction activities, and illicit connections and dumping into the storm drains.
Dry Well	An excavated pit lined with gravel or other porous materials to infiltrate stormwater.
Effluent	Municipal sewage or industrial liquid waste (untreated, partially treated, or completely treated) that flows out of a treatment plant, septic system, pipe, etc.
Filtration	A process that separates small particles from water by using a porous barrier to trap the particles and allowing the water through.

Flood	An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean.
Graywater	Gray water includes wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.
Green Infrastructure	An adaptable term used to describe an array of products, technologies, and practices that use natural systems – or engineered systems that mimic natural processes – to enhance overall environmental quality and provide utility services. As a general principal, Green Infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff.
Groundwater	(1) Water that flows or seeps downward and saturates soil or rock, supplying springs and wells. The upper surface of the saturate zone is called the water table. (2) Water stored underground in rock crevices and in the pores of geologic materials that make up the Earth's crust.
Groundwater Recharge	Inflow of water to a groundwater reservoir from the surface. Infiltration of precipitation and its movement to the water table is one form of natural recharge. Also, the volume of water added by this process.
Imported Water	Water brought into the City of Los Angeles from a non- tributary source either from the Los Angeles Aqueduct, through purchase directly from the Metropolitan Water District of Southern California or by direct purchase from a member agency.
Infiltration	The absorption of water into the ground. The rate at which infiltration occurs is expressed in terms of depth per unit time, such as inches/hour.
Influent	Water volume flow rate or mass loading of a pollutant or other constituent into a water body or wastewater treatment plant.
Injection well	Refers to a well-constructed for the purpose of injecting treated wastewater directly into the ground. Wastewater is generally forced (pumped) into the well for dispersal or storage into a designated aquifer. Injection wells are generally drilled into aquifers that don't deliver drinking water, unused aquifers, or below freshwater levels.
Integrated Resource Planning (IRP)	A method for looking ahead using environmental, engineering, social, financial, and economic considerations; includes using the same criteria to evaluate both supply and demand options while involving customers and other stakeholders in the process.
Irrigation	The controlled application of water for agricultural purposes through manmade systems to supply water requirements not satisfied by rainfall.
Low Flow	Minimum instantaneous stream flow during periods of low water runoff.
Low Impact Development (LID)	A sustainable landscaping approach that can be used to replicate or restore natural watershed functions and/or address targeted watershed goals and objectives.
Membrane Bioreactor MBR	A type of biological wastewater treatment process.
Non-Potable	Water that may contain objectionable pollution, contamination, minerals, or infective agents and is considered unsafe and/or unpalatable for drinking.
Osmosis	The movement of water molecules through a thin membrane. The osmosis process occurs in our bodies and is also one method of desalinating saline water.
Outfall	Location point where wastewater or stormwater flows from a conduit, stream, or drainage ditch into natural waters.
Percolation	The gradual downward flow of water from the surface of the earth into the soil.
Pollutant	A contaminant in a concentration or amount that adversely alters the physical, chemical, or biological properties of a natural environment. The term includes pathogens, toxic metals, carcinogens, oxygen demanding substances, or other harmful substances.

Porous Pavement	A special type of pavement that allows rain to pass through it and infiltrate into the underlying soil, thereby reducing runoff from the site and surrounding areas.
Potable Reuse	A general term for the use of recycled water to augment drinking water supplies. Potable reuse, which covers both indirect and direct potable reuse, involves various forms of treatment options.
Potable Water	Water that is satisfactory for drinking and cooking.
Receiving Waters	Creeks, streams, rivers, lakes, estuaries, groundwater formations, or other bodies of water into which surface water and/or treated or untreated wastewater are discharged, either naturally or in man-made.
Recharge	The process by which precipitation seeps into the groundwater.
Recycled Water	Treated wastewater that meets appropriate water quality requirements and is reused for a specific purpose.
Retention Basin	Surface or underground basin that captures flow and retain it until water infiltrates into the soil.
Reverse Osmosis (RO)	A method of removing salts or other impurities from water by forcing water through a semi-permeable membrane.
Runoff	The excess portion of precipitation that does not infiltrate into the ground, but "runs off" and reaches a stream, water body or storm drain.
Stakeholders	Individuals and organizations that are involved in or may be affected by a proposed action, such as construction and operation of a water recycling project.
Tributary	A lower order stream compared to a receiving waterbody. "Tributary to" indicates the largest stream into which the reported stream or tributary flows.
Ultraviolet Treatment (UV)	The use of ultraviolet light for disinfection.
Urban Runoff	Water derived from surface runoff or shallow groundwater discharge from urban land use areas.
Urban Water Cycle	The Water Cycle in an urban environment; includes the consequences of increased development. More development and more concrete means less infiltration of rainwater into the soil, and more runoff.
Wastewater	Usually refers to effluent from an industrial or municipal sewage treatment plant.
Wastewater Treatment	Wastewater treatment process that includes combinations of physical and chemical operation units designed to remove nutrients, toxic substances, or other pollutants. Advanced, or tertiary, treatment processes treat effluent from secondary treatment facilities using processes such as nutrient removal (nitrification, denitrification), filtration, or carbon adsorption. Tertiary treatment plants typically achieve about 95% removal of solids and BOD in addition to removal of nutrients or other materials.
Water Cycle	The circuit of water movement from the oceans to the atmosphere and to the Earth and return to the atmosphere through various stages or processes such as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transportation.
Water Quality	A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.
Water Reclamation	(1) The treatment of water of impaired quality, including brackish water and seawater, to produce a water of suitable quality for the intended use. (2) A term synonymous with water recycling.
Water Reclamation Plant	A facility designed to receive the wastewater from domestic sources and to remove materials that damage water quality and threaten public health and safety when discharged into receiving streams or bodies of water. The substances removed are classified into four basic areas: 1. greases and fats; 2. solids from human waste and other sources; 3. dissolved pollutants from human waste and decomposition products; and 4. dangerous microorganisms. Most facilities employ a combination of mechanical removal steps and bacterial decomposition to achieve the desired results. Chlorine is often added to discharges from the plants to reduce the danger of spreading disease by the release of pathogenic bacteria.
Water Recycling	The process of treating wastewater for beneficial use, storing and distributing recycled water, and the actual use of recycled water.
Watershed	The area or region of land draining into a common outlet such as a river or body of water. Synonymous with river basin or drainage basin.

ATTACHMENT C: LIST OF ABBREVIATIONS

Abbreviation	Description
$/AF	dollars per acre-foot
$M	millions of dollars
AF	acre-feet
AFY or afy	acre-feet per year
AWPF	Advanced Water Purification Facility
BMPs	Best Management Practices
BOD	biochemical oxygen demand
BOE	Los Angeles Bureau of Engineering
BSS	Bureau of Street Services
CIP	Capital Improvement Plan
City	City of Los Angeles
DCP	Department of City Planning
DCTWRP	Donald C. Tillman Water Reclamation Plant
DWP	Department of Water and Power
EWVIS	East-West Valley Interceptor Sewer
GIS	Geographic Information System
GSD	General Services Department
GWR	groundwater replenishment
HWRP	Hyperion Water Reclamation Plant
IRP	integrated resources plan
LA	Los Angeles
LA River	Los Angeles River
LA Zoo	Los Angeles Zoo
LAAFP	Los Angeles Aqueduct Filtration Plant
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LADBS	Los Angeles Department of Building and Safety
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
LASAN	Los Angeles Sanitation

Abbreviation	Description
LAUSD	Los Angeles Unified School District
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LFD	low flow diversion
LID	low impact development
MBR	membrane bioreactor
mg/L	milligrams per liter
mgd	million gallons per day
N/A	not applicable
NPR	non-potable reuse
O&M	operations and maintenance
One Water LA	One Water LA 2040 Plan
OSTFs	on-site treatment facilities
pLAn	Sustainable City pLAn
Prop O	Proposition O
R&R	replacement and rehabilitation
RAP	Los Angeles Department of Recreation and Parks
RWQCB	Regional Water Quality Control Board
SCMP	Stormwater Capture Master Plan
SIP	Stormwater Improvement Program
SWFP	Stormwater and Urban Runoff Facilities Plan
TBD	to be determined
TIWRP	Terminal Island Water Reclamation Plant
TMDL	total maximum daily load
UCLA	University of California Los Angeles
UWMP	Urban Water Management Plan
Water IRP	2006 Water Integrated Water Resources Plan
WCIP	Wastewater Capital Improvement Plan
WRD	Water Replenishment District
WRP	water reclamation plant
WWFP	Wastewater Facilities Plan


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