



# Assessing the Potential for Stormwater Capture and Reuse

Draft Whitepaper

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# Assessing the Potential for Stormwater Capture and Reuse Summary White Paper (Draft)

## Executive Summary

How can stormwater capture and reuse play a role in San Diego's sustainable local water supply solution? This draft whitepaper summarizes the three part workshop series presented in April, May and June of 2017 which were held to assess the potential for stormwater capture and reuse in San Diego. A final summit will be held on September 20 where participants will identify next steps and recommendations for San Diego which will be incorporated into the final whitepaper.

This project is intended to enhance awareness and understanding regarding the opportunities and challenges for stormwater capture and reuse as a sustainable water supply source. The desired outcomes for this project are:

- Enhanced education and awareness of the potential for stormwater capture and reuse as a sustainable water supply option with multiple benefits.
- Clear understanding of the benefits and limitations for stormwater capture from various stakeholder perspectives (public agencies, industry/companies, environment, taxpayers/ratepayers).
- Identification of necessary regulatory and legislative reforms to maximize stormwater capture and reuse.
- Active engagement and creative input from the business community, a sector that isn't yet fully engaged in this specific water supply option and can bring tremendous value in terms of ideas, entrepreneurship, and political support.
- Increased collaboration between project partners and stakeholders to advance stormwater capture as a sustainable water solution.

In the three well-attended workshops attendees heard from panelists representing the County of San Diego, the City of San Diego, the City of Los Angeles, Los Angeles County Department of Public Works, the City of Santa Monica, San Diego International Airport Authority, environmental consultants and engineers, Industrial Environmental Association (IEA), Building Industry Association of San Diego (BIA), San Diego Coastkeeper, and the State Water Resources Control Board. In the region, some stormwater is being captured now; reservoirs collect stormwater from upstream; the municipal stormwater permit requires capture and treatment of stormwater for new development projects; and many industries must capture stormwater to meet industrial permit compliance requirements. Still, much of the stormwater is discharged directly to the ocean and might represent an element of a locally sustainable water supply.

Stormwater regulations require the capture and treatment of stormwater to protect receiving water quality. Because of these requirements, San Diego has an opportunity to manage this captured and treated stormwater as a resource rather than capturing, treating, and discharging it to the ocean. Local municipal stormwater regulations allow for alternative compliance which means rather than capturing and treating all stormwater on the site, regional capture and treatment could be funded to result in an improved water quality benefit than treating on site. San Diego industry groups, IEA and BIA, as well as the environmental non-profit group Coastkeeper support these ideas.

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The City of Los Angeles has developed a One Water LA Program which applies an integrated approach to water supply, recycled water, wastewater, and stormwater. The Los Angeles approach relies heavily on infiltration of stormwater into the ground and into ground water to augment water supplies. However, unlike Los Angeles, San Diego soils are less amenable to infiltration and the region has far fewer ground water basins. The County of San Diego has initiated a Stormwater Capture Feasibility Study which will look at the feasibility of capturing stormwater for beneficial use from the municipal storm system. This doesn't completely eliminate infiltration from San Diego's potential solutions, since it will still be possible in some areas on certain projects. The launch of Pure Water in San Diego presents another potential opportunity for stormwater capture and reuse.

Workshop attendees heard examples of projects within Southern California which provide inspiration of what might be possible when re-imagining our stormwater more holistically. The City of Santa Monica plans to utilize stormwater together with waste water to achieve water independence by 2020. Los Angeles County is in the process of creating a regional stormwater capture and treatment facility which uses a public park to capture and infiltrate the surrounding neighborhood stormwater into the underlying ground water, where the ground water basin serves as a source of drinking water. The San Diego International Airport Authority has a capture and use project at Terminal 2 which will capture and treat stormwater and use it for HVAC cooling water.

On September 20, 2017, participants convene to discuss next steps to advance stormwater capture and reuse in San Diego. During this meeting participants will identify goals and actions to shape San Diego stormwater future.

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## 1.0 What is Stormwater?

The term “stormwater” refers to runoff that cannot be infiltrated or retained in the landscape. In urban environments it is necessary to manage rainfall and control it to avoid flooding. As cities built up with streets, sidewalks, buildings and other impervious surfaces, the natural infiltration of rainwater shifted to a greater volume running off the land. Flood control systems such as concrete channels and storm drain networks were constructed to move that water swiftly away from properties and people.

Undeveloped areas with natural ground cover experience 10% of rainfall as stormwater runoff versus highly urbanized areas where 55% of the rainfall becomes stormwater runoff (Figure 1).

As stormwater flows over land it picks up pollutants that can impair our creeks, rivers, lakes, wetlands, the ocean, and other waterways.

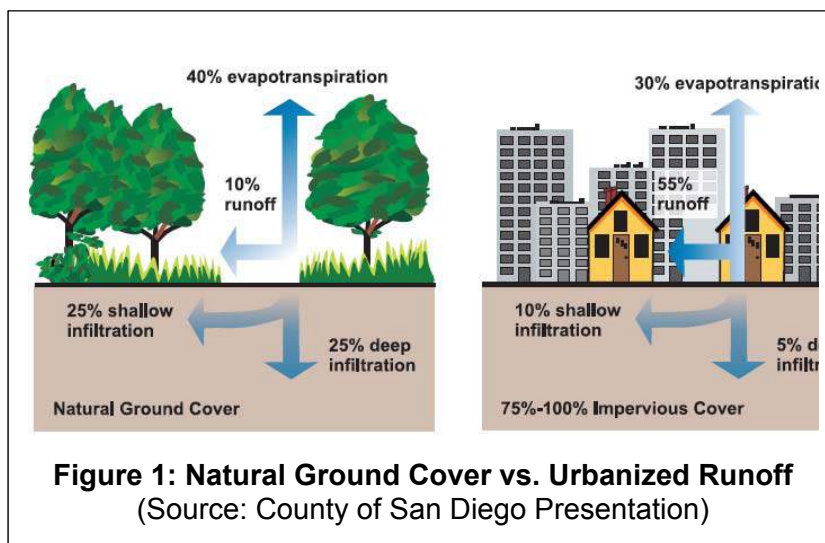
According to the EPA, stormwater is now the major source of water pollution in

the United States. The local Regional Water Quality Control Board (RWQCB) and the State Water Resources Control Board (SWRCB) regulate some stormwater discharges through permits to prevent pollution of waterways and water bodies.

The San Diego region’s local governments have been required under their municipal stormwater permit to develop plans for reducing runoff in each watershed area. These plans, called Water Quality Improvement Plans (WQIP), set forth strategies to improve water quality in the region. Compliance with the water quality requirements will be very costly to treat stormwater. The City of San Diego estimated the capital costs to meet WQIPs for the City’s compliance during the 20 year compliance period to be \$1.6B as presented in the *City of San Diego Stormwater Fee Study* published September 23, 2016.

In addition to the municipal stormwater permit with which the region’s governments must comply, industries and construction sites each have permit requirements. Many industries in San Diego fall under an industrial stormwater permit which has requirements that require compliance up to stormwater runoff prohibition. Construction projects greater than an acre also require permit compliance under a construction permit.

Compliance with the stormwater permits is costly and not optional. Local governments regulated under the municipal stormwater permits are starting to develop solutions that can provide multiple benefits versus simply treating the runoff and continuing to send it into the ocean as treated stormwater. One of those benefits is to include stormwater as part of the solution to reduce our dependence on imported water.



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### 2.0 A ONE WATER Approach – Los Angeles

Like the San Diego Region, Los Angeles faces significant water challenges in the form of aging infrastructure, a growing population, more stringent water quality regulations, dependence on imported water, and limited funding, particularly for stormwater. The majority of the City's water supply is imported and the City is committed to reducing imported water use by 50% by 2024.

The One Water LA Initiative leverages resources and creates integrated solutions for an improved water future for the Los Angeles region through the process of bringing together the agencies in charge of drinking water, stormwater, recycled water, and wastewater to find solutions to meet the City's reduced reliance on imported water by the goal deadline.

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*"We are looking at stormwater as a great opportunity."*

*Adel Hagekhalil, Assistant Director  
Bureau of Sanitation City of Los Angeles*

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Los Angeles views stormwater as a tremendous opportunity to locally source water supply. In a half-inch rain storm, the city sends four billion gallons into the ocean. Los Angeles, just like the San Diego Region, has to comply with their stormwater permit to meet water quality goals. In 2012, the stormwater municipal permit set forth an effluent limit for stormwater, which puts stormwater at the same level of scrutiny as wastewater treatment plants and required the development of management plans to improve water quality. The municipalities collaboratively developed these plans (Enhanced Watershed Management Program) and established a watershed-based holistic approach to stormwater compliance which focuses on stormwater runoff volume reduction and the capture of runoff for infiltration or direct use.

The City of LA is involved in five of the region's Enhanced Watershed Management Program plans; Marina del Rey, Santa Monica Bay, Dominguez Channel, Ballona Creek, and Upper LA River. The total annual stormwater capture area these plans estimate accomplishing is ~50,000 acre feet during an average storm year. The combined capital cost estimate for implementation of projects in these five watershed plans total more than \$7B. However, stormwater compliance projects that create multiple benefits can be an economic stimulus. A \$1M investment in a green stormwater project can create \$2M in local economy sales and up to 16 jobs, according to the City of LA.

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*"We are building wetlands. We are building greenways. People get excited about these One Water projects because they add greenspace not eyesores to neighborhoods." Huub Cox, Assistant Division Manager Watershed Protection, City of Los Angeles*

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A key consideration for the successful implementation of One Water LA, is public support for these projects and their associated costs. The City considers the cost of stormwater compliance when calculating overall project values and return on investment for the community. The City estimates the infrastructure costs for stormwater capture range from \$1000 to \$5000 per acre foot. Because they must build the infrastructure to meet compliance requirements, this is factored in to any

cost/benefit calculation. Because compliance is required, it is the incremental costs to bring a green project with multiple benefits to the community that matter. When water supply is a beneficiary of the project, in addition to community amenities such as parks and greenways, the public is enthusiastic about the value these projects can bring to an area and a neighborhood.

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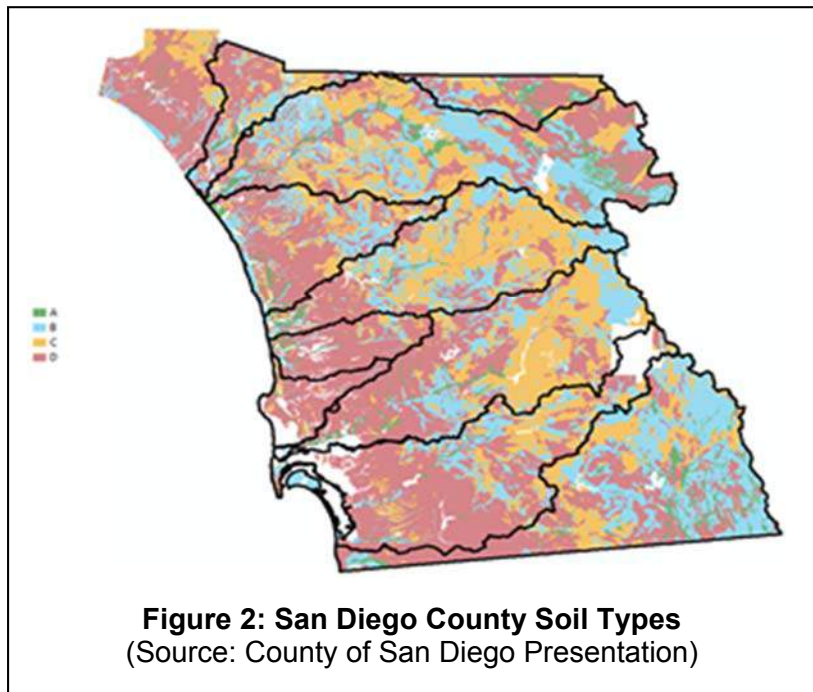
The Enhanced Watershed Management Program has an implementation strategy which is designed toward the primary goal of reducing stormwater runoff volumes from entering receiving waters and thereby reducing pollutant loads. The scale of implementation is at three levels; the property level, the street level, and the regional level. In terms of priority, all three are happening simultaneously because funding stormwater projects is always a challenge. These projects are diverse and spread among communities.

Los Angeles has numerous ground water basins which can be used for future water supply and much of the soil types in the region lend themselves to infiltration. The best way to move water from where there is an overabundance to where the need exists is to put it back into the ground, because moving it too far can become cost prohibitive. Many of the stormwater projects in the Enhanced Watershed Management Program focus on stormwater capture and infiltration to ground water, but those are not the only solutions in the One Water Plan. As an example, around UCLA there is high water demand, so a project in consideration is to build a small local satellite wastewater treatment plant designed to capture stormwater from storm drains and wastewater from sewers, treat it and distribute it via purple pipe within the nearby area where water demand is high. Another One Water idea is rethinking wastewater flows, and instead of sending them to the ocean, re-routing these flows to spreading grounds for groundwater recharge and future potable supply.

### 3.0 Stormwater Capture in San Diego

Los Angeles has numerous opportunities for infiltration and many ground water basins. San Diego has different conditions. San Diego soil types are different than those in Los Angeles and much of the San Diego regions' soils are not ideal for infiltration projects. Figure 2 shows the soil types across the region. Types A and B are suitable for infiltration while C and D are not. San Diego has fewer groundwater basins in the region as well.

The County of San Diego has initiated a Stormwater Capture Feasibility Study which will be completed in 2018. The purpose of the County-wide study is to determine the feasibility of planning, constructing, operating, and managing facilities that capture and beneficially use stormwater. The study will look for opportunities to augment water supply using stormwater from the municipal stormwater system.



**Figure 2: San Diego County Soil Types**  
(Source: County of San Diego Presentation)

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The study is partially funded through an Integrated Regional Water Management Program (IRWM) Proposition 1 Planning Grant. The County was awarded \$149,941 and has been seeking other partners to close the funding gap for the \$340K study. The IRWM is similar in philosophy to the One Water LA Plan in that it takes a holistic approach to water. The study will be completed in November 2018 and will assess existing information to determine what stormwater management practices agencies in the region are already implementing. Site locations, opportunities, and various potential approaches for stormwater capture will be prioritized and cost analysis for alternatives will be developed. The result will be a summary of this information in a feasibility report which will identify and prioritize potential opportunities for the capture and beneficial use of stormwater across the region on public lands.

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*“If you had no development 10% would runoff and the rest would infiltrate. With development 55% is running off. It’s (with) this extra runoff we think we can do something beneficial.”*  
*Stephanie Gaines, County of San Diego Watershed Protection Program*

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### 4.0 The City of San Diego’s Perspective

The City of San Diego has embarked on a project to clean up wastewater for potable reuse. Currently only 8% of San Diego’s wastewater is recycled and the rest is discharged into the

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*For more information about Pure Water visit [www.PureWaterSD.org](http://www.PureWaterSD.org)*

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ocean. Pure Water will recycle wastewater to provide 1/3 of San Diego’s water supply by 2035. During the first phase of Pure Water, which is now underway, the City has been working closely with the state of California to develop the specific requirements and regulations regarding indirect

potable reuse. These regulations did not exist, and since this is the first project of its kind, the City is working closely with the state to be certain that regulatory requirements are in place and met so Pure Water is potable, safe, and a model for other regions hoping to follow the City’s lead with their own projects.

Over the years the cost of imported water has continued to trend upwards, tripling over the past 15 years. Pure Water provides local control of water supply and cost control for ratepayers.

In Phase 2 of Pure Water, the City is planning to consider some stormwater incorporation into Pure Water. The San Diego River in Mission Valley is one example where it may be feasible to capture stormwater and inject it into the aquifer and mix it with Pure Water. The City is still investigating this and other opportunities for stormwater capture and incorporation into Pure Water; however, Phase 2 is still many years away.

In other regions, some cities are evaluating the combining of storm sewers and sanitary sewers, putting stormwater into the wastewater treatment process. In San Diego, combining the storm drains with the sanitary sewer systems regionally would require a significant capital investment.

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*“We have some exciting opportunities to look at ways to incorporate stormwater into Pure Water Phase 2.”* Halla Razak, Public Utilities Director, City of San Diego

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The City of San Diego's wastewater system is over 50 years old, comprises over 34,000 miles of pipeline, and was not designed to meet the capacity of our large storm events. The existing wastewater treatment process would need to be modified to handle the pollutants present in stormwater discharge. However, small localized treatment facilities might be more readily feasible similar to the satellite plant currently being considered in Los Angeles near UCLA, which will treat stormwater and wastewater resulting in purple pipe irrigation water in the vicinity, as mentioned in Section 2.0 regarding One Water Los Angeles.

The City of San Diego attempted a stormwater capture and reuse project at Robb Field where stormwater would be captured and used as irrigation water. The project faced some permitting and funding challenges. Ultimately, the project did not move forward because the cost of permitting was prohibitive and the cost of potable water is relatively inexpensive. Permitting for reuse projects will need to be worked through so they can move forward efficiently. Funding is also a challenge for municipal stormwater projects. Stormwater compliance is funded predominately with general fund money and is not fee or service based. A stormwater fee to fund these sorts of projects would require a vote by taxpayers unless the state constitution is amended.

### 5.0 The Regulatory Perspective

The State Water Resources Control Board has recognized that stormwater should be viewed as a potential resource instead of a waste. The regulatory agency is developing a strategy which reimagines the current stormwater regulatory program including incentives that result in clean water and stormwater reuse. In 2016, the regulatory agency initiated their Strategy to Optimize Resource Management of Stormwater; Stormwater Strategy or STORMs and initiated the program in 2016. The vision of STORMs is *“Successful implementation of the Stormwater Strategy will result in a future where stormwater is sustainably managed and utilized in California to support water quality and water availability for human uses as well as the environment.”*

The project seeks *“to lead the evolution of stormwater management in California by advancing the perspective that stormwater is a valuable resource, supporting policies for collaborative watershed-level stormwater management and pollution prevention, removing obstacles to funding, developing resources, and integrating regulatory and non-regulatory interests.”* The entire project is planned in three phases with work products delivered to affect changes during each of the three phases. The first phase is to be completed within four years of project initiation, the second phase within eight years, and the final phase within 12 years.

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*Information on STORMs can be found at*  
[http://www.waterboards.ca.gov/water\\_issues/programs/stormwater/storms/](http://www.waterboards.ca.gov/water_issues/programs/stormwater/storms/)

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The STORMs project identified the primary barrier to using stormwater as a resource as financial, both the cost of infrastructure for stormwater projects and the lack of available funding. Other key concerns from various stakeholders include regulatory uncertainty and water rights. Overcoming these and other barriers is the mission of the project.

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While funding is a barrier, developing an understanding of return on investment is often a project challenge when various projects are competing for funding and prioritization.

Establishing a monetary value of stormwater, one of the numerous projects goals in STORMs, will assist in funding issues that arise. The value will be in volumetric terms as an additional source of local water supply and the value to water quality. The framework will be supported by the various Regional Water Boards across the state and be built in collaboration with agencies and stakeholders to institutionalize the values of stormwater.

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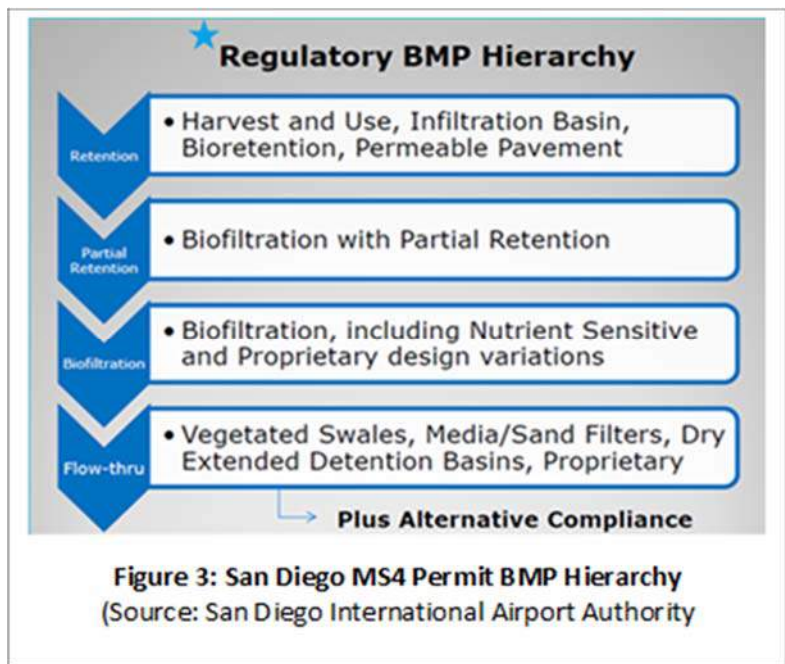
*“Finding funding for projects is key. We have received a slew of ideas from our study so far. One idea is to have the legislature require a fee for out of basin water transfers and have that fee fund stormwater projects in the basin. Our project is seeking input and if audience members or stakeholders have ideas, please contact me.” Chris Beegan, State Water Resources Control Board*

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Stormwater is regulated through permits issued to municipalities and industries by the State Water Resources Control Board and the Regional Water Quality Control Board. The San Diego region’s 19 local governments, including the City of San Diego and the County of San Diego with the other regions incorporated jurisdictions, together with the San Diego Regional Airport Authority and the Port of San Diego jointly hold a Municipal Separate Storm Sewer System (MS4) Permit as 21 co-permittees. The Industrial General Permit regulates stormwater discharge and provides general coverage for many industries based on their activities. Some industries hold specific permits for their individual sites which still comply with the Industrial General Permit but may have site specific requirements as well.

The permits have requirements for stormwater best management practices (BMPs) to remove pollutants from stormwater and protect receiving water quality. The municipal permit is renewed every 5 years and has the following hierarchy (Figure 3) for development project BMPs that requires retention, harvest, and use or infiltration as the initial BMPs types and allowing for alternative compliance as an option if the other solutions are determined to be unachievable on site.

The Industrial General Permit also has a BMP hierarchy that begins with good housekeeping practices such as sweeping and covering materials. It does not, however, offer an alternative compliance option to allow any off site treatment of stormwater.



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### 6.0 Industrial Business and Developer Perspectives

Numerous industrial businesses are required to treat or capture and retain stormwater on their property under the Industrial General Stormwater Permit. Some are not permitted to let it runoff and it cannot be combined into the sewer system. This poses a challenge to many San Diego businesses.

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*Our opportunity with stormwater “is no different than 20 years ago when the County Water Authority said we have to diversify. When you look at what their track record and what they have accomplished now it’s amazing. It’s a model in our state.” Jack Monger, CEO Industrial Environmental Association*

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Some businesses are fortunate to have ways in which they can use the stormwater such as dust control, infiltration on part of the site, HVAC cooling water, rain gardens, and other similar ideas. But many industries have no such opportunities for reuse and/or space constraints, and for those, the solutions become technically and economically challenging. The Industrial

Environmental Association (IEA) is a proponent of alternative compliance mechanisms for businesses who are unable to capture, retain, and treat stormwater on their property.

One idea for an alternative compliance approach is where an industry or business (or group of businesses) that are unable to capture and treat stormwater on their site would fund a project off-site from their facility, perhaps a regional project, which results in a water quality benefit. Allowing this sort of alternative compliance would allow the industry to responsibly meet the intent of the regulation and result in a better water quality outcome.

New development and redevelopment projects are regulated under the municipal permit which requires stormwater treatment as identified in the BMP Hierarchy shown in Figure 3. The Building Industry Association (BIA) is a strong proponent for alternative compliance as a solution that makes sense for both clean water and the development community. There is limited developable land in San Diego and redevelopments are often in highly urbanized areas with limited space. Using a footprint of land on the development site to treat the new development’s stormwater reduces the number of homes or units that could be built on that land. If the resulting treated

stormwater from the new development is discharged into receiving water containing pollution from all the upstream development which was pre-existing it does not add to the existing pollutant load, however, it does nothing to substantially improve conditions in the receiving water. The BIA suggests that a better solution in some cases might be the funding of a regional project which can result in overall cleaner receiving water. This

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*“San Diego is in a housing crisis with inadequate housing. Setting aside developable land on new developments doesn’t make sense when we could instead use that money to fund regional water quality improvement projects and have a better water quality benefit.” Michael McSweeney, Public Policy Advisor, Building Industry Association of San Diego*

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could reduce the size of the on-site footprint for stormwater treatment allowing for additional development and result in improved receiving water quality.

The BIA is highly supportive of development funded regional treatment solutions to help solve clean water through alternative compliance while still doing some treatment on site that will not significantly reduce developable land. Regional solutions might be similar to the County of Los Angeles Franklin D. Roosevelt Park described later in this document or they might be artificial treatment wetlands and/or dry wells to inject stormwater into aquifers and ground water. Alternative compliance would redirect money that would be spent on site and use it on another project to create a water quality benefit.

The municipal permit allows for alternative compliance and requires the individual jurisdictions to develop their own alternative compliance programs. The City of San Diego is currently designing a program for alternative compliance with multiple stakeholders including BIA and local environmental groups.

### 7.0 The Coastkeeper Perspective

San Diego Coastkeeper, an environmental non-profit organization with a mission to protect and restore water quality in San Diego, is supportive of a holistic approach to water which captures and beneficially uses stormwater through a variety of solutions and technologies at different scales from small distributed facilities throughout a watershed to larger regional facilities. Coastkeeper and other citizen groups are able to stop regulatory violations and enforce water quality regulations through lawsuits permitted under the citizen enforcement section of the Clean Water Act. The group has been working closely on the issues of stormwater quality with the regulators, industry groups, and municipalities.

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*“We recognize the drivers for both water quality and water reuse. If you think about it you will have to spend a few billion dollars one way or another so the approaches that are multi-benefit can create more value for the money.” Matt O’Malley, Executive Director, San Diego Coastkeeper*

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Alternative compliance is acceptable to Coastkeeper as long as water quality objectives in receiving waters are met, regulatory measures are enforceable with accountability to each permit holder as required by the Clean Water Act, and permit holders are still properly maintaining their sites to eliminate and reduce pollution through localized best management practices. The idea of a regional stormwater capture and treatment facility somewhere in the watershed would only be

acceptable to Coastkeeper if the receiving waters are not being used to convey polluted water to that regional treatment facility.

The group is very cognizant that funding for municipal stormwater is a challenge and has been supportive of a constitutional amendment in California which will define sewer to include stormwater. This will allow for stormwater fee assessments similar to wastewater and water services not subject to Prop 218 which requires a 2/3 voter approval.

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### 8.0 Examples of Stormwater Capture in Southern California

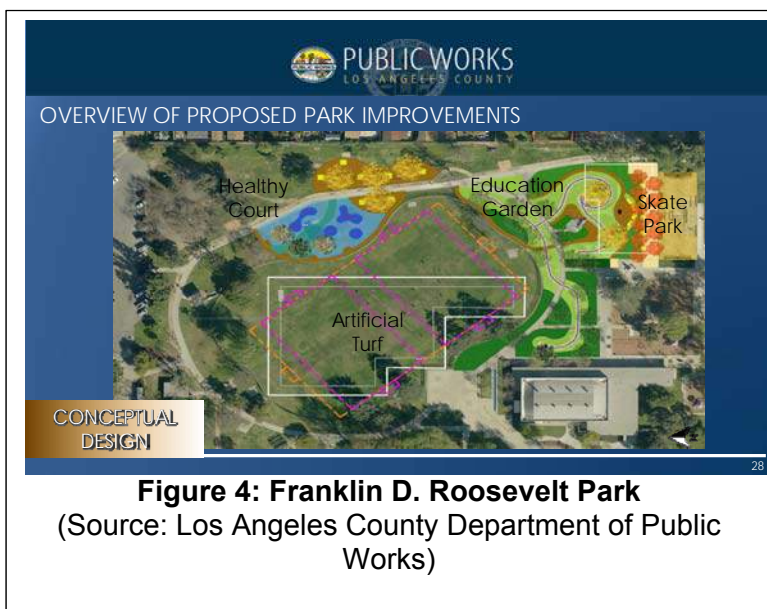
Stormwater capture is happening now in San Diego. New development and redevelopment projects must capture stormwater using the BMP Hierarchy in Figure 2. As an example, the City of Vista is completing a Green Street Project which has low impact development features including stormwater detention and infiltration. Green Streets projects can often be designed to treat runoff from a neighborhood.

Two property level stormwater capture examples include Stone Brewery and Kaiser Hospital. Stone Brewery in the City of Escondido has impervious hardscapes, captures stormwater, and uses it as a design feature. The newly constructed Kaiser Permanente Hospital in Kearny Mesa is a LEED Platinum facility and features stormwater capture and recycled water use.

Although stormwater capture is happening now in San Diego, and required on all new and redevelopment projects, the region has an opportunity to develop a holistic approach to reuse the majority of stormwater that currently still flows into the ocean. There are many different approaches to stormwater capture and reuse. The following projects illustrate various types and scales of stormwater capture projects that have been planned and are being implemented.

#### 8.1 Franklin D. Roosevelt Community Park

The Franklin D. Roosevelt Community Park Regional Stormwater Capture Project is the first regional stormwater capture project at a Los Angeles County park being implemented by the Los Angeles County Department of Public Works. The project meets the multiple benefit strategy set forth in the Los Angeles municipal permit. The permit also encourages jurisdictions to collaborate in the development of regional projects. Parks are one of the priority areas that can be used for stormwater capture projects in the region to provide a receiving water quality and other benefits. The project will divert stormwater from 200 acres of tributary area within the highly urbanized area of Compton Creek, which is a large tributary to the Los Angeles River.

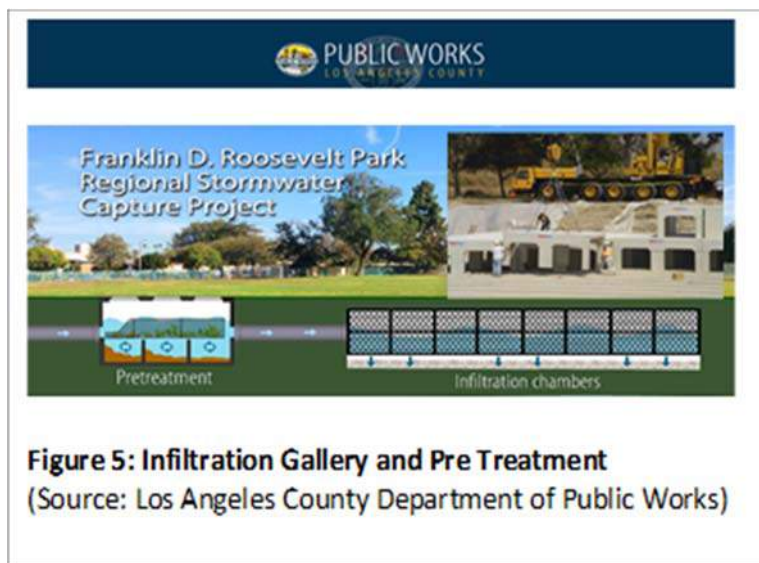


The design capacity of the project is 8 acre feet which is equivalent to 34M gallons in an average year and meets the design storm criteria of the permit to divert and retain the 85th percentile volume of the average storm. The project design consists of three main infiltration areas. Two infiltration galleries in the park and one green street. Within the park, stormwater will be diverted from two storm drain areas into two separate infiltration galleries. Stormwater will be pre-treated to remove trash, sediment, and grease prior to entry into each infiltration gallery so that the galleries will not get clogged and water can infiltrate into the ground and

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ultimately the ground water below. The third area is a green streets element where stormwater will be diverted into a neighborhood street where infiltration is planned to be injected via dry wells into the ground instead of infiltration galleries.

Regional soils maps, such as those discussed earlier and represented for San Diego (Figure 2), do not provide site level specificity and are not adequate to determine site level conditions for project design implementation. To determine if infiltration is feasible at any given location, a site specific soils and hydrology study must be performed. The soils and hydrology studies at the site were critical during the initial phase of the study to determine feasibility of the proposed project design conducted in 2015.



The project cost is \$13M. The County was able to obtain \$2M toward the project from 2015 Prop 84 IRWMP grant funding and the remaining \$9M was committed from the County's general fund. This project was started in 2015, is currently underway, and anticipated to be completed by 2019. On-going operation and maintenance costs, once the park is constructed will be the responsibility of both the County Parks Department and County Stormwater Department. The Parks Department will maintain the above ground amenities and the Stormwater Department will be responsible for maintenance of infiltration galleries and pre-treatment units. Post construction monitoring was a grant requirement and will be conducted to ensure the BMP is actually removing pollutants as intended.

The use of design renderings which were originally created for the grant application were

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*"I think we will be asked a lot if these large expensive BMPs are doing what we say they would do. It's a valid question so we will get good data to determine if we are actually removing the pollutants that we want to remove with these BMPs. It will also help us determine which are more effective in different situations."*  
*Genevieve Osmena, Civil Engineer, Watershed Management Division, Los Angeles County Department of Public Works*

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incredibly useful during both community engagement and presentations to County leadership to obtain the additional \$9M needed to fund the project. These design renderings provided strong visuals to help show the value and multiple benefits of the project.

The County engaged the community during the initiation of CEQA to obtain design feedback for the park. This park is in an area of Los Angeles which has very few parks and the community has expressed the importance of parks and their benefits. These benefits are

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enhanced through amenities discussed by the community through outreach and engagement. These include an education garden with drought resistant plants, artificial turf on the soccer field, improvements to the existing skate park, a new picnic area, exercise stations, a walking path and play mounds.

### 8.2 Sustainable Water Infrastructure Project

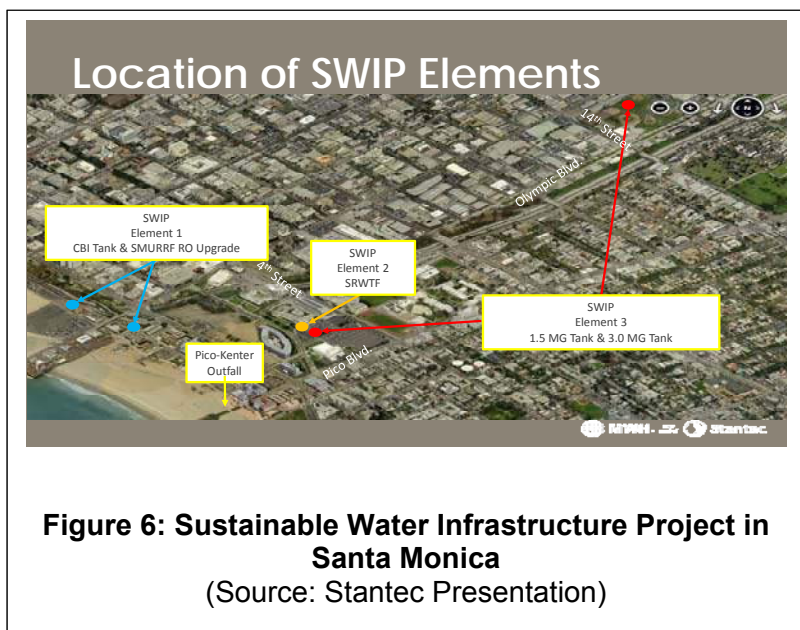
The City of Santa Monica also has to comply with the Los Angeles municipal permit and its strategy of multi-benefit stormwater solutions. Additionally, the City of Santa Monica has a goal to be water self-sufficient by 2020. Finding infrastructure solutions to meet both water quality regulations and create water sufficiency in an urban coastal environment can be a challenge; however, this project leverages regulatory driven initiatives with sustainability and water independence (Figure 6).

Santa Monica's current water supply is a combination of local groundwater and imported water. Santa Monica's wastewater is treated by the City of Los Angeles Hyperion Wastewater Treatment Plant. Currently, Santa Monica captures a portion of their runoff for non-potable reuse at the Santa Monica Urban Runoff Recycling Facility (SMURRF) which is located near the Santa Monica Pier.

The Sustainable Water Infrastructure Project will move Santa Monica toward its water self-sufficiency goal by combining three project elements. The project will upgrade the SMURRF with additional stormwater capture and incorporate treated brackish water so that the facility has a continuous supply of water for recycling and increasing treatment capacity from the current 0.2 MGD to 0.5 MGD (Element 1, Figure 6).

A new sustainable recycled water treatment facility will be constructed within Santa Monica which will tap into the 10 MGD of wastewater sent to the City of Los Angeles' Hyperion Wastewater Treatment Plant and scalp off 1 MGD to treat locally. This new local recycled water treatment facility will treat both the 1MGD of scalped wastewater and additional captured stormwater (Element 2, Figure 6).

The additional stormwater will be captured within two new tanks, one at 1.5MG capacity and the other at 3MG capacity, which will be constructed with conveyances to transfer captured stormwater to the new recycled water treatment facility. Initially the recycled water treatment facility will provide tertiary treatment of the water, and as permitting for advanced water treatment is available, this facility will obtain permits and treat the water for ground water replenishment and potable reuse, similar to the advanced water treatment for Pure Water (Element 3, Figure 6).



**Figure 6: Sustainable Water Infrastructure Project in Santa Monica**

(Source: Stantec Presentation)

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The economics of this project work when taking into account avoided costs with future cost increases. The City of Santa Monica purchases its imported water and that cost has escalated dramatically over time. The City also pays the City of Los Angeles to treat its wastewater at the Hyperion Plant and this cost has also escalated over time. These will be avoided costs (cost savings) to the City of Santa Monica when it achieves water self-sufficiency.

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*“This finds infrastructure solutions in a highly urbanized environment and leverages the (stormwater) regulations to move Santa Monica closer to water independence.” Jim Borchardt, Vice President, Stantec*

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### 8.3 Terminal 2 Parking Plaza Stormwater Capture and Reuse

The San Diego municipal permit requires stormwater treatment BMPs for new development projects following the hierarchy previously described (Figure 3). The San Diego International Airport Authority had to develop a stormwater BMP for the Terminal 2 Parking Plaza.

The capture and reuse project will capture all the stormwater that falls on the building, retain it, then treat and use it as evaporative cooling water for the central utility plant HVAC. For this project the 7.6 acre building footprint was the capture area which resulted in a design capture volume based on the permit design capture volume requirements of 93,000 gallons. The facility was designed to store 107,000 gallons and the central utility plant HVAC uses ~30,000 gallons per day for evaporative cooling. This BMP has potential to capture and reuse 2M gallons per year.

The captured stormwater will be pumped and treated prior to use as cooling water. The treatment consists of oil water filtration, microfiltration, and UV treatment prior to use. It is within a closed system to prevent potential cross contamination of the potable water supply.

This is the first capture and reuse project site at the Airport and while the permit allows for capturing additional stormwater beyond required volumes, the Airport had no appetite to do so and bank the credits. A challenge this project faced was obtaining approval of the reuse. The Airport approached both the City of San Diego and the County, however neither had a process in place for stormwater reuse approval. Ultimately the City of San Diego approved the plumbing for the system.



**Figure 7: Terminal 2 Parking Plaza**  
(Source: San Diego International Airport Authority)

While this is the Airport's first capture and reuse BMP, it has implemented other BMPs under the requirements of the prior municipal permit. These would likely not be built now under the current permit BMP Hierarchy,



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but others would have been designed to effectively treat stormwater and comply with the updated permit. These existing BMPs include:

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*Capture and reuse of 2M gallons a year sounds great but “this project didn’t really impress anyone because potable water is so cheap. At less than ½ cent per gallon, 2M gallons a year is only \$10,000.” Richard Gilb, Environmental Affairs Manager, San Diego International Airport Authority*

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- Infiltration area of 1 ¾ acre artificial turf which captures and infiltrates 9 acres of tarmac stormwater runoff.
- Biofiltration devices at the San Park long term parking lot.
- Bioswales surrounding the Rental Car Center.

The Airport has other expansion plans which will require stormwater BMPs, including a plan to develop 200 acres on the south side of the Runway. As the Airport looks toward this redevelopment it faces constraints and concerns relating to stormwater. The Airport, close to San Diego Bay which has numerous TMDLs and a superfund site, is a part of the San Diego Bay Water Quality Improvement Plan (WQIP) which identified the limits for copper and zinc at concentrations so low they are beyond the limits of current available technology to achieve. In addition to being adjacent to San Diego Bay, the Airport is built upon fill material, making infiltration impracticable in most cases. The key question the Airport faces is what it can do with stormwater it captures in the future.

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*“The silver bullet for the future is I’m hoping Pure Water will be able to take the water we have to capture.” Richard Gilb, Environmental Affairs Manager, San Diego International Airport Authority*

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### 9.0 Key Workshop Takeaways

The following is a synopsis of key issues and takeaways from the three workshops:

- A holistic approach to water where drinking water, wastewater, stormwater, ground water, and recycled water are all considered together in the large context of water was a stated philosophy and perspective of all workshop panelists.
- Other regions have developed policies, initiatives, and projects for capture and reuse stormwater as part of the local water supply in a move toward water independence, while also meeting mandatory stormwater permit requirements.
- San Diego County will be assessing the potential for stormwater capture and reuse from the municipal storm system on public lands.
- Finding funding to implement stormwater projects is a challenge, however, treatment of stormwater is a regulatory requirement. Potable water is still relatively inexpensive, although the costs of imported water consistently increase year over year. More importantly, the reliability of imported water over the long term is a consideration.

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- Stormwater projects which provide multiple benefits such as improved receiving water quality, recreational opportunities, green spaces, flood control, habitat, and augmented water supply are preferred by communities.
- Multiple benefit projects can create a greater economic benefit than stormwater treatment alone.
- Alternative compliance which allows for permit requirements to be met through the funding and implementation of stormwater BMPs not on the specific project site are allowed by the regulations for municipal governments, developments and redevelopments; however, they have not been allowed by the State Water Resources Control Board for industries yet. Moreover, the specifics around how alternative compliance will be implemented in each jurisdiction are still under development.
- Because stormwater capture and reuse is relatively new, the permitting process is not fully developed, as evidenced by the San Diego International Airport Authority in their difficulty in obtaining permits for their reuse project.

### **10.0 San Diego Opportunities**

What goals and actions should we consider for San Diego?

To Be Completed Based on Summit Input.

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#### **Workshop 1: Introduction to Stormwater Capture and Reuse, April 2017**

Moderator: Ry Rivard, Voice of San Diego

Panelists:

Adel Hagekhalil, Assistant Director of Sanitation, City of Los Angeles  
Huub Cox, Assistant Division Manager of Watershed Protection, City of Los Angeles  
Stephanie Gaines, Watershed Protection Program Coordinator, County of San Diego  
Lisa Kay, President, Alta Environmental

#### **Workshop 2: Regulatory Hurdles and Conflicts, May 2017**

Moderator: Ry Rivard, Voice of San Diego

Panelists:

Jack Monger, CEO Industrial Environmental Association  
Matt O'Malley, Executive Director San Diego Coastkeeper  
Halla Razak, Public Utilities Director City of San Diego  
Chris Beegan, CA State Water Resources Control Board

#### **Workshop 3: Case Studies & Proofs, June 2017**

Moderator: Ed Othmer, Stantec

Panelists:

Richard Gilb, Environmental Affairs Manager, San Diego International Airport Authority  
Michael McSweeney, Public Policy Advisor, Building Industry Association of San Diego  
Genevieve Osmena, Civil Engineer, Watershed Management Division, Los Angeles County Department of Public Works  
Stephanie Gaines, Watershed Protection Program Coordinator, County of San Diego  
Jim Borchardt, Vice President, Stantec

Whitepaper Author: Lisa Kay, Alta Environmental