RIO HONDO
SAN GABRIEL
RIVER
WATER QUALITY GROUP

Rio Hondo/San Gabriel River

Revised Enhanced Watershed Management Program

Presented to: Los Angeles Regional Water Quality Control Board | Presented by: Rio Hondo/San Gabriel River Water Quality Group | March 30, 2018

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WATER QUALITY GROUP

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While the City of Azusa was a member of this Water Quality Group, they have elected to continue implementing the 2016 EWMP within their jurisdictional area, and therefore, are not included as a member agency participating in this rEWMP update.

TETRA TECH Document and analysis prepared by Tetra Tech, Inc., Pasadena, CA

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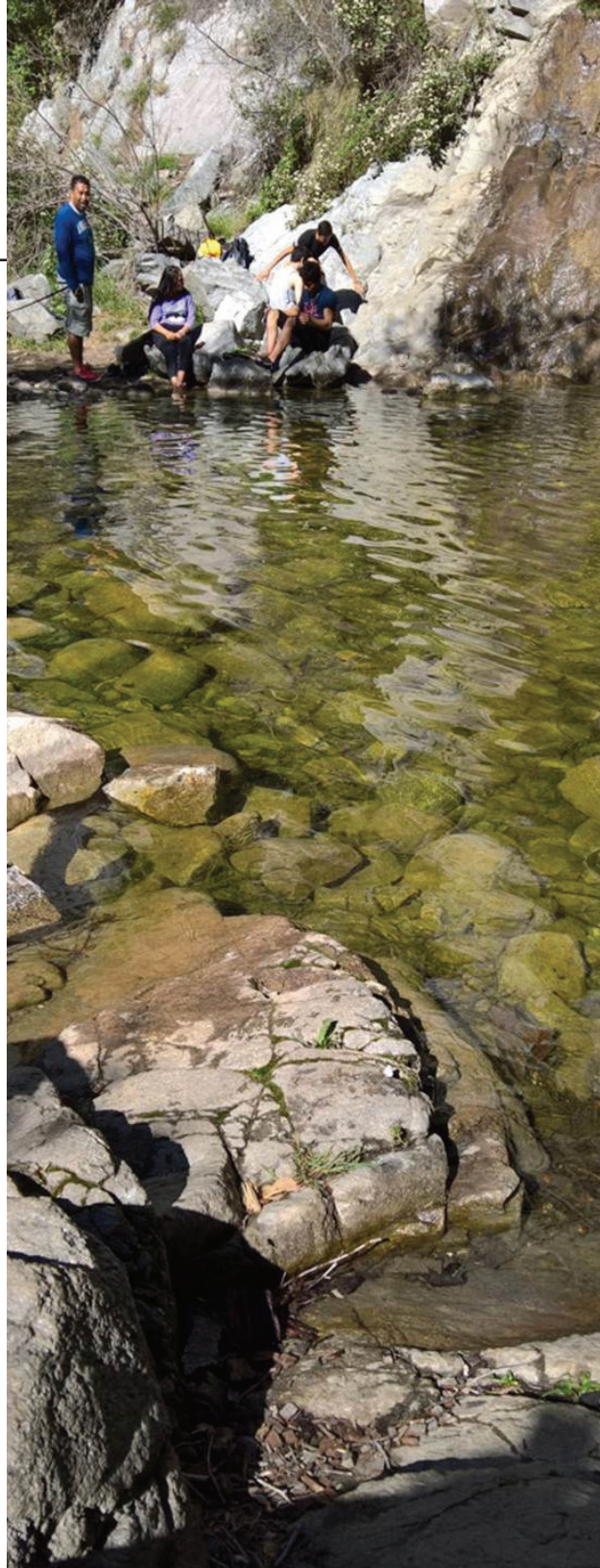


Peck Lake

1 DOCUMENT INTENT AND NAVIGATION

This revised Enhanced Watershed Management Program (rEWMP) improves upon some parts of the existing Rio Hondo/San Gabriel River Enhanced Watershed Management Program (EWMP), which was approved by the Los Angeles Regional Water Quality Control Board (Water Quality Control Board) on April 21, 2016. The Rio Hondo/San Gabriel River Water Quality Group (Water Quality Group) voluntarily developed the rEWMP in response to meaningful progress pursuing activities to improve water quality in the Rio Hondo and San Gabriel River watersheds.

The following chapters provide an approachable description of the guiding principles and methods for developing the rEWMP, and generally note how the original EWMP was updated using new data and improved watershed understanding; this document, together with the accompanying attachments and the 2016 EWMP, define the Water Quality Group's updated compliance plan. To clearly identify which sections of the original EWMP were formally amended by this effort, Attachment A provides a redlined version of the EWMP.

This document is curated to the following users:

Permittees and Practitioners – The Water Quality Group and their agents can use this document to guide watershed planning and decision making. Chapters 5 and 6 provide an initial pathway to clean water, and Attachment B includes detailed summaries of the multi-benefit projects currently on that pathway. Chapter 7 outlines next steps to inform adaptive management of the rEWMP as projects advance.

Regulators – The Regional Water Quality Control Board can use this document to review and track the Water Quality Group's progress towards compliance. Chapter 4 discusses the foundational updates to the EWMP and Attachment C provides technical details backing up the revised and enhanced reasonable assurance analysis. Chapter 6 outlines the clean water strategy, with specific actions and milestones.

Advocates and Stakeholders – Residents of the Rio Hondo and San Gabriel River watersheds, non-governmental organizations, and other stakeholders can use this document to learn more about how the Water Quality Group plans to actively improve water quality while also maximizing other benefits to the community and environment. Chapter 1 introduces the principles that guided development of the rEWMP, Chapter 3 describes public engagement efforts to date, and Chapter 5 discusses opportunities to participate in the program as it is implemented. While the rEWMP sets an initial direction for watershed improvements, the program is expected to evolve and adapt over time in response to continued public input and new watershed information.


Restoring
Baldwin Lake

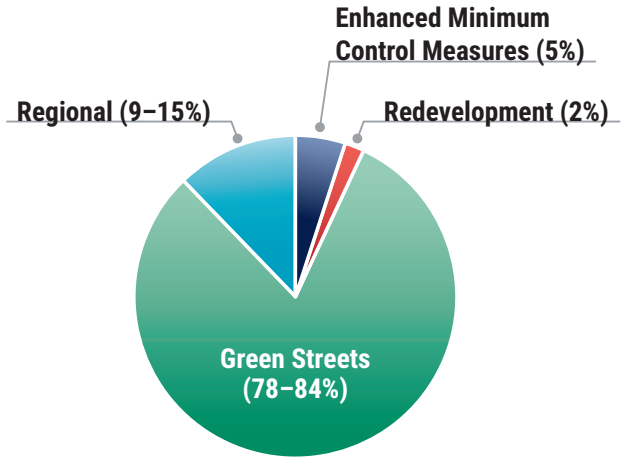
2 EWMP REIMAGINED

When it rains, urban stormwater runoff picks up pollutants from the land, including heavy metals, bacteria, and trash. These pollutants are then transported by storm drains directly to rivers, lakes, and beaches. Some waterbodies in the Los Angeles region are considered impaired by this stormwater pollution, which may impact certain beneficial uses to people and ecosystems.

The Water Quality Group recognized the importance of clean water, and in 2013 began developing the EWMP as a plan to reduce the amount of stormwater pollution being discharged from their jurisdictions. The EWMP identified an initial suite of programmatic stormwater best management practices (BMPs) that could be implemented to reduce the discharge of pollutants or eliminate them at the source (known as minimum control measures) or to capture and treat runoff using specially designed stormwater infrastructure (structural BMPs).

To demonstrate how the chosen BMPs would effectively improve water quality and help restore and protect the beneficial uses of impaired waterbodies, the EWMP performed a reasonable assurance analysis. A reasonable assurance analysis is a scientific exercise that (1) sets pollutant reduction targets and (2) estimates how many BMPs are required to meet those targets and achieve compliance.

2016 EWMP — *What Was Doing the Work?*



The reasonable assurance analysis in the 2016 EWMP recommended a menu of BMPs that was heavily weighted towards implementation of distributed green streets, which are structural BMPs built along roadways to intercept runoff from gutters; 436 miles of green streets were prescribed, which, end-to-end, would stretch from Los Angeles County to Tucson, Arizona.

In addition to green streets, the 2016 EWMP included 10 regional projects intended to capture stormwater from larger drainage areas, low-impact development (LID) projects constructed during re-development of parcels, and enhanced minimum control measures. The estimated price tag for the entire program exceeded $1.4B.

The Process

While the EWMP set an initial path to improve water quality, the Water Quality Group proactively decided to enhance the original EWMP through an iterative adaptive management process. The rEWMP was therefore developed to:

1. Improve the accuracy of the reasonable assurance analysis
2. Incorporate stakeholder input and
3. Bolster confidence that investments in the program will yield meaningful and cost-effective water quality improvement.

These updates result in a more robust and reliable compliance plan by applying more accurate metrics and methods.[1]

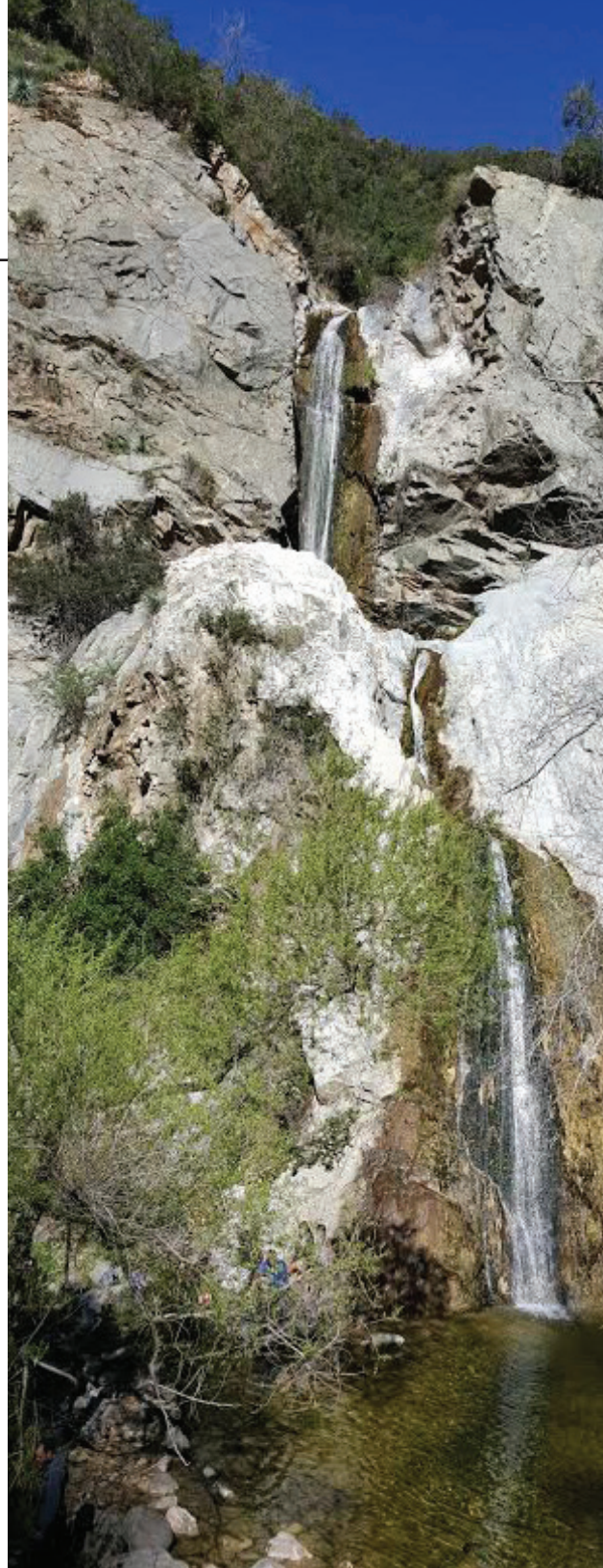
Another reason for creating the rEWMP was the Water Quality Group's enhanced understanding of the multi-benefit regional projects throughout the region. Emphasizing these regional multi-benefit projects will amplify the Water Quality Group's ability to align with other environmental objectives (e.g., water supply augmentation and ecosystem rehabilitation) which may enhance opportunities for funding by outside partners. The rEWMP will maximize the community benefits of regional projects and devise a green streets strategy which better integrates with the permittees' capital improvements planning process.

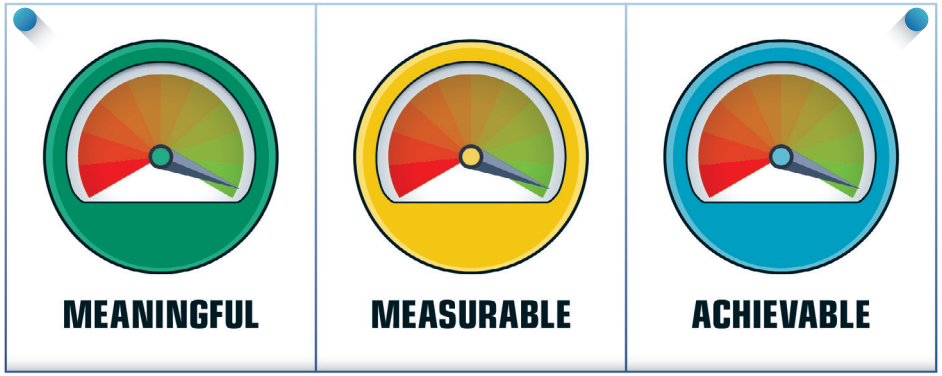
The rEWMP was also developed to take advantage of newly available monitoring data and a better understanding of water quality in the region. This new information is foundational to updating the watershed model and pollutant reduction targets that drive which BMPs and projects are needed to reach compliance.

The rEWMP emphasizes the attainment of protective, science-based, and cost-effective solutions through transparency and collaboration with regulators and environmental advocacy groups.

In addition to traditional rationale for rEWMP development, the Water Quality Group is investing in the rEWMP as an opportunity to break down walls and open lines of communication with stakeholders. These new lines of communication will help the permittees to arrive at solutions that have broad support and provide the benefits the community wants and needs. By using this collaborative process, the Water Quality Group shows that they are committed to pursuing and seeking funding for real, specific projects. This broad based support will help ensure that solutions are implemented and maintained over time, thereby increasing their resilience.

[1] Specifically, the rEWMP corrects the pollutant reduction target for lead, which was inaccurately reported in the 2016 EWMP.





rEWMP Guiding Principles

The rEWMP process was driven by the philosophy that each decision and outcome must be meaningful, measurable, and achievable. These guiding principles can be agreed upon by cities, regulators, and advocates alike, and provide a valuable test by which the final rEWMP can be judged.

Meaningful: Although some compliance strategies might satisfy guidelines on paper, they may not necessarily result in improvements to water quality in reality or provide additional, achievable community benefits. Outcomes should demonstrate potential for comprehensive water quality and quality of life improvements that are robust and resilient.

Measurable: The meaningfulness of a solution can only be truly understood if results can be measured over time. Using the best available science and data, the rEWMP includes metrics that will show how planned strategies will produce quantifiable results.

Achievable: There are many different pathways to arrive at meaningful and measurable results, but it is critical that the pathways are physically possible and built on sound engineering judgment. Achievable solutions should be cost-effective and facilitate meaningful outcomes which are manageable by local governments with limited resources.

Dry Well Treating Road Runoff and Recharging Groundwater in Sierra Madre

Water Quality Group Touring a Potential Multi-Benefit Regional Project (Basin 3E at Santa Fe Spreading Grounds)

3 COLLABORATION & PARTNERSHIPS

Often the hardest part of watershed planning is getting—and keeping—the right voices engaged in the conversation. To accomplish this the Water Quality Group identified who the stakeholders were and invited them to participate in a way that garnered trust and collaboration. This included a robust exchange of data, modeling assumptions, and programmatic details. The Water Quality Group was committed to having substantive and sustained dialogue with a variety of stakeholders during the development of the rEWMP and sharing any information that could enhance the final product. They went beyond the typical EWMP engagement protocol.

In addition, the Water Quality Group collaborated with the Regional Water Quality Board staff and actively sought staff input throughout the rEWMP development process.

The Water Quality Group understands planning behind closed doors stifles innovation and prevents lasting partnerships. This more collaborative approach led to, not only a rEWMP which is vastly more measurable, meaningful, and achievable than the original, but has laid the foundation for continued transparency and open communication during implementation of the program. The Working Group chose to "lead with science" using an objective planning process which includes all perspectives rather than only those of the permittees.

15
meetings held to exchange information and ideas

Productive meetings with stakeholders, along with numerous internal Water Quality Group meetings, produced the following outcomes and themes, which were used to steer the rEWMP:

- The **Water Quality Control Board staff** closely supported the Water Quality Group's efforts to achieve realistic, cost-effective solutions; they worked closely to review assumptions in real-time so that a meaningful rEWMP compliance story could be developed.
- Environmental advocacy groups, including **Natural Resources Defense Council, Los Angeles Waterkeeper, Amigos de los Rios, and Nature for All,** participated in a workshop with the Water Quality Group to discuss the specific rEWMP approach and broader (30,000-foot) philosophies for watershed management. The advocates shared their concerns with previous EWMPs that were too vague and presented a potential for stalling tactics instead of actionable progress. Participants from all groups were pleased to find common ground in the collaborative rEWMP approach that pursues cost-effective, solutions-oriented strategies using transparent, protective methods. The advocates supported the convergent planning that was embraced in the design of the multi-benefit regional projects, and tentatively agreed to continue working closely with the Water Quality Group and regulators to investigate ways that the compliance framework can be strengthened.
- The **Arboretum Working Group** was revived and facilitated by the Water Quality Group; this multi-agency group advocates for water quality projects at the Los Angeles County Arboretum, and includes representatives from the Arboretum, LA County Department of Parks and Recreation, LA County Department of Public Works, and the cities of Arcadia and Sierra Madre.
- The Water Quality Group engaged with their **local city managers oversight committee** and administrative leadership to develop top-down support for water quality planning and rEWMP projects.

"We appreciate the Rio Hondo/San Gabriel River Water Quality Group reaching out to LA Waterkeeper and the broader environmental community to discuss their efforts around updating their watershed management plan. We look forward to working with the group collaboratively as they move forward with a revised program that will ensure the health of the Rio Hondo and San Gabriel rivers."

—Bruce Reznik, Executive Director LA Waterkeeper

4 UNDER THE HOOD

As the Water Quality Group embarked on developing the rEWMP, they realized that it was important to take a closer look at the assumptions of the reasonable assurance analysis. By objectively reanalyzing the modeling data and assumptions—and allowing outside groups to do the same—they gained a better understanding of which data and decisions have the largest impact on the scale and cost of strategies needed to reach compliance.

Identifying those high-impact components and being transparent about their importance with stakeholders allowed the Water Quality Group to confidently enhance the program to yield more meaningful, measurable, and achievable water quality outcomes.

The following key enhancements are included in the rEWMP; refer to **Attachment C** for the technical details.

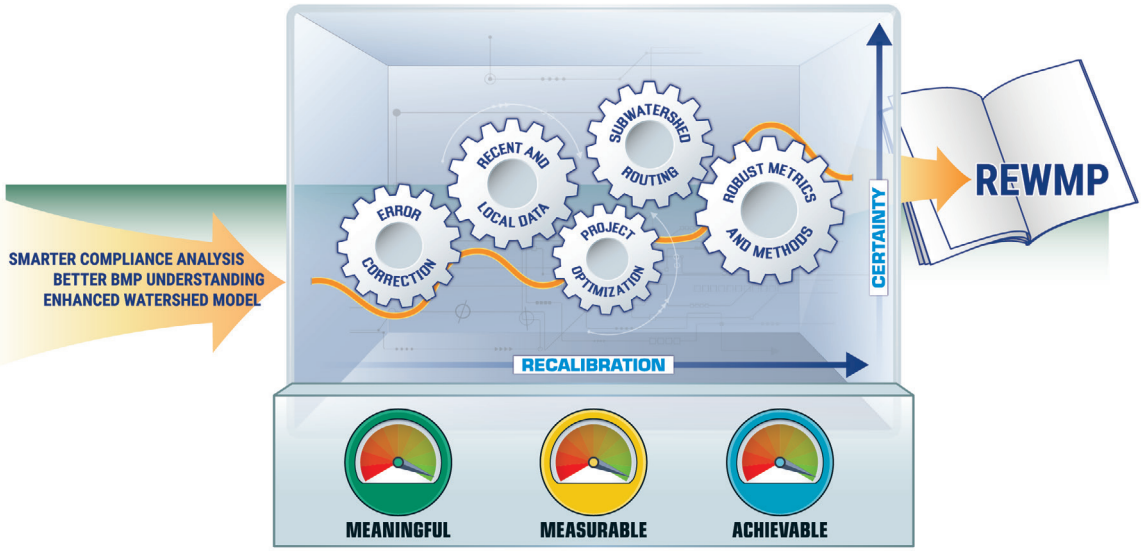
Recalibrated Watershed Model

The Water Quality Group worked with experts to update the baseline watershed model using the best available data and science. This was a critical step that deserved careful thought, because the watershed model is the foundation for all subsequent compliance analyses. It is important that the model be calibrated to best represent real conditions so that outcomes are meaningful when implemented in the watershed, and so that progress can be effectively compared to measurements collected during monitoring.

24,048
Monitored Flow Data Points Used in Recalibration

1990–2012 Recalibration Period to Consider Recent Data (Changing Climate)

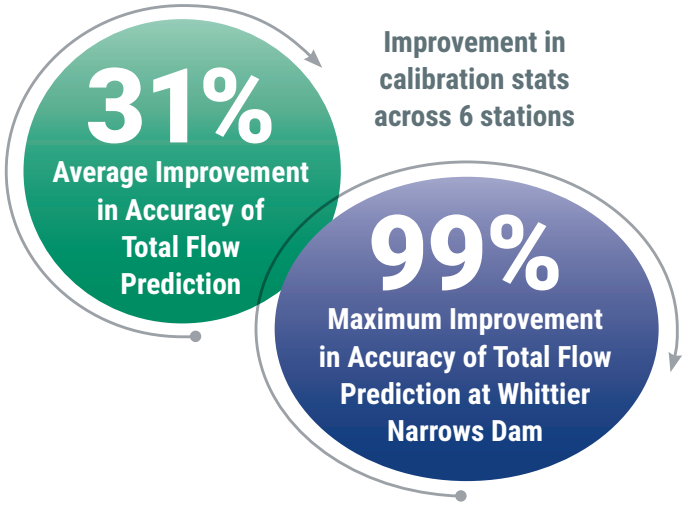
249
Monitored Water Quality Data Points Used



Enhancements

- The watershed was more accurately represented in the model to better capture the Water Quality Group's jurisdictional areas and upstream drainage. This provides a more meaningful representation of receiving water quality.
- Watershed model was improved to better represent flow through channels to the compliance point (instead of assuming instantaneous runoff).
- Watershed model was recalibrated using more recent, local monitoring data to substantially improve accuracy of runoff and water quality estimates.

Trail at Fish Canyon Falls



Better BMP Understanding

Once the watershed model was recalibrated to more accurately represent monitored data, specific project opportunities were investigated in depth to determine what is feasible and how projects could ensure that the maximum impacts of multiple benefits could be realized. Innovative, efficient, and practicable project concepts were established based on these investigations to provide higher certainty that rEWMP outcomes can be realized during implementation.

Enhancements

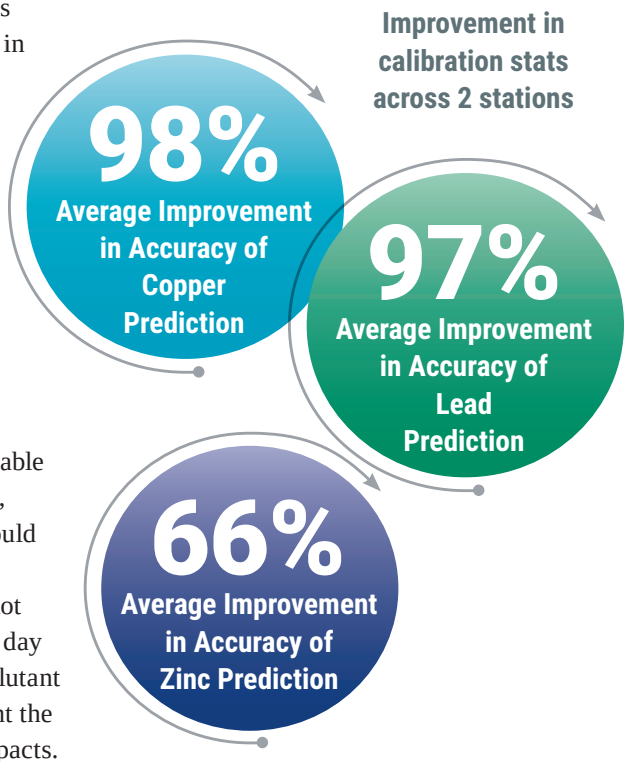
- Multi-benefit regional project concepts were developed through detailed site investigations and engagement with key stakeholders. The concepts were formed using realistic expectations for performance on the basis of pragmatic engineering considerations, such as hydraulic design constraints, geotechnical limitations, and long-term maintenance. Emphasis was placed on integrated, multi-objective projects to improve funding opportunities.
- The project-scale performance of multi-benefit regional projects was optimized using state-of-the-science tools to appropriately, conservatively, and mechanistically represent pollutant removal mechanisms (instead of simplified representations). This helps ensure that projects are designed to meaningfully address comprehensive pollutant reduction, are cost-effective (achievable), and will also ensure measured project performance will clearly tie back to modeled predictions.
- Distribution and design of distributed green streets were re-evaluated to help ensure that the right project is recommended in the right place. Potentially unsuitable streets were eliminated based on constraints such as steep slopes, soil contamination, and street type, and specific, street-scale land use data were used to improve representation of runoff draining to the green street opportunities. Cross sections and configurations were customized to the pollutants of concern and soil conditions throughout the area to help ensure more achievable and effective green street distribution.

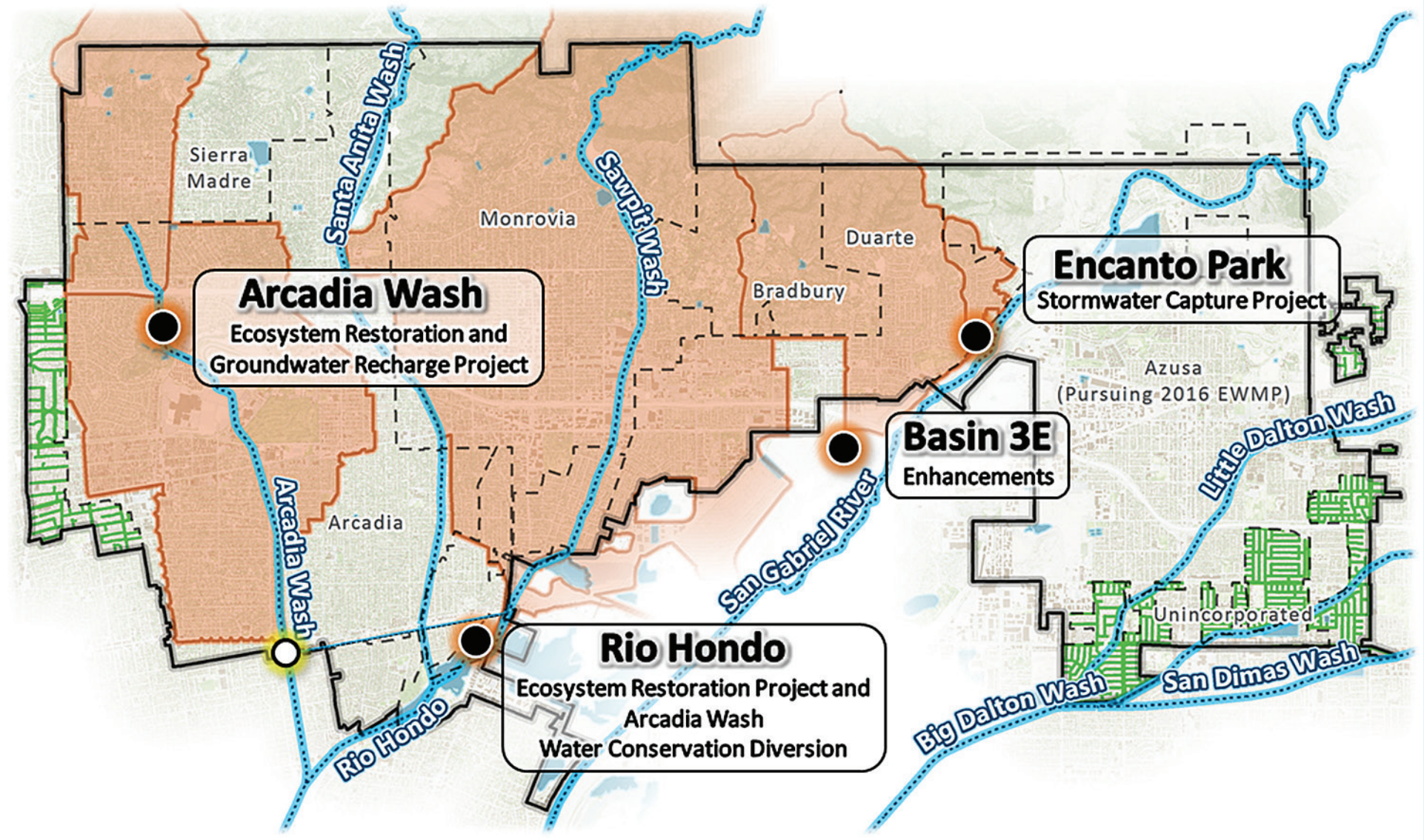
Smarter Compliance Analysis

Although it may seem like water quality permit requirements are explicit and prescriptive, there are numerous metrics and methods that impact how clean water is defined and planned for. One data point or decision can drastically change the compliance story, and these uncertainties can have billion-dollar consequences throughout the region. Through the collaborative rEWMP process, the Water Quality Group engaged regulators and other stakeholders to investigate compliance options and arrive at a robust implementation approach that utilized those options to "move the needle" towards compliance while also reducing uncertainties. The rEWMP compliance analysis is clearly linked to project and programmatic approaches which will result in meaningful, measurable, and achievable water quality improvement.

Enhancements

- The Water Quality Group re-interpreted water quality objectives using an enhanced, science-based understanding of the local conditions. Toxicity criteria were updated based on recent Basin Plan updates, new site-specific objectives, new monitoring data, and more conservative objectives. This effort also corrected an inaccurate water quality objective for lead that was used in the original EWMP. Carefully and meaningfully defining water quality objectives ensures that the pollutant reduction targets used in the reasonable assurance analysis will correspond with the targets enforced during monitoring.
- The conditions under which water quality objectives are evaluated has a substantial impact on how many compliance projects are needed and how their performance is measured. The Water Quality Group discovered that defining pollutant reduction targets using a short-term condition is not a reliable approach for watershed planning; rather, long-term planning and investments should be informed by a longer-term period of evaluation to ensure that decisions are not being made based on a single, arbitrary, day with a specific rainfall intensity and pollutant loading that may not accurately represent the longer-term discharge condition and impacts.
- Using the more accurate watershed model, improved water quality objectives, and more reliable critical condition, load reduction targets were computed for the compliance points specified during recalibration. These re-computed load reduction targets better align with long-term, meaningful improvement of receiving water quality, can be measured to assess progress over time, and are achievable compared to other proxy metrics.




Sierra Madre
Santa Anita Wash
Monrovia
Sawpit Wash
Duarte
Bradbury
Arcadia Wash
Ecosystem Restoration and Groundwater Recharge Project
Encanto Park
Stormwater Capture Project
Azusa
(Pursuing 2016 EWMP)
Basin 3E
Enhancements
Little Dalton Wash
Arcadia
Arcadia Wash
San Gabriel River
Unincorporated
Rio Hondo
Ecosystem Restoration Project and Arcadia Wash Water Conservation Diversion
Rio Hondo
Big Dalton Wash
San Dimas Wash

5 ENHANCED OUTCOMES

After recalibration of the watershed model, the Water Quality Group had increased confidence that investments in water quality projects would produce definitive water quality improvements. The group then funded a detailed study to devise an improved rEWMP BMP strategy which best leverages new and previously identified opportunities located within the Rio Hondo and San Gabriel River watersheds.

The result of this study was a list of multi-benefit regional projects and a refined distributed green street strategy customized to current, local water quality conditions. The recalibrated model confirmed—with high certainty—that implementing the rEWMP BMPs will achieve the desired water quality improvements and overall cleaner water.

Multi-Benefit Regional Projects

Four projects were identified by the Water Quality Group as key opportunities to meet the water quality goals multi-benefit objectives of the rEWMP:

- Arcadia Arboretum Ecosystem Restoration and Groundwater Recharge Project
- Rio Hondo Ecosystem Restoration Project and Arcadia Wash Water Conservation Diversion
- Encanto Park Stormwater Capture Project
- Basin 3E Enhancements at Santa Fe Spreading Grounds

The Water Quality Group identified actionable projects that will achieve substantial water quality benefits, while also providing other value to the community. These projects provide the potential for augmenting local water supply, providing habitat restoration, and generating new recreational opportunities—co-benefits that were applauded by stakeholders during outreach efforts. Achieving multiple benefits is critical to bolster funding opportunities and make the rEWMP an achievable plan

The four projects are strategically located to manage runoff from the Water Quality Group's jurisdictions and improve water quality in the Rio Hondo and San Gabriel River.

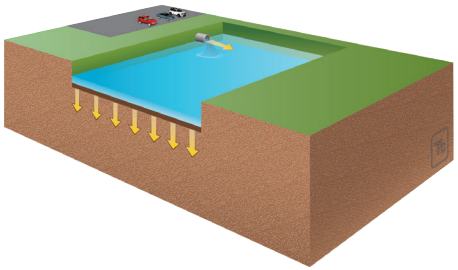
Modeling analysis was performed on these projects to take into consideration sizing, water quality benefit, and cost. These parameters were run through a series of optimization scenarios that also considered how projects in the same watershed work in conjunction with one another to meet the pollutant reduction goals. The analysis balanced the performance of each project and allowed the Water Quality Group to recommend the optimum configuration of BMPs for cost-effective water quality impacts.

The projects are generally described on the following pages. While these concepts were developed using the best available data, they may be updated over time in response to new information. ***See* Attachment B *for detailed project analyses, layouts, and fact sheets.***

Santa Fe Spreading Grounds

Arcadia Arboretum Ecosystem Restoration and Groundwater Recharge Project

This project is located at the Los Angeles County Arboretum, a high-value community resource with a rich history. The Arboretum is conveniently located adjacent to the Arcadia Wash, which makes this project an ideal location for managing stormwater. A treatment wetland system is proposed, which would consist of a vegetated channel with restored native habitat which will provide a natural treatment of the stormwater flowing in Arcadia Wash. This system will also infiltrate excess stormwater using groundwater recharge basins surrounding the wetland and recharge the Raymond Groundwater Basin. Stormwater that is cleansed by the wetland ecosystem will be conveyed to Baldwin Lake, which does not currently have a sustainable water supply. The distribution of flow to Baldwin Lake versus the groundwater recharge basins can be optimized over time to attain the Water Quality Group's desired balance of co-benefits.



In addition to water quality and ecosystem restoration benefits, this wetland and groundwater recharge facility also will a provide additional watershed education and interpretation opportunities at the Arboretum. The Water Quality Group has actively lobbied for federal funding to support this project.

Comprehensive Water Quality Improvement (1,633-acre drainage area)

Groundwater Recharge (104 acre-feet/year infiltrated, on average)

Revitalization of Baldwin Lake (68 acre-feet/year supplied on average

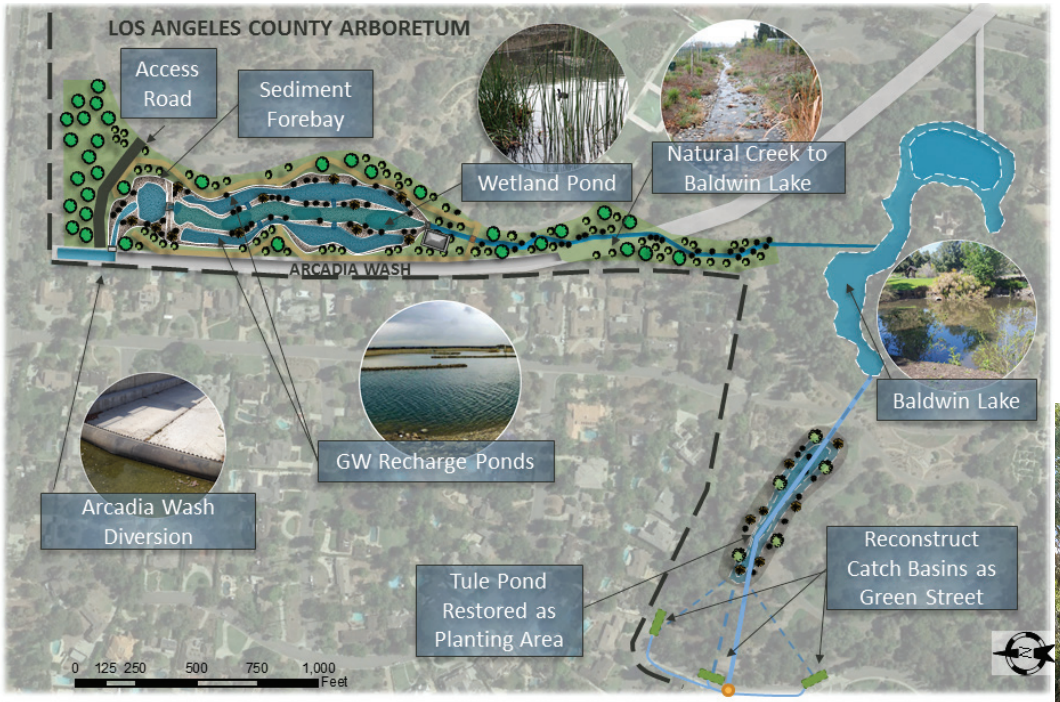
New Habitat (0.6 acres new wetland habitat)

Watershed Education and Outreach

Baldwin Lake Without Sustainable Water Supply

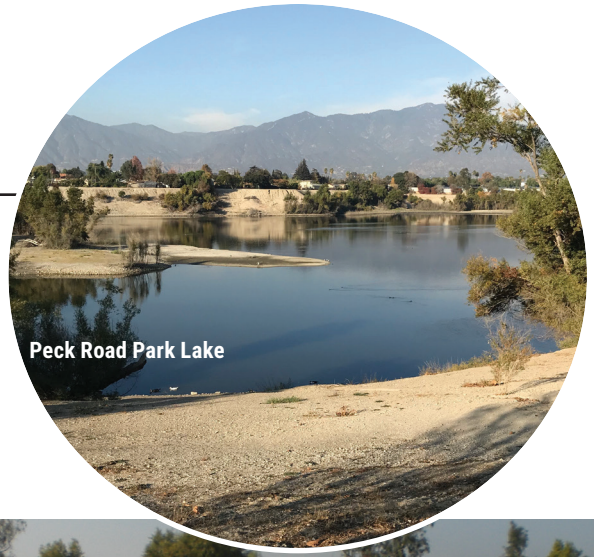
Example Stormwater Wetland

Arcadia Arboretum Ecosystem Restoration and Groundwater Recharge Project



Example Rendered Wetland and Recharge Ponds (not to scale)

Rio Hondo Ecosystem Restoration Project and Arcadia Wash Water Conservation Diversion



Comprehensive Water Quality Improvement (15,777-acre drainage area)

Groundwater Recharge (1,006 acre-feet/year infiltrated, on average)

Conversion of Developed Land to New Habitat (6.7 acres converted)

Watershed Education and Outreach

This project is located just north of the Peck Road Park Lake, upstream of the Rio Hondo. The proposed project would capture and treat stormwater flows from both Arcadia Wash and Sawpit Wash via diversion structures within each channel. The diversion structures would convey the flow to a treatment wetland and infiltration ponds before discharging to Peck Road Park Lake. The system would improve the quality of water entering Peck Road Park Lake and would restore native wetland and riparian habitat.

Arcadia Wash currently provides no groundwater recharge benefits, and bypasses Peck Road Park Lake to discharge directly to the Rio Hondo, so the Arcadia Wash Water Conservation Diversion will be constructed as the first phase of this project to provide meaningful groundwater recharge (and incidental water quality benefits) while the remainder of the project is being planned and designed.

This project would also enhance the existing natural aesthetic of the adjacent Peck Road Conservation Park and provide additional educational and interpretive opportunities for park users. Increasing wildlife habitat in this area may allow residents to feel more connected with nature and hopefully encourage stewardship of the project and park.

Because the proposed project location is currently privately owned, the Water Quality Group is investigating acquisition of the parcels. To improve the confidence that substantial water quality benefits can be achieved at this location, the Water Quality Group also proposed several viable alternative concepts including the creation of a secondary wetland system where Santa Anita Wash flows into Peck Road Park Lake and/or capture of runoff and diversion to the sanitary sewer for treatment and subsequent reuse.

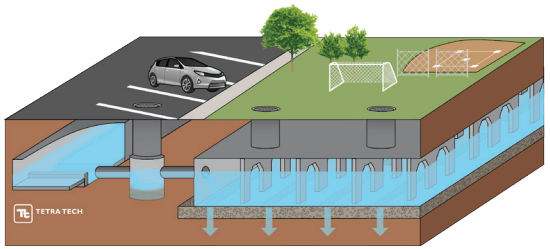
Sawpit Wash

Rio Hondo Ecosystem Restoration Project and Arcadia Wash Water Conservation Diversion

Encanto Park Stormwater Capture Project

This stormwater capture project is located at Encanto Park in the City of Duarte, close to the foothills and directly west of the San Gabriel River. Active use parks provide unique opportunities for multi-benefit regional projects because a subsurface infiltration gallery can be constructed beneath an existing recreational field and then restored back to the same, or better condition. This provided the Water Quality Group with opportunities for recreational enhancement in addition to meeting water quality goals.

Encanto Park has two large storm drain pipes that converge on the west side of the property before discharging to the San Gabriel River. This project proposes a storm drain diversion to intercept stormwater and convey it to a subsurface infiltration gallery that will reduce pollutant loading to the San Gabriel River. The site's proximity to the San Gabriel River ensures favorable infiltration and groundwater recharge conditions.



This project complements the green stormwater infrastructure—bioswales and stormwater basin—already installed at Encanto Park. There is also a potential for onsite treatment and reuse of captured stormwater to offset the irrigation demand of the park if onsite monitoring reveals a sufficient supply of dry weather runoff.

Comprehensive Water Quality Improvement (180-acre drainage area)

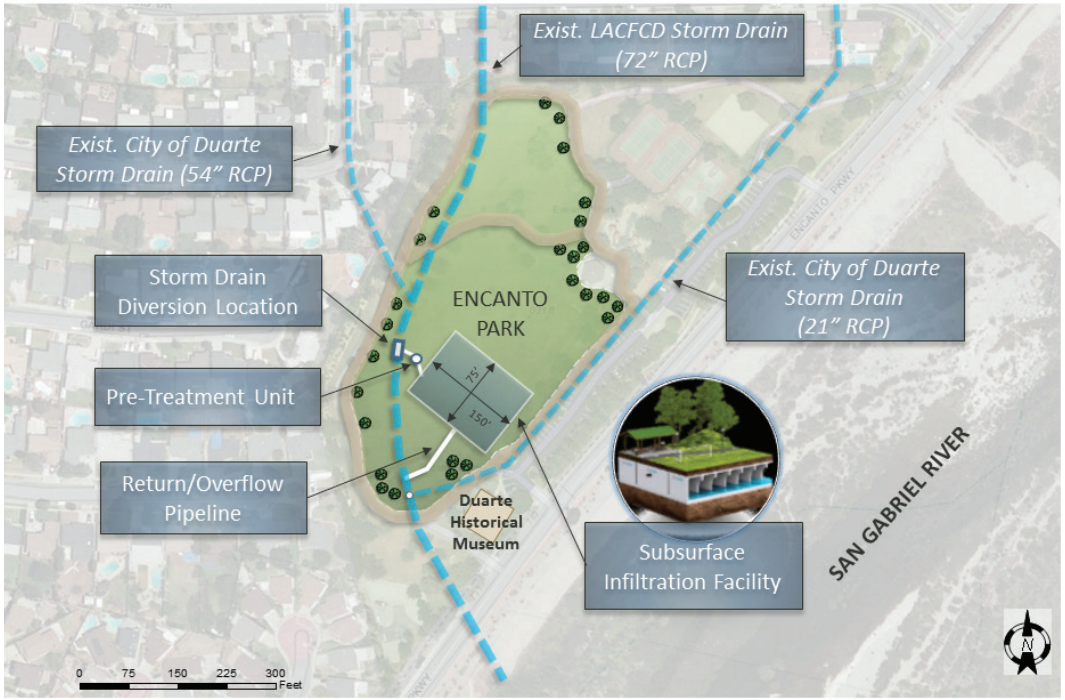
Groundwater Recharge (18 acre-feet/year on average)

Maintenance or Enhancement of Existing Recreational Facilities

Watershed Education and Outreach


Example Subsurface Infiltration Gallery

Encanto Park Stormwater Capture Project



Example Rendered Infiltration Gallery (not to scale)

Basin 3E Enhancements at Santa Fe Spreading Grounds

Comprehensive Water Quality Improvement (2,137-acre drainage area)

Groundwater Recharge (337 acre-feet/year infiltrated on average)

Vector Control (elimination of nuisance standing water)

This project is located at the outfall of Bradbury Channel, which discharges into Basin 3E at the Santa Fe Spreading Grounds, just southeast of the I-605/I-210 freeway interchange. The Santa Fe Spreading Grounds divert water from the San Gabriel River and hold it in surface basins that allow for groundwater recharge. Although Basin 3E is located among the spreading grounds, the Los Angeles County Flood Control District does not maintain it as an infiltration facility because of the sediment-laden stormwater which currently flows unobstructed through the basin before discharging to the San Gabriel River.

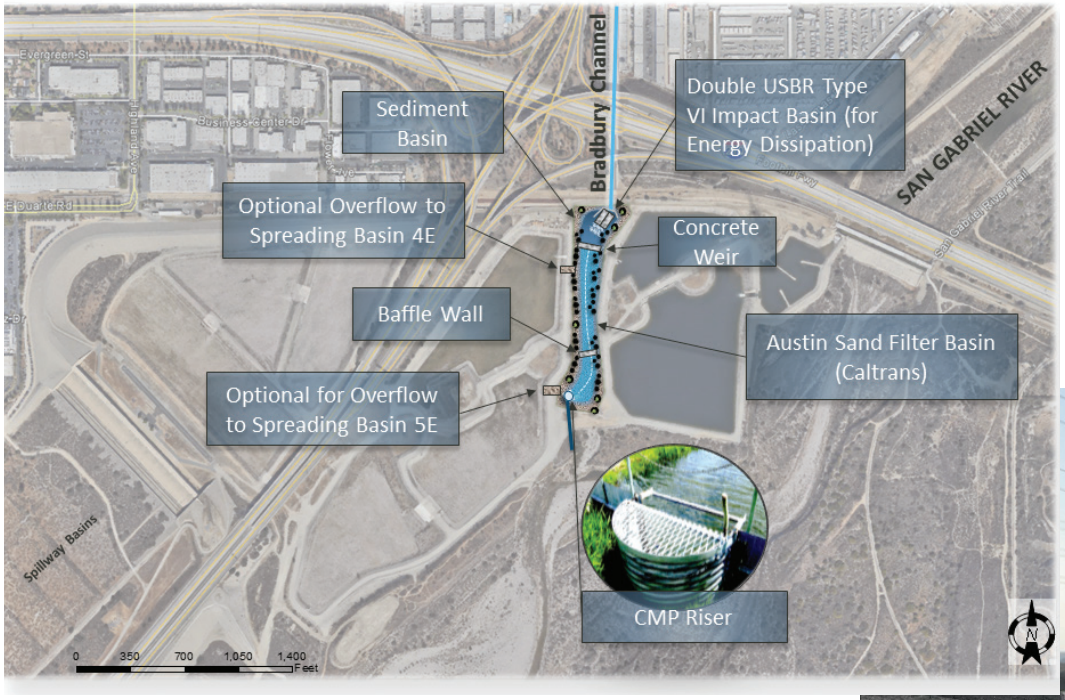

Inflow to Basin 3E

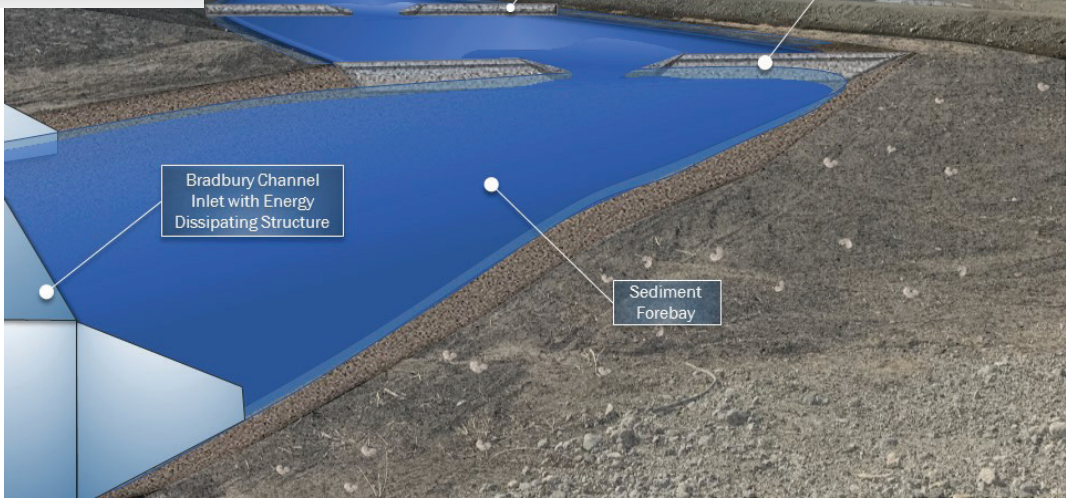
To enhance the functionality of Basin 3E, this project proposes dredging the bottom of the existing basin, and constructing a sand filter basin. The facility would use sand filter media and a perforated underdrain to treat polluted water, infiltrate it into the ground and eliminate standing water between wet weather events. A sediment forebay at the inlet to the facility would decrease maintenance needs in the future by pretreating the stormwater for sediment prior to entering Basin3E. The facility would also be designed to safely convey larger storms from Bradbury Channel to the San Gabriel River using baffles and energy dissipaters to reduce erosion and resuspension of captured pollutants.

This proposed project would enhance the existing Basing 3E by making it more efficient and functional, and would help with vector control issues by eliminating standing water which can harbor mosquitos. Reduced maintenance, stormwater treatment, and groundwater recharge make this project an ideal facility for regional treatment.


Downstream End of Basin 3E

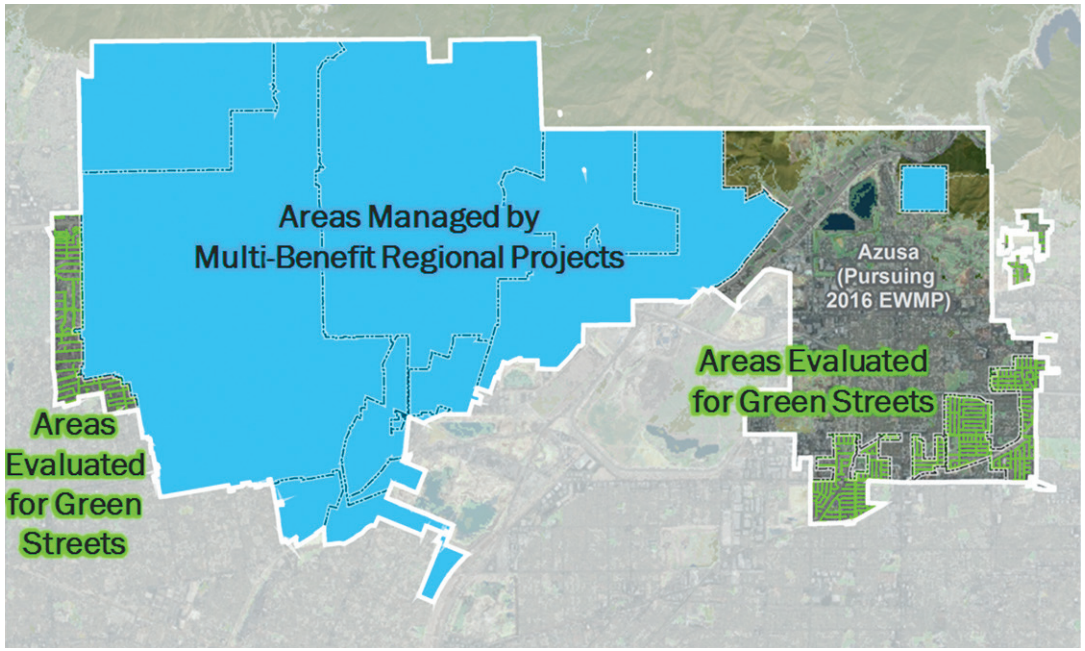
Basin 3E Enhancements at Santa Fe Spreading Grounds

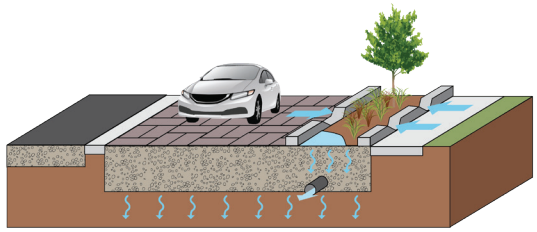




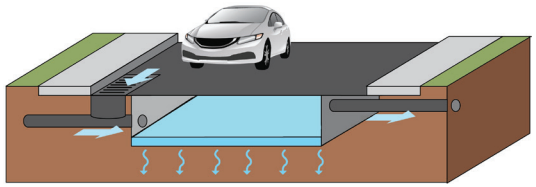
Example rendered enhancements (not to scale)

Redistribution of Green Streets

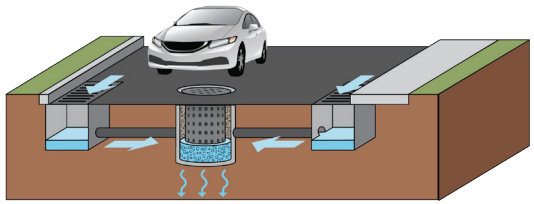




Bio-(in)filtration



Infiltration Gallery



Dry Well

Due to the enhancements included in the recalibrated watershed model, the Water Quality Group was able to re-evaluate and customize the existing distributed green street strategy. Green streets use natural processes in the public right-of-way to intercept and treat stormwater before it enters the storm drain or waterways. Traditional green streets include vegetated bioretention areas between the sidewalk and road, although many other configurations are possible, including dry wells, tree boxes, subsurface storage vaults and filters, and larger infiltration galleries. Green streets provide opportunities for partnerships with organizations promoting urban forestry, traffic calming, and alternative transportation options such as walking and biking.

The recalibrated watershed model and better understanding of multi-benefit regional projects allowed the Water Quality Group to focused green street implementation in areas that were not already being managed by proposed regional projects. They then considered local conditions to recommend cost-effective green street configurations customized to the soil types and pollutants of concern.

6 COMPLIANCE STORY

The Water Quality Group applied their enhanced watershed model, better BMP understanding, and smarter compliance analysis methods to select strategies which will result in real water quality and quality of life improvements. The certainty of these results was confirmed through the completion of the rEWMP reasonable assurance analysis, which is detailed in **Attachment C**.

The first step in the reasonable assurance analysis was to determine what the pollution reduction targets should be.

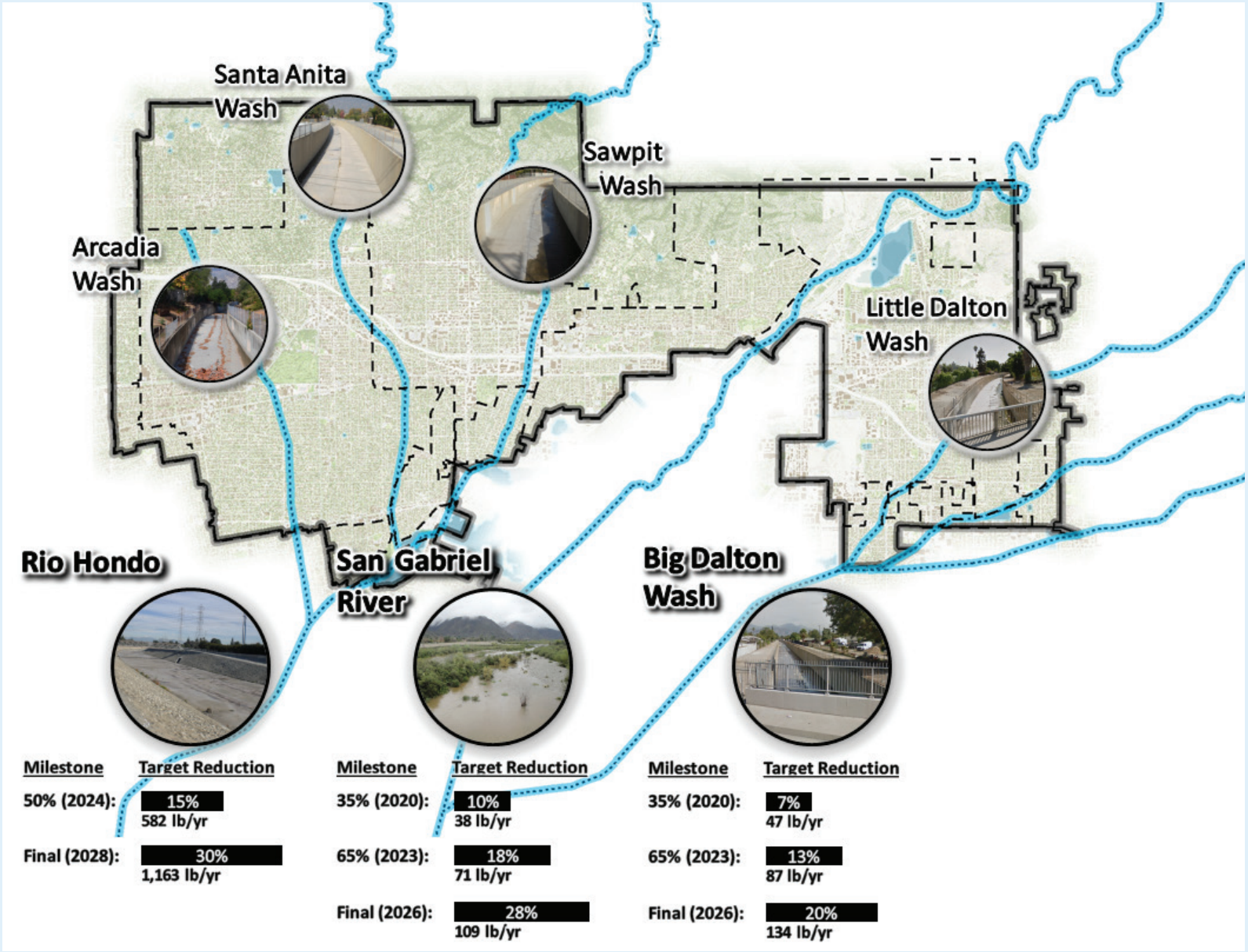
Pollutant Reduction Targets

Because the planning area is divided between two watersheds, separate pollutant loading reduction targets were determined for each. As discussed in *Under the Hood,* evaluating compliance using longer-term metrics provides a more meaningful, measurable, and achievable basis for watershed planning; the pollutant reduction targets were therefore computed based on the "critical water year" for each watershed to establish protective and conservative goals.

Once the targets were defined for each compliance point (see next page), the Water Quality Group modeled the potential pollutant reduction benefits of the selected regional projects, green streets, re-development LID projects, and enhanced minimum control measures.

Basin 3E at Santa Fe Spreading Grounds

Butterfly at Fish Canyon Falls, Duarte


Santa Anita Wash
Sawpit Wash
Arcadia Wash
Little Dalton Wash
Rio Hondo
San Gabriel River
Big Dalton Wash
Milestone
Target Reduction
50% (2024):
15%
582 lb/yr
Final (2028):
30%
1,163 lb/yr
Milestone
Target Reduction
35% (2020):
10%
38 lb/yr
65% (2023):
18%
71 lb/yr
Final (2026):
28%
109 lb/yr
Milestone
Target Reduction
35% (2020):
7%
47 lb/yr
65% (2023):
13%
87 lb/yr
Final (2026):
20%
134 lb/yr

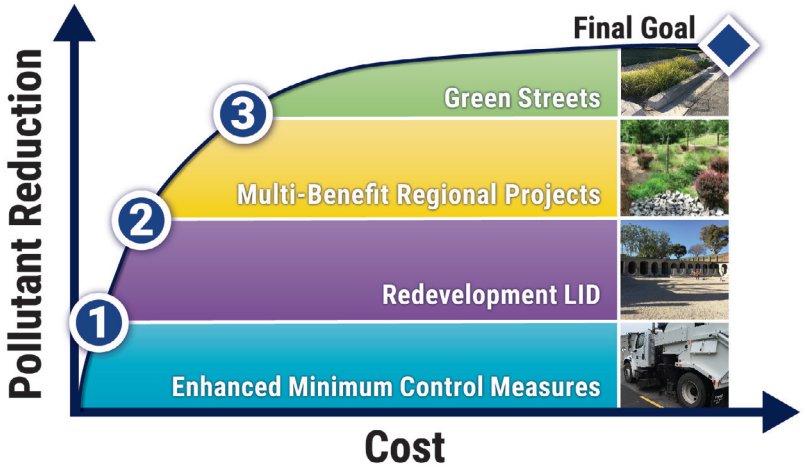
Clean Water Strategy

The Water Quality Group's clean water strategy focuses on implementing the most cost-effective projects first to achieve the most rapid progress towards water quality improvement, while also realizing valuable co-benefits.

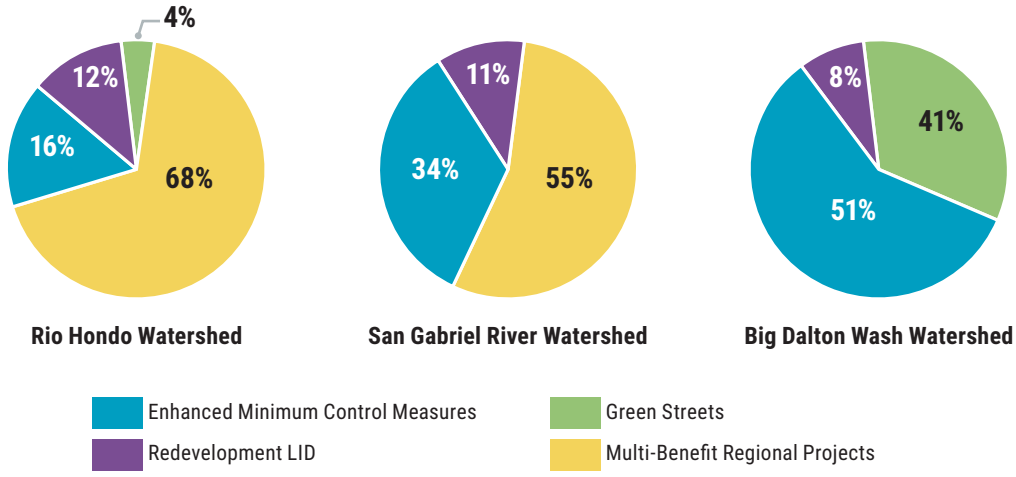
The nearest-term milestones for each watershed will be met using the combination of enhanced minimum control measures and re-development LID projects. Collectively, the regional projects, minimum control measures and re-development LID can be expected to achieve the target load reductions for both the Rio Hondo and the San Gabriel River compliance points, whereas green streets are needed in the Big Dalton Wash watershed and for areas that drain downstream from the Rio Hondo compliance point. Later milestones will be met by building the multi-benefit regional projects and green streets in phases, as shown in the following timelines.

Note that the Water Quality Group has the potential to overachieve their load reduction target by an additional 30% in the San Gabriel River watershed by enhancing Basin 3E at the Santa Fe Spreading Grounds; it is expected that the excess benefits from overbuilding this project could be cost-shared with neighboring jurisdictions.

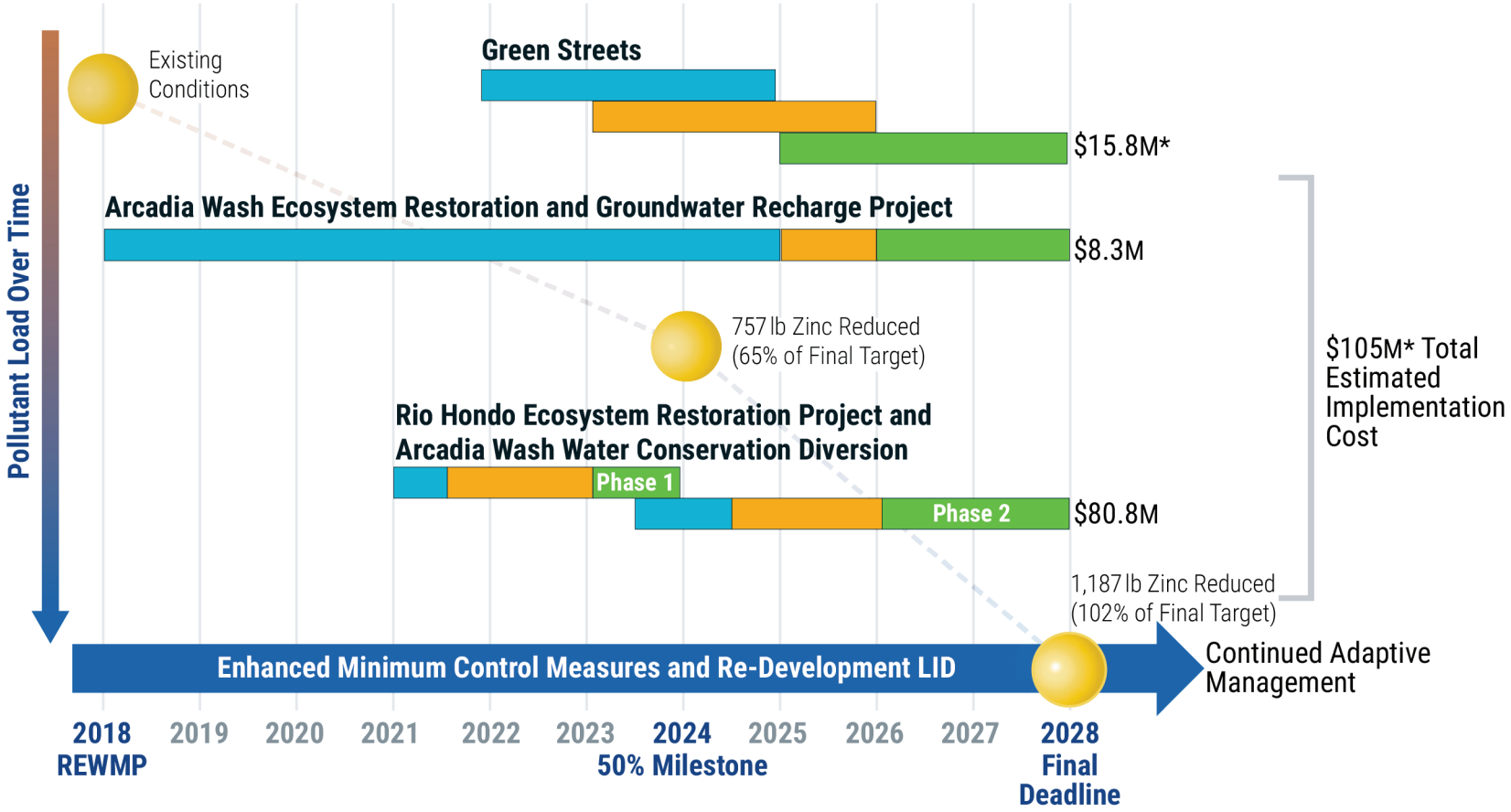
How Projects Were Prioritized in the rEWMP



What's Doing the Work?
Fraction of Total Pollutant Reduction by BMP Type



Rio Hondo Watershed Clean Water Strategy

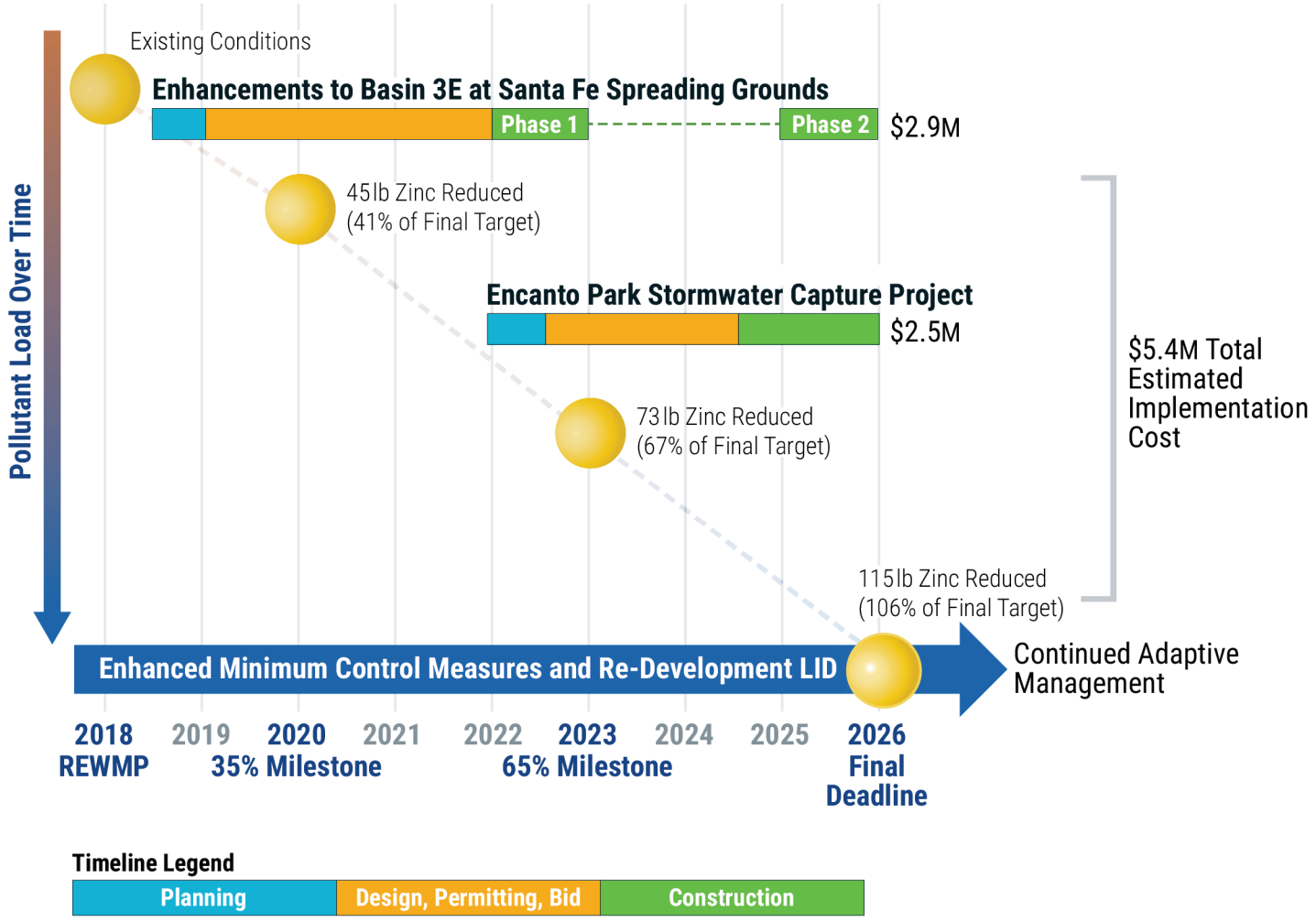


Timeline Legend

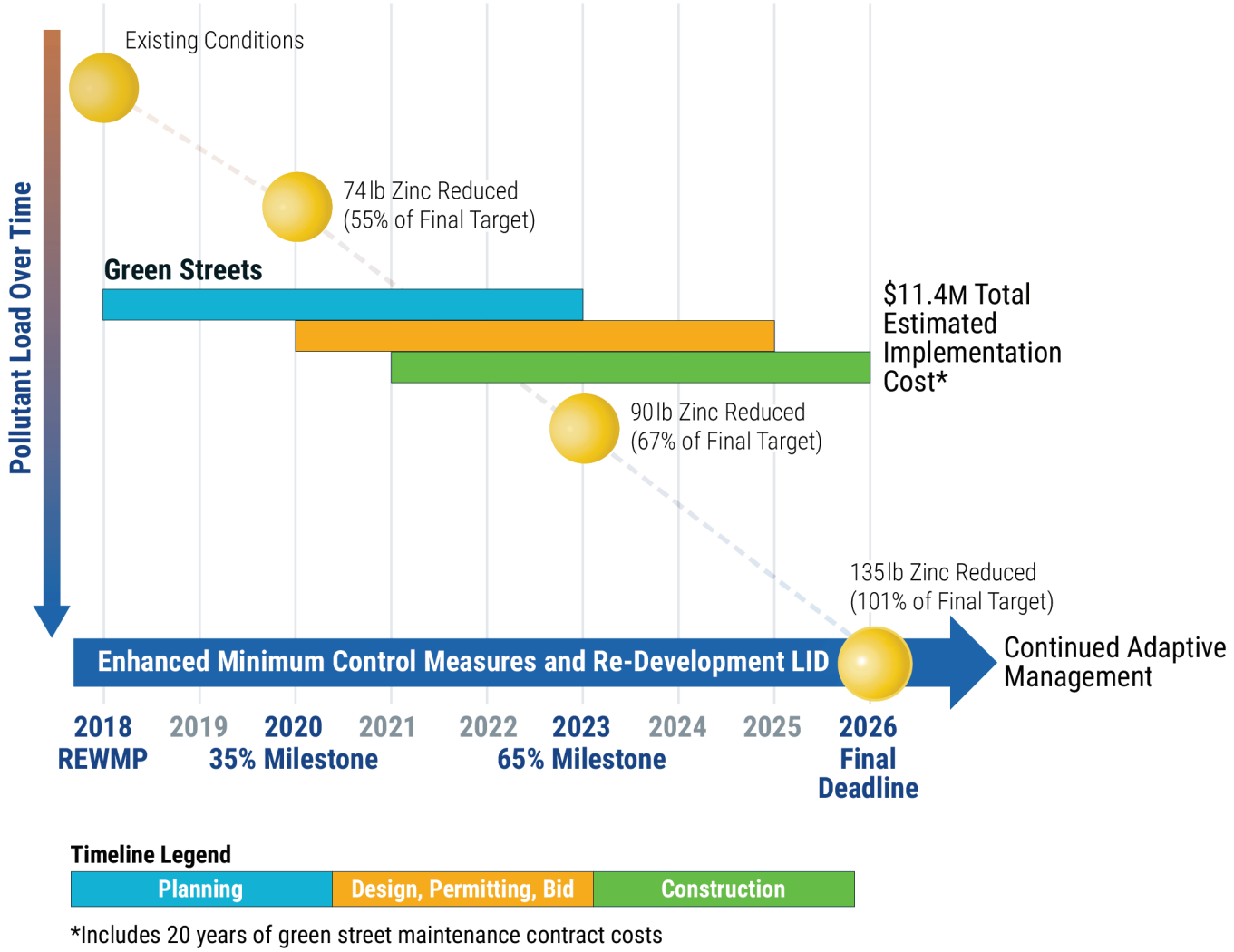
Planning	Design, Permitting, Bid	Construction

*Includes 20 years of green street maintenance contract costs

San Gabriel River Clean Water Strategy



Big Dalton Wash Clean Water Strategy

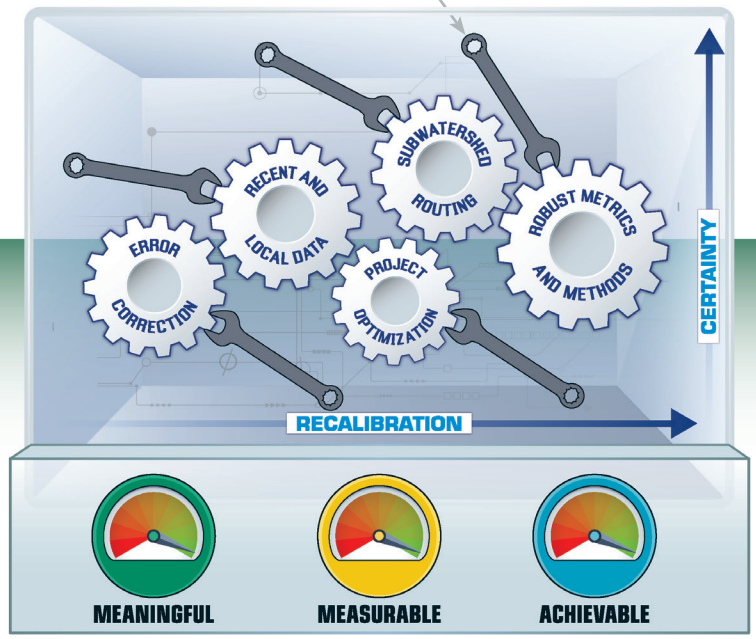


*Includes 20 years of green street maintenance contract costs

7 WHAT'S NEXT?

The Water Quality Group developed this rEWMP to orient their watershed planning around real, actionable, multi-benefit projects, and did so in collaboration with regulators and dedicated stakeholders. The compliance story provides a clearly defined series of steps to achieve meaningful, measurable, and achievable results—such as cleaner water, additional community benefits and lower implementation costs; however, the rEWMP only represents the first part of a longer pathway. The Water Quality Group will continuously evaluate the rEWMP through an interactive adaptive management process and are further committed to implementing the following specific actions and timelines to ensure that watershed investments continue to align with water quality goals:

- **Feasibility Studies**—The enhanced outcomes and projects in the rEWMP were developed using the best available data. To confirm and refine the current design assumptions, the Water Quality Group will conduct feasibility studies for each of the multi-benefit regional projects according to the schedule discussed in the rEWMP compliance story. Planning and feasibility analyses will be conducted early in the Water Quality Group's clean water strategy implementation schedule so that the strategy can be adapted in real-time to site-specific data.
- **Clean Water Strategy Enrichment**—When the Water Quality Group looked under the hood to develop a meaningful and robust clean water strategy, they used sound science and engineering. Along the way, they discovered a number of factors that can impact the certainty of compliance planning exercises, including the selection of critical conditions, interpretation of monitoring data, application of site-specific objectives, determination of "limiting" pollutants, and application and distribution of weather data. To buttress the compliance framework and improve resiliency of the rEWMP, the Water Quality Group will continue to collaborate with advocates and regulators through the adaptive management process to explore special studies and enhancements. The outcomes are expected to enrich the compliance framework throughout the region.
- **Adaptive Management**—The Water Quality Group is required to submit an annual report in December 2018 documenting their progress towards rEWMP targets. The annual report represents the next formal check-in



Tuning Up the Compliance Framework through Adaptive Management

Watershed Education and Outreach at the Arboretum

point with the Water Quality Control Board to demonstrate accountability for the projects and activities described in in the rEWMP. If adequate progress has not been made towards pollution reduction targets, the Water Quality Group will propose changes to the rEWMP through the permit-prescribed adaptive management process, which will be submitted two years following rEWMP acceptance.

- **Continued Outreach and Partnership**—Transparency and collaboration were the foundation of the rEWMP process. The Water Quality Group is committed to continued engagement with stakeholders, regulators, advocates, and potential partners to gather additional feedback to strengthen the rEWMP. These continued discussions will also open doors for strategic partnerships and allow the Water Quality Group to explore a wide range of funding opportunities. The Water Quality Group plans to continue engaging with the Regional Water Quality Control Board staff annually (at a minimum), and with environmental advocates as often as needed to continue building productive relationships.

Stormwater Capture in the City of Duarte

7 WHAT'S NEXT?

Local project partners

Local stormwater outreach conducted by the Water Quality Group

Stormwater Infiltration in City of Bradbury

Parcel-scale LID in the City of Sierra Madre

- **Joint Powers Authority**—To streamline project planning and funding—and ultimately increase the pace of water quality improvement—the Water Quality Group is exploring the formation of a Joint Powers Authority.
- **Continued LID Project Implementation and Support**—The projects outlined in the rEWMP are expected to yield significant water quality improvement and co-benefits. However, in addition to these projects, the Water Quality Group is also supporting and investing in the implementation of additional local LID projects. These projects include the 166,000-gallon capacity stormwater capture system installed at the City of Hope facility in Duarte, several distributed and regional capture projects in the City of Sierra Madre, a 53,000-gallon capacity infiltration system in the City of Bradbury, and approximately 2,100 linear feet of green alleys proposed by the City of Arcadia for Proposition 1 funding. Additionally, the City of Monrovia has adopted an internal policy of replacing dead or diseased City trees with at least one to two trees when possible. The City of Monrovia is also undergoing a tremendous amount of capital improvements citywide and during this process has identified critical areas in need of green technology (i.e., drywells) to help alleviate drainage issues while improving water quality. These additional investments demonstrate the Water Quality Group's long term commitment to clean water and community improvements.