LAND USE, TRANSPORTATION, AND WATER QUALITY PLANNING FRAMEWORK

Final Report

Prepared for
Southern California of Governments (SCAG),
in partnership with Western Riverside Council
of Governments (WRCOG)

March 2016

Prepared by

ESA BIRCHLINE PLANNING LLC KEYSER MARSTON ASSOCIATES. Robert A. Leiter, FAICP FEHR PEERS

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Executive Summary

As stormwater quality and watershed protection becomes ever more important to land use and community development, communities in Southern California will be challenged to find effective ways to integrate stormwater management measures into the land development, financing, and permitting process. While conventional tools such as zoning, development impact fees, and development agreements have long been used to manage transportation and other development impacts, and the California Environmental Quality Act (CEQA) addresses transportation and land use, the issue of stormwater management typically has not been addressed in such context or framework. As stormwater management rules become more stringent, integrating stormwater management for new development and municipal "retrofits" for watershed protection into the municipal planning and implementation process could provide great public and private benefit to new development and redevelopment projects.

Through the Southern California Association of Governments (SCAG) Sustainability Grant, the Western Riverside Council of Governments (WRCOG) and consultant team have developed a step by step framework to analyze the opportunities and constraints faced by new development and redevelopment projects in meeting recently changed—and far more stringent—requirements for on-site control and dispersal of stormwater runoff. In particular, this framework provides WRCOG's member communities with a valuable tool for planning, financing, implementing, and operating off-site and regional stormwater management facilities (whether with public or private financing) to meet these new stormwater regulations where it is not feasible to fully meet these requirements within a development site. Use of these off-site stormwater facilities is allowed under the Alternative Compliance program in the regional Municipal Separate Storm Sewer System (MS4) permit, discussed in more detail in the Constraints and Opportunities – Regulatory Overview section of this report.

Stormwater and Land Development

Fundamental to the SCAG Sustainability Grant Project is the concept of Alternative Compliance, or the off-site mitigation of stormwater generated by a development or redevelopment project. In Southern California, provisions of the Municipal Separate Storm Sewer System (MS4) permit require that a significant portion of the storm-related water runoff from a new development or redevelopment site be: (1) retained on-site to prevent adverse effects on downstream areas, (2) filtered through a medium to remove pollutants, and (3) either infiltrated into the groundwater table, evaporated, or taken up by plants to "naturalize" the water cycle on-site. The engineered and natural systems needed to accomplish this process affect the pattern and cost of land development: Stormwater systems either take up part of the surface area of a development site (as with ponds, landscaped bioretention areas, planter boxes with filter media, or swales) or require costly underground storage and infiltration structures. Thus, the choice of stormwater treatment systems, and the volume of water that must be managed on-site to meet permit requirements, have significant implications for developers' pro formas and ongoing operating costs.

In an Alternative Compliance or off-site mitigation scenario, all or a part of the runoff volume that must be managed to meet permit conditions for a particular site is handled through construction of an off-site stormwater management project, or by payment of a fee-in-lieu to an entity (typically a municipality or regional district) that constructs and maintains such projects. By contributing to watershed enhancement projects that provide an equal or greater benefit than would be achieved on an individual site—including retrofit projects that treat existing, unmanaged stormwater runoff—applicants can gain greater development flexibility, and water quality in the larger watershed will benefit. In addition, many of these projects can provide other community co-benefits, such as recreation, trail access, habitat protection, flooding protection, etc., that would not necessarily be provided by on-site projects.

Making an Alternative Compliance program work in practice requires a careful balancing of costs, timing, engineering, and policy. If an Alternative Compliance program results in greater permitting certainty, a reduced cost of compliance, enhanced development potential on-site, and/or co-benefits, or a combination of all four, applicants are likely to want to use it—and a public agency hoping to fund watershed enhancement projects, or to create capacity for desirable development, will have a source of funding for project implementation. However, if the cost of a fee-in-lieu option is not properly balanced with development costs, or watershed enhancement projects that provide Alternative Compliance "credits" are not readily available, a program may falter. In addition, effective policy and planning mechanisms must be put in place to administer an Alternative Compliance program.

Understanding the Numbers

This project and framework has used a case study approach in three cities in Western Riverside County—Temecula, Murrieta, and Wildomar—to work through the details and "the numbers" of the following key components of an Alternative Compliance framework: land development planning and finance; stormwater retrofit project construction costs, operation, and maintenance costs; public financing options and implications; and the potential for regulatory and CEQA streamlining. This report walks through the analysis process in detail, providing a guidance document that municipalities, regional agencies, and applicants alike can use in assessing and designing an Alternative Compliance program to fit their unique needs and objectives.

Step 1 of the framework process is obtaining existing data on land use, projected development, current stormwater practices, existing stormwater infrastructure, public lands and planned public works projects. Step 2 includes developing a base case scenario for each of the three study areas. The base case uses the data collecting in Step 1 that includes known planned and proposed projects to project a 10 year scenario for new and re-development for each study area. Step 3 determines the stormwater management requirements for each of the new and re-development parcels. Both on-site and off-site alternative compliance options are developed with estimated construction and operations and maintenance costs for stormwater management facilities. For this study, four scenarios were developed. The two 100%

on-site stormwater management scenarios included an option for using retention and infiltration and the other option using on-site biofiltration. The other two options included managing 70% of stormwater on-site and 30% off-site at an alternative compliance facility using either retention-infiltration as one option, and bio-filtration as the other. The ratio for off-site stormwater management was selected based on the stormwater analysis of the study areas. Ratios will depend on the specific site condition, planned development and BMP costs. The results of the Step 3 stormwater analysis with regard to the volume of stormwater that can be managed on-site indicated the following:

- New Development on larger tracts (Wildomar Base Case) generally can accommodate on-site stormwater management using biofiltration and most using infiltration (if soils suitable).

- Smaller parcels for mixed-use and commercial development generally can marginally manage stormwater on-site using biofiltration but often not with infiltration (Murrieta Case) due to greater land area needed for infiltration.

- Higher density in-fill development have the least capacity for above ground on-site management and often will most likely require off-site alternative compliance options (Temecula Case)

The costs of stormwater management for each of the four scenarios were developed using literature values and a case study recently completed in Orange County. A volume based unit cost was used for this study. Bio-filtration has a higher unit cost per volume than above-ground retention-infiltration, but can be more easily configured to fit onto smaller and constrained properties. Underground infiltration chambers may be an option for urban redevelopment, but these units are even higher in volume based unit cost than bio-filtration. As an initial framework, this analysis did not evaluate other combinations of BMPs than the four selected.

Step 4 includes the financial analysis of these four scenarios with regard to the cost of the stormwater management as an impact to the overall cost of a development. The consultant team prepared preliminary financial models to "feasibility test" the potential cost burdens for each development project planned in the Wildomar, Murrieta, and Temecula study areas. The economic impact of stormwater management on development costs were rated using a scale of low, medium and high impact based on a percentage of total development costs (excluding land costs). The results of this analysis are as follows:

- **Scenario 1 – 100% On-Site Infiltration Basins** – This scenarios is not viable from an area available to manage the required stormwater volume standpoint (not costs) and for redevelopment and many of the new Development Projects

- **Scenario 2 – 100% On-site Biofiltration**- This scenario is spatially viable for most projects but relatively expensive and potentially limiting for all but high

density projects (Temecula) due to the higher cost of biofiltration compared to above ground retention-infiltration. This is also due to the compliance language in the MS4 Permit that requires biofiltration BMPs to address 1.5 the required volume compared to infiltration BMPs. Furthermore, the Water Quality Equivalency ratio developed by the County of San Diego for off-site alternative compliance BMPs is 1.5 for biofiltration. This increases the volume to be managed by these BMP types and therefore the cost per volume.

- **Scenario 3 – 70% On-Site/ 30% Off-site Infiltration Basins** - Most feasible across most projects – well suited for mixed use and multi-family housing

- **Scenario 4 – 70% On-Site/ 30% Off-site Biofiltration** - Works primarily with mixed-use development (Temecula) with higher cost in new development (Wildomar & Murrieta) – this may vary with less favorable soils

In summary, for lower-density settings, and for development projects with larger areas of open space, on-site compliance with the MS4 permit appears to be readily achievable, physically and financially, using on-site infiltration measures. This assumes on-site soils are suitable for infiltration at rates that meet required draw down times for these BMP's. For most Murrieta and Wildomar projects, the optimal solution financially is the off-site infiltration basin (30%). The least feasible solution, because of the higher unit cost of biofiltration, is the off-site biofiltration (30%). An approach using on-site infiltration basins is not viable for the major mixed-use developments planned in Temecula because of the lack of available land area. In situations where developers may experience both physical/site development and financial feasibility challenges in implementing on-site stormwater management facilities, the most feasible approach to manage and treat stormwater is the off-site infiltration basin option. Use of this option presupposes, of course, that an Alternative Compliance program has been adopted by the municipality, approved by the Regional Water Quality Control Board, and priced in a manner consistent with the assumptions in this report. It also assumes that subsurface soil conditions will be favorable to infiltration of these off-site facilities.

The Alternative Compliance language in the MS4 permit does not specify the particular mechanism by which a local program would be implemented, leaving development of the ordinance, framework, or other provisions to each municipality to invent and propose. However, Alternative Compliance for stormwater is essentially identical in intent and effect to the many existing systems by which California municipalities have implemented fee-in-lieu or mitigation provisions. Fees to offset capacity impacts on traffic, school, park, water and sewer, and other comparable systems are assessed through many methods, including the use of Area Drainage Plans to mutually agreed-upon conditions in Development Agreements. The most likely funding mechanisms for capital facilities are Reimbursement Agreements, followed by Development Impact Fees, Community Facilities Districts, and/or I-Bank loans. For ongoing operations and maintenance, the most likely funding mechanisms are Landscaping/Maintenance Districts and Community Facilities Districts.

Steps Forward

Steps forward have been added to this report based on the input and comments received on the Draft Report and from the Stakeholder Workshop conducted on December 7, 2015. These steps forward include:

- **Further Analysis on Bio-filtration BMP Costs** - The results of the financial analysis indicate that infiltration basins for 100% on-site infiltration, when there is sufficient space and favorable soils, are more favorable to address stormwater management than bio-filtration. The 70/30 scenario also indicates that the infiltration basin option has less financial impact than bio-infiltration. This is due to the both the higher cost of bio-infiltration on a cost per volume basis and the required larger volume of 1.5 times for bio-infiltration than infiltration to meet the Permit requirements. Bio-infiltration has in fact been successful in numerous applications in Riverside County. Additional analysis was recommended to assess a third scenario using on-site bio-infiltration for a portion of the stormwater volume requirements and the remaining portion as off-site basin infiltration. This may show less impact on overall project finances. In addition, an analysis of select parcels should be conducted to determine the cost per volume of bio-infiltration for on-site stormwater management, considering the cost savings from deducting the cost of landscaping from the areas used for bio infiltration; in other words, this analysis would prevent any "double-counting" of the cost of landscaping where an area is used for bio-infiltration.

- **Further BMP Cost Analysis for Use of Underground Infiltration BMPs** - The financial impact for on-site bio-infiltration at 100% for the redevelopment sites in Temecula is low due to the lower land area (thereby low volume) and greater square feet of building compared to the site drainage area. Although bio-infiltration fits within the available area for the parcels analyzed, it is likely that developers will use underground storage and infiltration to maximized available developable land. Therefore the study should include an analysis of the financial cost of compliance using an underground storage BMP for the Temecula Study Area.

- **Additional Scenarios for Greater Percentage of Off-Site Alternative Compliance** – Suggestions for future analysis included completing additional scenarios that include a greater percentage of off-site stormwater compliance through an alternative compliance program. Additional scenarios suggested include 50, 75 and 100 percent off-site alternative compliance.

- **Further Analysis and Discussion of Potential Off-site Alternative Compliance Projects for the Study Areas** – The report includes the descriptions of potential off-site alternative compliance sites under the Base Case discussions of each of the three Study Areas. The scope of this study did not include an evaluation of the feasibility, storm volume capacity and

costs. Potential future steps were suggested to include further analysis of these potential sites and the anticipated volume and cost per volume of these BMPs compared to the costs presented in the referenced BMPs study in Orange County.

- **Additional Next Steps Study Questions**: The following additional study questions were suggested for consideration in next steps to this initial study:

    - Are the storm water regulations incentivizing desirable, planned growth patterns and strategies? What types of development could be dis-incentivized under the storm water requirements, and what strategies are needed to re-structure the incentives?
    - What can cities do to prepare for these regulations, and provide for planned development and redevelopment in their communities (e.g. revise codes and ordinances to allow for dual use of landscaped areas, develop Alternative Compliance policies, enable use of the right-of-way for stormwater management, etc.)?

- **Additional Compliance Program Option**: Lastly, another potential next step in an analysis examining Alternative Compliance program development in Riverside County (and elsewhere) is the determination of specifically what type of Alternative Compliance program would be offered. MS4 permits (including the San Diego Regional MS4 permit) generally allow payment of a fee in lieu of on-site compliance, or establishment of a water quality credit trading program. In the report's conclusions, it is generally suggested that a municipality would be the principal project proponent, from the standpoint of creating the Alternative Compliance program opportunity, planning and constructing it, and operating it over time. Stakeholder input on this has suggested that other program management scenarios do exist and warrant evaluation, whether the program is based on a water quality credit trade or payment of fee in lieu. An assessment of these other program management scenarios was recommended as a possible next step to fully develop an Alternative Compliance program option in suitable locations.

section 1

Introduction

Project Overview – Constraints and Opportunities

Water quality and stormwater management have moved squarely into the purview of land use and transportation planning in recent years, particularly with adoption of the MS4 National Discharge Elimination System (NPDES) Permit for the San Diego Region in 2013. The new MS4 permit, which includes the County of Riverside and the cities of Murrieta, Wildomar, and Temecula, requires stormwater management measures to be implemented both to manage the ongoing impacts of older development built before modern stormwater control standards (retrofits), and to manage impacts of new development and redevelopment projects. Both of these requirements affect planning for developable areas such as those in the U.S. Highway 395 Corridor. Under Provision E.3 Development Planning, the Permit requires significant on-site treatment measures to be implemented that may, in some conditions, pose significant constraints on new development and redevelopment. To meet the standards, applicants are required to implement BMPs that capture and retain on-site the amount of stormwater such that the amount of runoff from the developed project matches or does not exceed more than 10% of the pre-development site condition; this is intended to restore the hydrologic condition of the site and reduce the impact from increased peak flow that may result in downstream hydromodification (i.e., increased erosion of stream banks, greater sediment load to streams and creeks and loss of aquatic habitat). Additional measures are required to address pollutant loading, to prevent potential impacts on the beneficial use of receiving waters. These measures include the use of low-impact development (LID) techniques that retain and then infiltrate, evapotranspire, and/or re-use stormwater on-site.

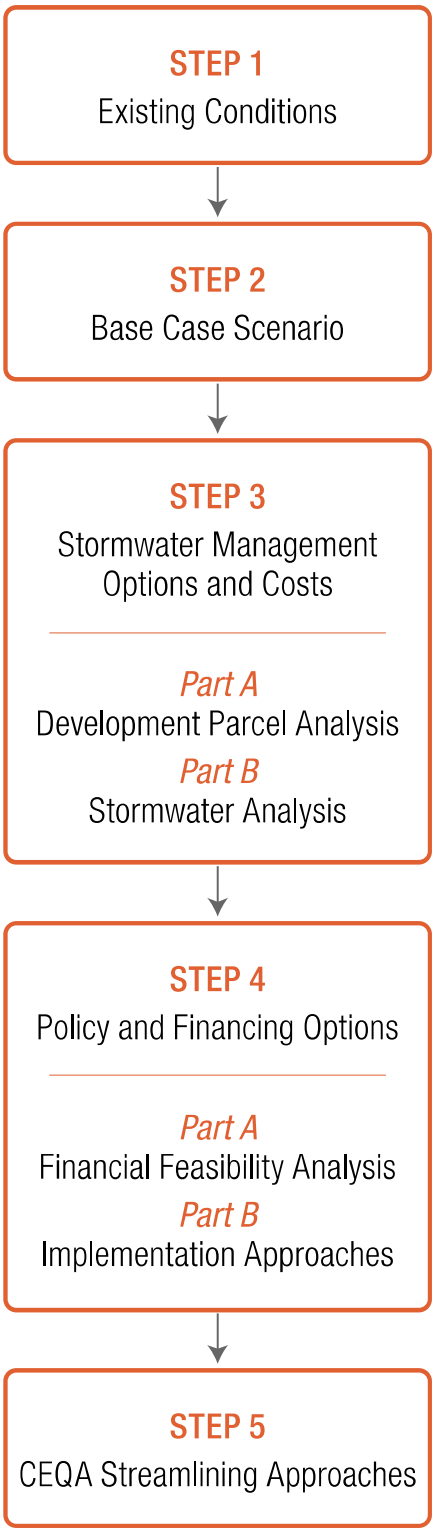
Depending on the site size and configuration, geotechnical site conditions, and economic feasibility, building these required measures within the boundaries of a single property may not be feasible. Moreover, once cost is taken into account, the requirements may lead to a financing situation in which stormwater costs represent a significantly large percentage of total project cost that the project's overall viability is threatened. These water quality and hydromodification requirements can therefore preclude the development and redevelopment of sites in accordance with specific land use designations, either physically or financially, unless an alternative is made available. For this reason, the MS4 permit provisions allow Alternative Compliance measures, which include use of off-site or cooperative regional treatment measures that, considered as a whole, meet or exceed the required stormwater capture and treatment for the site. This offers opportunities for municipalities to plan water quality projects that provide capacity for future development and redevelopment, and to work with the regulatory and resource agencies as well as developers to find potential off-site and regional sites suitable for implementing LID and other stormwater management facilities. Taken together, these regional facilities offer the potential for water quality/hydromodification "mitigation banking"—an approach similar to the WRCOG-developed Transportation Uniform Mitigation Fee, which has long been used to manage transportation capacity impacts—where developers and municipalities

could establish and purchase stormwater management "credits" to meet the NPDES Permit provisions.

The imposition of more stringent requirements for on-site stormwater management has the potential to affect the feasibility of development—and particularly redevelopment—in Western Riverside County. As such, this project used the land use and development environment in three rapidly evolving communities in Western Riverside County—Wildomar, Murrieta, and Temecula—to create a framework for evaluating an increasingly critical part of real estate finance, municipal management, and capital planning: how to balance new and far more stringent regional requirements for the on-site control and dispersal of stormwater runoff with community and private development goals, and with the potential for off-site projects to provide Alternative Compliance opportunities. To evaluate this issue in an active development setting, representative study areas were selected along the Highway 395/Jefferson Avenue corridor in each city. These are areas where public transportation, infill development, stormwater retrofit, and flood control facilities are being studied actively, offering an excellent test case for developing the elements of an integrated planning, permitting, and financing strategy. The study has found that in some cases, Alternative Compliance will be needed to ensure that stormwater regulations do not affect the financial feasibility of projects already planned in portions of the WRCOG subregion, making preparation of this study and framework especially timely and important.

The development of a functional Alternative Compliance program, with water quality/hydromodification facility banking, requires substantial upfront planning. A municipality or regional authority must first identify and set aside properties where regional or off-site stormwater management can be provided, and/or must "over size" publicly sponsored water quality projects, to create sufficient capacity to address the anticipated needs of future development and redevelopment within a drainage area or watershed. The MS4 permit provisions require that off-site and regional facilities be within the same drainage area or at least within the same watershed as the development or redevelopment project. On the positive side, the opportunities are many: Regional or cooperative stormwater facilities can be integrated into transit centers, flood management areas, parks and recreational facilities, and habitat restoration projects to achieve cost-effective multi-benefit projects that can be funded through an in-lieu fee program. The establishment of an in-lieu fee program allows sites to be set aside for stormwater management and then constructed using the in-lieu fee program. This overall program can allow development and redevelopment to proceed in constrained areas where otherwise, the MS4 permit requirements could not be met. In this way, stormwater management requirements can support, rather than hinder, implementation of preferred land use plans in transit priority areas and other areas where the City wishes to accommodate new development or redevelopment.

Figure 1-1 Step Process



This project thus provides a significant advance, linking Regional Water Quality Control Board policy mandates with municipal planning and implementation policies, the integrated land use planning policies adopted in the 2012 Regional Transportation Plan & Sustainable Communities Strategy. As water quality requirements increasingly drive municipal investment and policy, stormwater and retrofit planning must be integrated into plans for upgrades to existing roadways, community parks, flood management corridors, recreational bike and walking trails, and transit corridors in Western Riverside County. Integrating regional stormwater facilities into a plan for the Highway 395/Jefferson Avenue Corridor represents an opportunity to consider different ways by which water quality improvements might become part of the capital facilities and transportation/land use planning, permitting, and CEQA review process.

Project Objectives – Components of WRCOG Planning Framework

The consultant team was tasked to work with WRCOG to develop a framework for integrating Land Use, Transportation, and Water Quality Planning, demonstrating specific ways that these regulatory constraints to potential development and redevelopment can be addressed through Alternative Compliance options and financing strategies. Through this project, a framework has been developed to establish/define the path by which this optional program can be applied in a planning area or areas. This policy path includes the following four items.

1. Outlining an anticipated development scenario, with sufficient detail to project the amount of impervious surface, landscaped area, and otherwise unused space on-site so that both stormwater volumes and “opportunity areas” for stormwater management can be estimated.
2. Using the information from the development scenario, estimating stormwater volume and treatment needs, including consideration of retrofit needs for existing untreated development or impervious areas, based on permit requirements and physical conditions in the sub-watersheds within the planned growth area.
3. Identifying potential locations on public or private land, and/or within projected public capital improvement projects or private development/redevelopment projects, where Alternative Compliance stormwater facilities could be constructed that exceed the requirements for their own sites, and thus provide available volume and treatment capacity.
4. Outlining a potential financing mechanism to establish the cost per unit of stormwater volume and treatment, hold funds, and provide financing to construct or incentivize Alternative Compliance capacity projects.

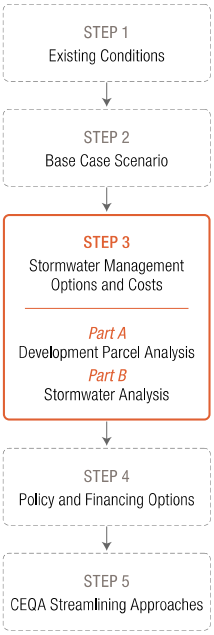
Overall Technical Approach

To accomplish the policy path, the project proceeded through a series of five steps that yield a framework for evaluating on- and off-site stormwater compliance and development finance options in other communities and settings. The steps in the process are shown in **Figure 1-1** .and summarized as follows.

Step 1. **Conduct an Existing Conditions Analysis**, identifying both the land use and infrastructure systems in place, and the existing and planned open spaces, rights-of-way, and drainage networks that could provide opportunities for Alternative Compliance.

Step 2. **Prepare Base Case Scenarios** in each of the three municipalities, each with a set of future private development and public facility projects expected to develop over the next 10 years (i.e., 2015–2025), with detailed build-out assumptions such as square footage or residential density. In this step, the potential locations and types of watershed improvement projects in the vicinity that could serve as Alternative Compliance projects can also be identified.

Step 3. Identify Stormwater Management Options and Costs. This step includes two parts, Part A: Development Parcel Analysis and Part B: Stormwater Analysis. Step 3 Part A involves projecting the specific site development scenarios for each project in order to determine the land use areas and space available for stormwater management within each parcel. This detailed projection of land use (building footprint, parking, service areas, landscaping, stormwater management, etc.) provides the areas and runoff coefficients that are then used to develop the projected stormwater volumes that must be managed on-site, using the MS4 permit requirements for priority development and new development projects (as applicable). Step 3 Part B involves calculating the on-site stormwater volumes that are required to be retained on-site in accordance with the new MS4 permit. Section 5 of this report gives a more detailed discussion of Step 3 Part B; this discussion presents a number that must be paved for public safety access and the opportunity to incorporate infiltration or biofiltration into required landscaped areas) can have a significant impact on the feasibility of development or redevelopment under the MS4 permit. The Stormwater Analysis itself has two steps. The first is identifying the likely stormwater engineering options and costs associated with each development scenario, under applicable provisions of the MS4 permit. The second step is outlining a set of potential off-site mitigation projects, with associated costs, for each study area. The four stormwater scenarios used for this project used scenarios with either 100% on-site management with infiltration or biofiltration, or 70% retention of the 85th percentile storm on-site with either infiltration or biofiltration and the remaining 30% treated in the same type of BMP off-site. For the 100% on-site scenarios, on any site that did not have sufficient space to fully accommodate the required volume on-site and still carry out the planned development scenario, the difference was managed off-site. For the 70% on-site scenarios, 30% of the total required volume was managed off-site.



Step 4. Evaluating Financing Options that would enable the development scenarios and off-site stormwater mitigation projects identified in Step 3 to work under the Alternative Compliance provisions of the MS4 permit, and under the development and public finance structures readily available to applicants and municipalities alike. This includes, in this report, an assessment of the impact of the four stormwater scenarios on the financial feasibility of each project.

Step 5. A CEQA Streamlining Analysis includes a review of the current CEQA legislation(Public Resources Code 21000–21189) and the CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387) that provides for a more streamlined process for projects that are integrated with Transit Priority Projects. Where off-site alternative compliance stormwater projects are integrated with these urban transit systems, a more stream lined CEQAS process can reduce the time and effort for upfront environmental documentation for these projects. As part of the development of the Land Use, Transportation and Water Quality Framework Plan, opportunities to streamline the CEQA process for subsequent surface water quality projects were evaluated and documented in Section 7.

This report is structured to walk the reader through each of these five steps. Each section of the report presents a summary of the process and findings of each of the steps. For Step 3, which has two parts, two separate sections are presented. This 5-step process represents the framework for planning and financing a stormwater Alternative Compliance program for communities in the region.

The importance of sound and realistic information on planned and projected development to the validity of these findings, and the usefulness of the framework, must be emphasized. WRCOG and the consultant team worked closely with planners and stormwater managers from each of the three cities and flood managers from the Riverside County Flood Control and Water Conservation District (RCFCWCD) in the development of the study areas and in the identification of opportunities for potential watershed projects or stormwater management facilities that could be used for Alternative Compliance. The anticipated future development within these study areas was used as the basis to analyze the opportunities and constraints associated with meeting the new MS4 regulations and the need for Alternative Compliance. Input and information provided by the Cities and RCFCWCD on local stormwater practices and opportunities for potential off-site facilities provided the basis for analyzing how these crucial components of infrastructure and planning can be integrated into land use and planning, transportation plans, build-out analysis, financing, and CEQA to accomplish multiple goals.

It is likewise important that the analysis in this report reflects ongoing work by the San Diego Regional Co-Permittees to establish the technical basis of the Alternative Compliance program that will be applicable to Western Riverside County. Throughout this project period, the consultant team's members and the staff of the municipalities and RCFCWCD worked as part of the Technical Advisory Committee in the development of the Water Quality Equivalency Report that defines the basis for

establishing the credits for Alternative Compliance facilities. The methods for determining water quality equivalency developed by the San Diego Regional Co-Permittees were used in calculating the required off-site facilities needs for the three study areas analyzed for this project. The Team applied the recommended methods and formulas from the draft San Diego Water Quality Equivalency Report to this project.

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section 2

Existing Conditions – Step 1

The framework process begins with ***Step 1, the Existing Conditions Analysis***. This step is essentially a data gathering exercise to obtain the necessary baseline information from which the base case scenarios can be developed in Step 2, and stormwater off-site Alternative Compliance options identified in Step 3. The collaboration of the Cities and the RCFCWCD in this initial step was fundamental to the outcome.

The baseline information collected in this step includes existing land use, infrastructure systems, existing and planned open space, right-of-ways, hydrologic features, drainage areas, and municipal storm sewer systems. A more detailed summary of the data and maps obtained are presented in the Existing Conditions Report provided as Appendix A. A GIS directory and map files of the collected data will be provided in the final report in Appendix A.

The project study area as shown in **Figure 2-1** generally follows the Historic U.S. Highway 395 Corridor, which parallels I-15 throughout the cities of Temecula, Murrieta, and Wildomar. Key elements of the existing transportation, land use and hydrological/geological systems are described and in the following pages.

Existing Transportation

As shown in **Figure 2-2**, there is an extensive transportation system within the study area, which includes a variety of roadways, bicycle/pedestrian, and transit facilities. The following discussion gives an overview of the transportation system.

Within Temecula as shown in Figure 2-2, the study area generally follows Jefferson Avenue which has four travel lanes with intermittent sidewalks on one or both sides of the roadways. There are no existing bicycle lanes within the study area but future bicycle routes are proposed along Murrieta Creek, Winchester Road, Jefferson Avenue, and Rancho California Road. The bicycle facilities on Murrieta Creek would be a Class I off-street trail while the remaining facilities would be Class II (on-street bicycle lanes). The study area within Temecula is currently served by Riverside Transit Agency (RTA) Route 24 and Route 79. A Bus Rapid Transit (BRT) is proposed along Jefferson Avenue, though timing for this improvement is uncertain. Additionally, RTA is evaluating a proposed transit center at potential locations within Temecula.

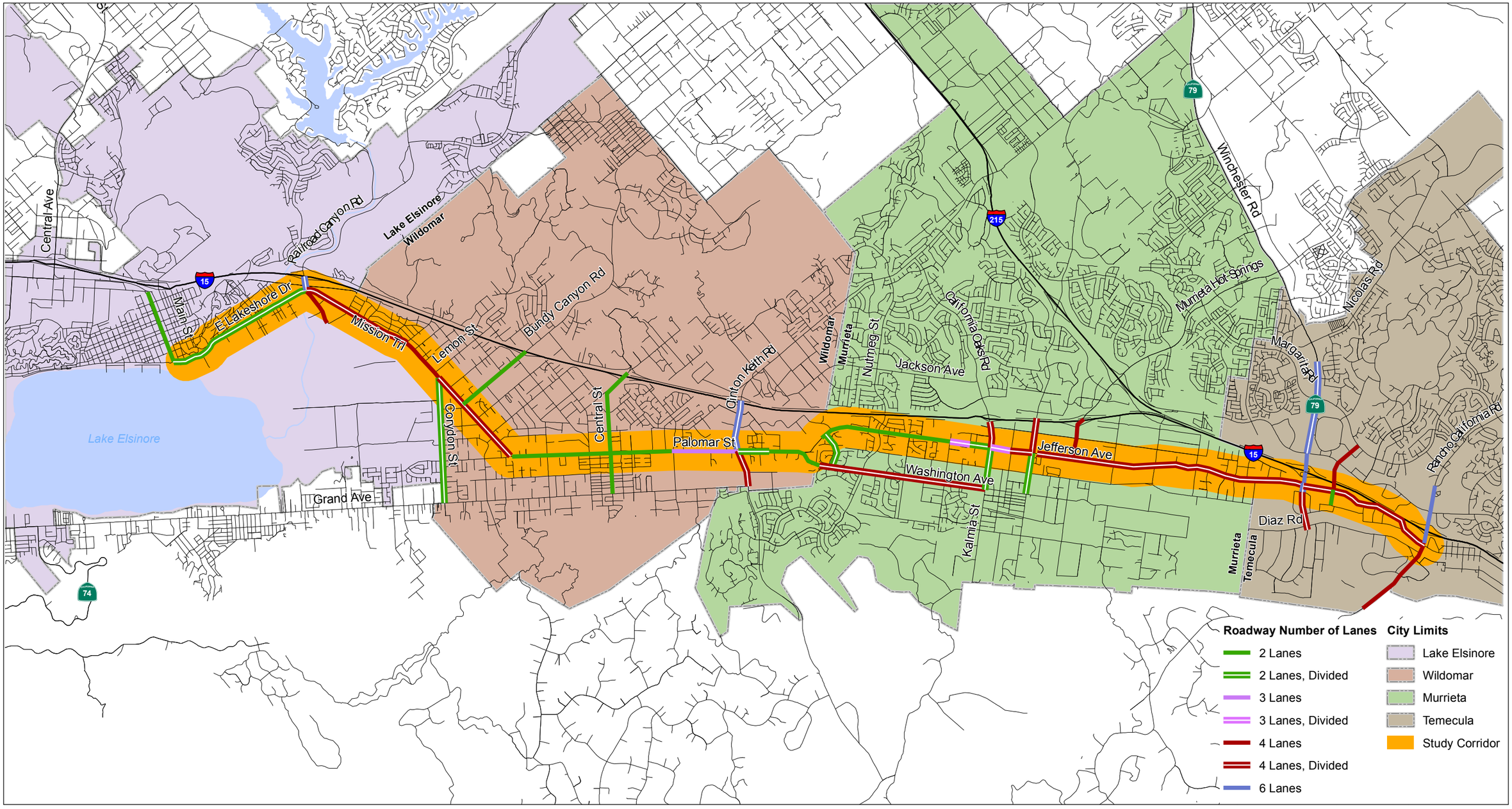
Within the City of Murrieta, as shown in Figure 2-2, major roadways within or proximate to the study area include Jefferson Avenue (4-lane roadway), Palomar Street (4-lane roadway), and Kalmia Street (4-lane and 2-lane roadway). Kalmia Street also provides access to I-15 through a major interchange. There are limited pedestrian facilities within the study area. Bicycle facilities are proposed along Jefferson Avenue (Class II) and the Murrieta Creek Trail (Class I). RTA Bus Route 23 provides service to the study area. BRT service is also proposed along I-15 and I-215 within the City.

SOURCE: ESRI

SCAG WRCOG.140308

Figure 2-1

Project Area - 395 Corridor



SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 2-2

Existing Roadway Lane Configurations

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Transportation facilities in the City of Wildomar as shown in Figure 2-2 include major roadways such as Clinton Keith Road and Palomar Street. Clinton Keith Road varies between four lanes and six lanes with an interchange at I-15. Palomar Street varies between two and three travel lanes. There are intermittent sidewalks along Palomar Street, though most of the roadways in the area have no sidewalks or pedestrian facilities. An extension of the proposed Murrieta Creek Trail, a Class I facility, would traverse the study area. Bicycle lanes area also proposed along Clinton Keith Road from north of I-15 to south of I-15. Bus service within the study area is currently provided by RTA Bus Routes 7 and 23. A BRT Route is also proposed along I-15.

Existing Land Uses

As shown in **Figure 2-3**, the Corridor within Temecula is primarily commercial, with uses ranging from relatively higher-density offices to restaurants to general commercial uses. Other notable land uses include hotels and educational facilities. There are also several vacant parcels located along the Corridor within Temecula.

- Office: Offices within Temecula provide a variety of professional services, including real estate, medical services, and other similar uses. These professional service offices occur typically in two- to three-story buildings, which are often set back significantly from the highway.

- Restaurant: There are also an extensive number of restaurants within the Corridor, providing a wide range of both fast food and sit-down facilities. These restaurants are found sometimes as stand-alone sites and are sometimes located within larger shopping areas or clusters of restaurants.

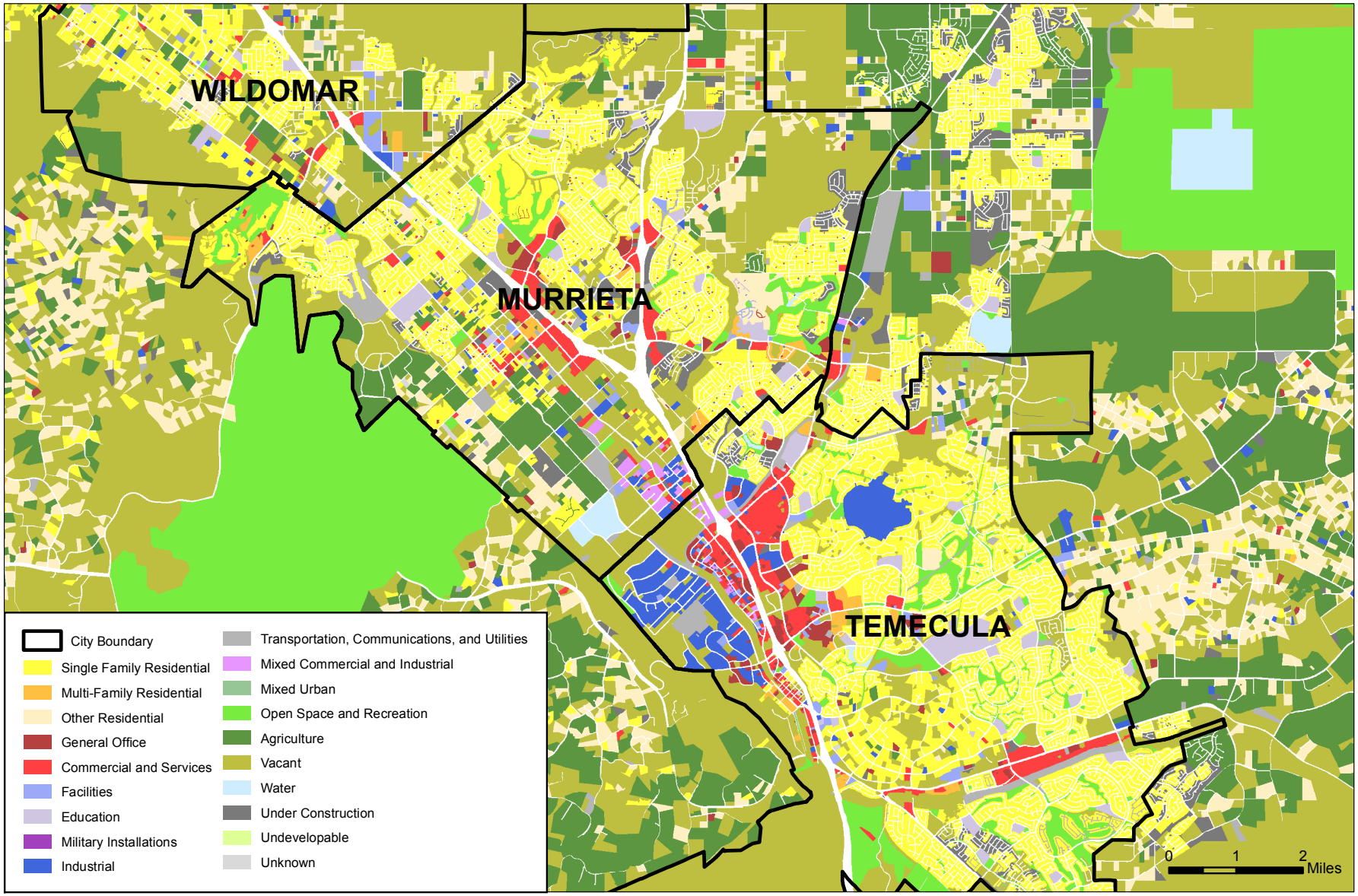
- Retail: General retail and commercial uses along the highway tend to be smaller shopping centers that accommodate a wide variety of patrons.

- Hotel: There are several hotels located near the intersection of Jefferson Avenue and Rancho California.

- Educational: There are several educational facilities along the Corridor. For example, the University of Redlands Business School has a satellite facility in Temecula.

As shown in Figure 2-3, the existing uses within the Corridor in Murrieta vary even more significantly than in Temecula, with residential, commercial, industrial, and institutional uses as well as vacant parcels.

- Residential: A significant portion of the Corridor, particularly the northern end, is occupied by residential uses. The residential uses tend to be a mix of multi-family and single-family, with single-family uses predominant.



SOURCE: ESRI

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 2-3

Existing Land Uses in Project Area

- Commercial: General commercial uses, including smaller shopping centers, are common in the city of Murrieta. Several of these shopping centers focus on automotive-related uses, such as the "Auto Mall."

- Industrial: Light-industrial centers are also common throughout the Corridor in Murrieta. While most of the tenants within these light-industrial complexes are traditional industrial and manufacturing uses, there are several buildings with non-industrial tenants.

- Vacant Land: There are also vacant parcels along the Corridor in Murrieta. These parcels tend to be larger sites and are essentially scattered at various locations. One trend is that there appear to be more vacant parcels in the segments near Wildomar as compared to near the city of Temecula.

Similar to Temecula and Murrieta, there is a significant variation in the existing land uses found within the Corridor in Wildomar, as shown in Figure 2-3. These uses range from small shopping centers to residential and institutional uses. Segments of the Corridor in Wildomar are unique, with very rural uses, including large lot residential units with facilities for animal keeping and equestrian activities.

- Residential: Much of the Corridor in Wildomar is currently occupied by various types of residential uses. These residential uses appear to be predominantly single-family. Rural residential uses are significant within this segment of the Corridor. For example, multiple single-family homes were observed with equestrian and animal keeping facilities fronting the Corridor. In addition to these rural residential uses, supportive retail uses such as feed stores and other related facilities were also noted.

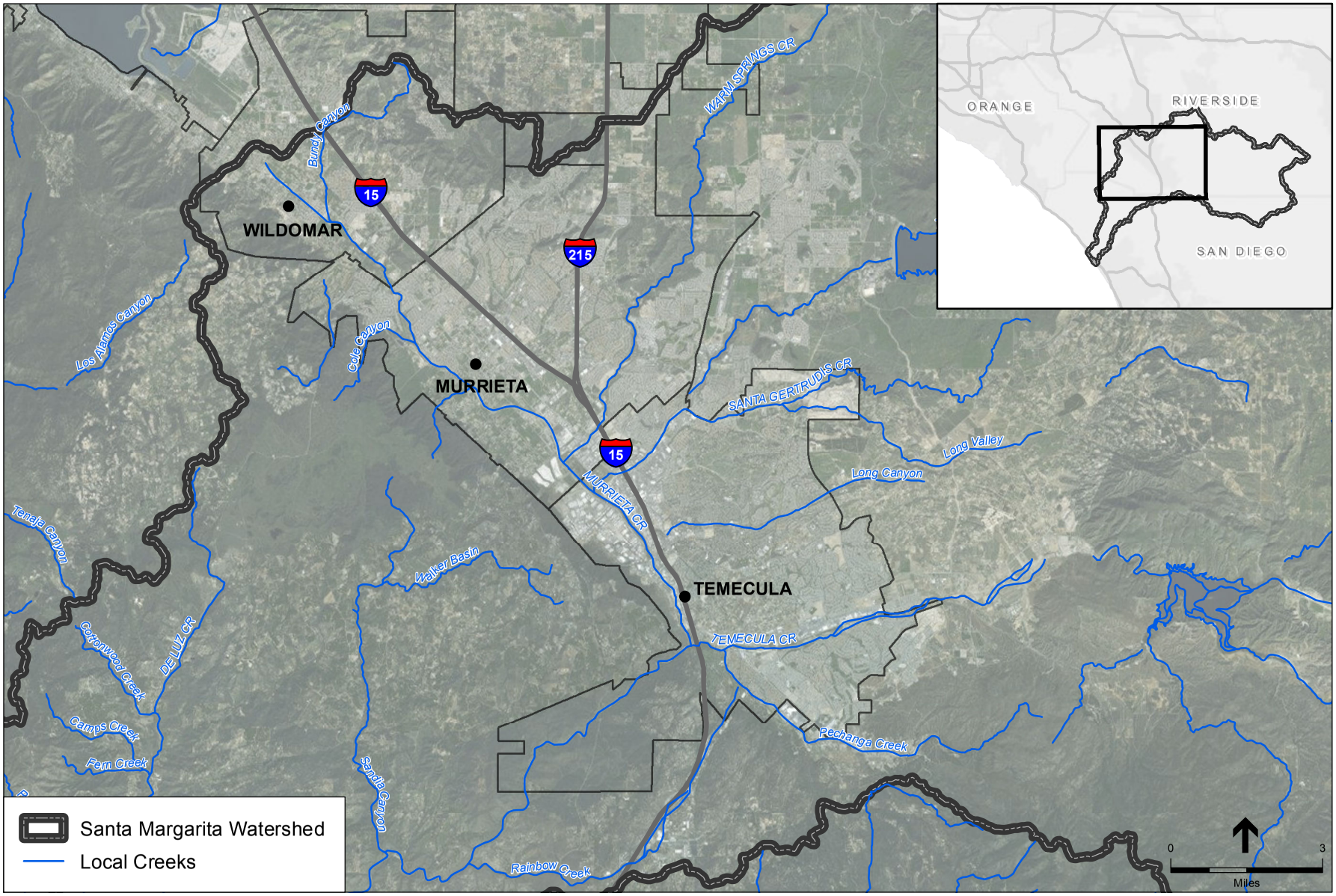
- Cemetery: One land use unique to Wildomar is a cemetery.

- Vacant Land: There are several vacant parcels along the Corridor. Like in Murrieta, these vacant parcels tended to be larger sites. Unlike in Murrieta, these sites tend to be distributed throughout the Corridor in various locations instead of concentrated in one or two sites.

Existing Hydrologic/Geological Conditions

As shown in **Figure 2-4**, the entirety of the study areas in the Cities of Murrieta and Temecula fall within the Santa Margarita River watershed. Immediately to the west, the City of Wildomar is located within a portion of the Santa Margarita Watershed and the San Jacinto watershed. The focus of this study is the area within the Santa Margarita Watershed.

Drainage systems in the study areas consist principally of County and municipal stormwater facilities and blue-line streams. Data for blue-line streams was provided by the U.S. Geological Survey while the locations of existing and planned stormwater facilities



SOURCE: Riverside County GIS, ESRI Imagery

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Figure 2-4

Existing Hydrologic Conditions in Project Area

were provided by the RCFCWCD and the Cities of Temecula and Wildomar. Data on municipal stormwater facilities in the City of Murrieta was not available.

Available impervious surface information was obtained through RCFCWCD in the form of 30-meter National Land Cover Database data from 2006. However, it should be noted that this data predates a significant amount of then-existing development in the cities of Wildomar, Murrieta, and Temecula. Based on a review of available data, patterns in the impervious surface in the focus areas include:

- Much of the study area in the city of Temecula is impervious surface except for those areas along Murrieta Creek.
- In Murrieta and Wildomar, there are limited areas covered by impervious surface.

The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) conducts the National Cooperative Soil Survey to provide detailed soil data. According to the NRCS soil survey data, a variety of different types of soils exist within and surrounding the focus areas, including clay, clay loam, sand, and unweathered bedrock.

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section 3

Base Case Scenario– Step 2

Step 2: The preparation of the Base Case Scenario in the framework process includes the development of land use scenarios that identify within a study area the reasonably foreseeable future development and redevelopment projects expected to occur based on available planning information gathered in Step 1. For this framework, development three separate base case scenarios were developed for each city to provide representative future development and redevelopment conditions. The outcome of Step 2 is the base case study area maps and parcel data that identified the projected amount of new development and redevelopment within each study area. The results of Step 2 are then used in the first part of Step 3 (Part A) to develop the individual parcel land use data conditions in order to calculate the future stormwater volume management requirements. The following provides a summary of the development of these three scenarios.

The project team developed the three study area boundaries and base case scenarios or study areas for this project, one in each municipality, based on input received from WRCOG, RCFCWCD, and the Cities of Wildomar, Murrieta, and Temecula. The consultant team used the land use and transportation plans and studies previously prepared for the U.S. Highway 395 Corridor, along with consultations with staff members from each of the three cities. Meetings were held at each of the three cities to obtain information and input on the approach to the base case scenarios. Based on these discussions with the Cities and WRCOG, it was determined that each of the cities along the U.S. Highway 395 Corridor represented various stages of development and redevelopment. The project team prepared an approach to scenario development that provides greater representation of this to provide representative study areas for the various types of future development and redevelopment that are anticipated in the next 10 years that will be subject to the new stormwater requirements (i.e., 2015–2025). In order to provide a more representative base case scenario, three study areas in each of the cities along the U.S. Highway 395 Corridor were selected. Further discussion of the development of the three base case scenarios, maps and description of each parcel of new development and redevelopment within the study area are presented in the following discussion. The three base case study areas include a set of build-out assumptions including square footage for non-residential uses, number of residential units, and maximum densities and intensities based on information provided by the cities on anticipated projects in the next 10 years.

Overall Approach to Development of Base Case Scenarios

The approach to the development of the base case scenarios was to identify and develop a representative study area to conduct the stormwater and financing analysis. In preparing the base case scenarios, the Project Team used the land use and transportation plans and studies previously prepared for the U.S. Highway 395 Corridor, along with consultations with staff members from each of the three cities. Based on these discussions with the cities and WRCOG, it was determined that three base case study areas located in each of the three cities along the U.S. Highway 395

Corridor would best represent various type of future development. The Temecula base case represents future redevelopment in an already urbanized setting. The base case study area in Murrieta represents mature development with limited large tracts for new development with new development planned for smaller, more isolated parcels. The base case represented by the study area in Wildomar is characterized by a less mature developed area where larger tracts still remain for new development along or near major transportation routes. The three base case scenarios therefore provide a greater representation of planned future development in the region that varies from redevelopment to large track new development scenarios.

The base case scenario for each city includes a set of future private development projects and public facility projects that could be expected to develop over the next 10 years (i.e., 2015–2025), and includes build-out assumptions such as square footage for non-residential uses, number of residential units, and maximum densities and intensities.

Each base case scenario is accompanied by a map showing new development and redevelopment sites, transportation improvements, open space and recreation features, and sites or investments identified with potential for off-site or regional/cooperative stormwater management. Using the 10-year build-out assumptions established for each base case scenario, an estimate of the volume of stormwater required to be managed to meet requirements of the MS4 permit will be generated in Step 3.

Characterization of Individual Base Case Scenarios

In formulating the base case scenario for each of the three cities, the Project Team identified the following characteristics as being important in determining the most appropriate Alternative Compliance options for each city:

1. Community Place Types

The classification of areas within towns and cities by “place types” allows for the application of broadly accepted planning principles related to transportation and land use integrated to particular areas as a basis for making planning, investment and management decisions. In this study, we used the “Smart Mobility Place Types” that are set forth in the Smart Mobility Framework http://www.dot.ca.gov/hq/tpp/offices/ocp/smf.html, which was published by Caltrans in 2010. The Smart Mobility place types have been used in the formulation and evaluation of regional and local plans throughout California since the report was completed in 2010.

According to the place type categories in the Smart Mobility Framework, all three of the study areas being evaluated in this report would be considered to be components of “Suburban Communities,” which are “communities characterized by a low level of integration of housing with jobs, retail and services, poorly

connected street networks, low levels of transit service, large amounts of surface parking, and inadequate walkability."

It should be noted, however, that all three cities have adopted General Plans that set forth policies intended to improve mobility and land use integration over time. These plans will be discussed further in the *Description of Individual Base Case Scenarios* section as applicable.

2. Land Development Patterns

In addition to considering existing and future community place types, it is also important to consider the patterns of development within each study area. The following distinct patterns of development are observed in most suburban communities and apply to varying extents (and to some extent, in combination) to the three study areas:

- A greenfield development pattern, consisting of relatively rapid development of larger vacant sites, is typical in the early stages of suburban community development and observed in the Wildomar study area.
- An in-fill development pattern, consisting of slower rates of development on smaller parcels that were "passed over" as too small or not able to be purchased and integrated into a larger development project during the initial phase of community development, is typical of many suburban communities following the initial stage of greenfield development and observed to some extent in the Murrieta study area.
- Redevelopment occurs where older developed areas are planned for re-use, typically at a higher density or intensity of development, and with new or updated public facilities; this is the primary characteristic of the Temecula study area.

3. Open Space and Green Infrastructure Characteristics and Opportunities

Open space areas that are planned for long-term preservation (through any combination of management as open space, placement of restrictive easements, or acquisition) frequently provide opportunities for off-site stormwater mitigation projects. Similarly, existing and planned parks, recreation facilities, and urban agricultural uses such as community gardens and food forests, may provide off-site stormwater mitigation opportunities if developed and treated as part of a community's "green infrastructure" system. In development of the base case scenarios, a handful of existing and planned permanent open space areas were identified in Murrieta and Wildomar, including areas along Murrieta Creek planned for open space and recreational trails. Private open space uses, including a golf driving range, also were noted; while securing permission or easements to develop Alternative Compliance measures on private land poses much greater potential cost and legal barriers than developing measures on public land or in the

right-of-way, there are instances where cooperative agreements with private landowners might yield Alternative Compliance opportunities.

4. Transportation System and Public Transit Characteristics and Opportunities

The study area has been the focus of many plans for investment in both a regional transit center, and enhanced roadway transportation. Transportation systems for most suburban communities consist primarily of a local street network that is connected to adjoining highways and regional arterials. Public transit systems will typically provide limited local bus service, with very limited intercity and regional service. However, in locations where a regional transportation agency has planned for future regional transit service or improved local transit services, cities may plan for new development or redevelopment that will take advantage of improved transit access. The identification of opportunities for future transit service and infrastructure that could qualify a particular study area as a "transit priority area" or similar designation in future Regional Transportation Plans could allow for future streamlining of environmental review requirements under SB 375 and/or SB 743. These opportunities will be discussed in greater detail in Chapter 7.

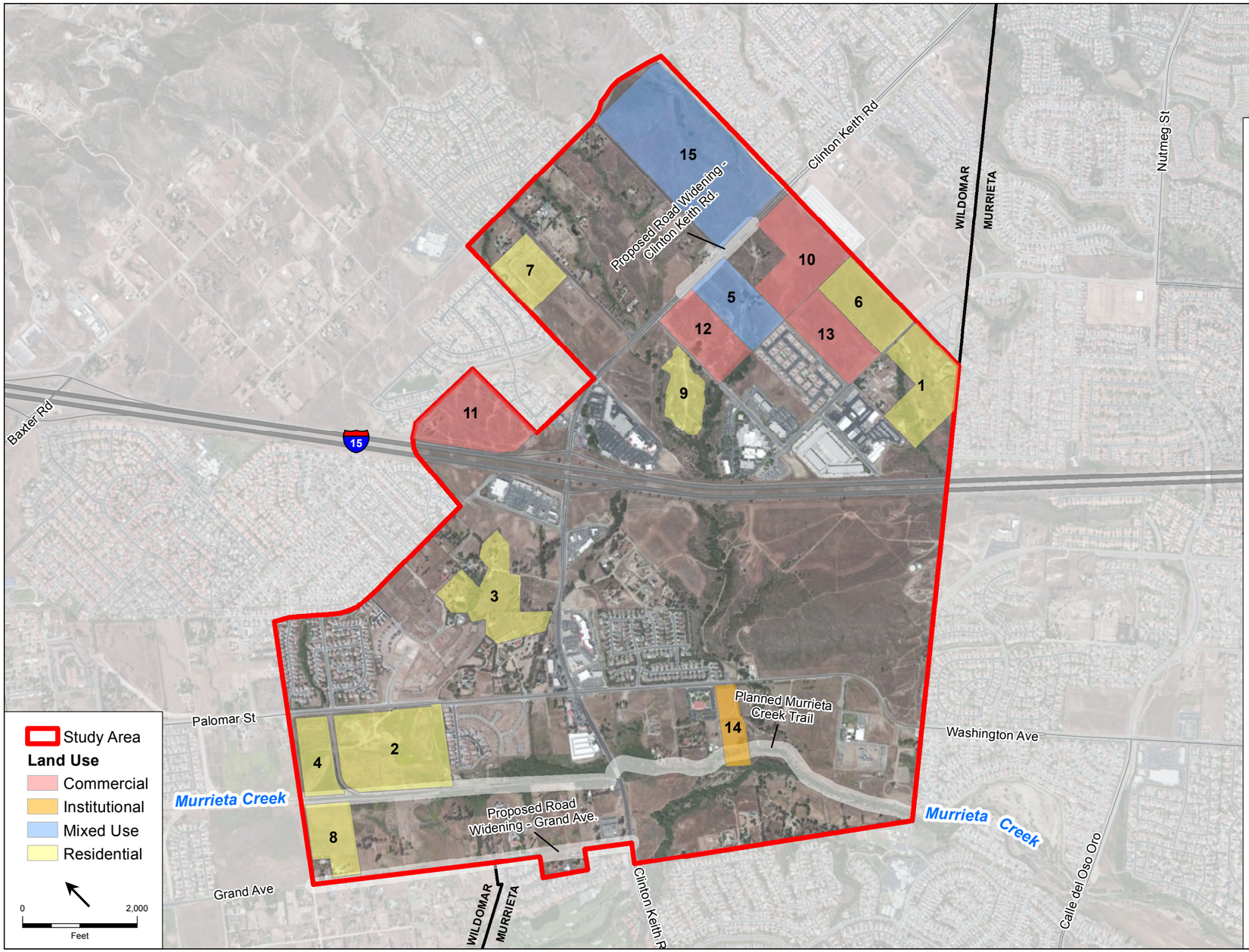
Each individual base case scenario is discussed below and in the following pages in relation to the characteristics outlined above.

Description of Individual Base Case Scenarios

Wildomar

The boundaries of the base case scenario for Wildomar are illustrated in **Figure 3-1**, which also includes a chart summarizing the 10-year build-out assumptions for the analysis. Overall, the City has identified 15 future development projects in the southern portion of the city straddling I-15. These projects include nine residential projects containing 1,064 dwelling units; five commercial projects containing 731,892 square feet of building area; and two institutional/open space projects containing 238,000 square feet of building area, that are likely to develop during the 10-year study period.[1] This base case scenario represents less mature development conditions where larger tracks of land are available for less dense new development adjacent to major transportation corridors. There are typically fewer constraints to managing on-site stormwater.

[1] It is important to note that a large (approximately 160-acre) commercial property at the Wildomar/Murrieta boundary has not been included for analysis in the base case scenario. From knowledge of real estate development practices and market conditions in the area, the ESA Team believes that this parcel is not likely to develop within the 10-year study timeframe. Moreover, large parcels of this nature tend to be master planned; a master planning approach on a parcel this size in a suburban development pattern almost always would allow sufficient space and opportunity to meet stormwater requirements on-site. Therefore, to ensure the study output is most relevant to the 10-year study period and the current permit, a development scenario will not be applied to this parcel.



Proposed Development Summary

Project	Parcel	Applicant	Land Use	DU/SF	Acres
Residential					
1	1	Lennar Residential	Residential	67 DU / SFD	26.8
2	3	CV Communities	Residential	102 DU / SFD	42.0
3	4	Lennar Homes North Ranch	Residential	84 DU / SFD	27.2
4	9	McVicar	Residential	49 DU / SFD	12.9
5	15	Grove Park Mixed Use Project	Mixed Use	162 DU / MFD	10.3
6	17	Horizones / Strata	Residential	180 DU / MFD	6.8
7	30	Diversified Pacific Homes	Residential	51 DU / SFD	NA
8	32	Beazer Homes	Residential	108 DU / SFD	35.2
9	NA	Zoned Residential 101 Condos	Residential	101 DU / MFD	12.9
			Total Residential	1,064 DU	174.1
Commercial					
5	15	Grove Park Mixed Use Project	Mixed Use	40,000 SF	10.3
10	5	Rancon Medical / Retail	Office/Comm	96,240 SF	7.2
11	13	Westpark Promenade	Commercial	86,000 SF	6.6
12	NA	19 Acre Zoned Commercial	Commercial	248,292 SF	19.0
13	NA	20 Acre Zoned Commercial	Commercial	261,360 SF	20.0
			Total Commercial	731,892 SF	63.1
Institutional					
14	33	Sycamore Academy Charter	Institutional	28,000 SF	10.0
15	NA	College and Joint Use Park	Mixed Use	210,000 SF	48.0
			Total Institutional	238,000 SF	58.0
Open Space					
15	NA	College and Joint Use Park	Mixed Use	210,000 SF	48.0
			Total Open Space	210,000 SF	48.0

Study Area: 1,738.0 Acres

Proposed Development: 358.0 Acres / 21% of study area

Existing Development: 752.3 Acres / 43% of study area

Undeveloped/No Proposed Development: 525.0 Acres / 36% of study area

SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 3-1

City of Wildomar Study Area

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Characteristics and Opportunities

The following characteristics and opportunities have been identified for this study area:

1. Community Place Type – The areas in which these development projects are planned would be considered as typical neighborhoods within a "Suburban Community" place type setting. The proposed development is generally lower-density residential detached and medium-density attached residential, and the commercial development appears to be primarily locally oriented development rather than regional.
2. Land Development Patterns – The residential projects in this study area are relatively large greenfield sites, ranging from 10.3 to 42 acres in size. The commercial projects are also relatively large greenfield sites, ranging from 6.6 to 20 acres in size. The two institutional projects (a charter school and a community college campus with joint use park) are 10 acres and 48 acres in size, respectively.
3. Open Space and Green Infrastructure Characteristics and Opportunities – Murrieta Creek traverses the western portion of the study area. It is our understanding that the City of Wildomar has been actively supporting the development of a regional linear park and trail system along Murrieta Creek, which would include trail improvements within the portion of the creek corridor located in Wildomar. No other park or green infrastructure projects have been identified in this scenario.
4. Transportation System and Public Transit Characteristics and Opportunities – The existing and planned transportation system for the City of Wildomar consists almost entirely of a network of local roads that are connected to I-15 and a limited number of regional arterials, including Clinton Keith Road and Grand Avenue, which connect Wildomar to adjoining communities. Public transit in the study area is limited to local bus service, and no regional transit projects are planned at this time. For purposes of further analysis, only local bus service is anticipated in the next 10 years.

Stormwater Control and Mitigation Options

The planning analysis for the Wildomar study area looked at the following possible options for meeting stormwater requirements for the private development projects listed in the base case scenario, as well as for the Clinton Keith Road and Grand Avenue roadway improvement projects.

On-site stormwater control measures for development projects:

- Use of typical on-site retention and infiltration or biofiltration management approaches that are consistent with the new MS4 permit but within the current practice of area developers, including above and underground storage/infiltration systems and bioretention trenches and cells along parking lot and property perimeters.

- Requiring larger setbacks on development project sites uphill of I-15 (e.g., 140 feet instead of 100 feet), within which stormwater management facilities could be located and "over-sized" to provide retrofit and Alternative Compliance capacity.
- Changing the city's required profile for roadway projects to incorporate permeable bicycle lanes (which would provide stormwater storage); narrower pavement widths, and use of flow-through filtration BMPs such as bioretention boxes or modular wetlands.

Off-site stormwater Alternative Compliance projects:

- Protection and enhancement of the riparian corridor along Murrieta Creek through land or easement acquisition, buffer enhancements, and stormwater management (biofiltration cells along trail) integration.
- Incorporating permeable surfacing and/or biofiltration trenches into the Clinton Keith Road widening project.
- Using of a portion of a residential development site for a regional retention infiltration or biofiltration BMPs,
- Retrofitting existing stormwater treatment systems in developed residential neighborhoods, where the systems were under-designed compared to current more stringent regulations.
- Incorporating supplemental retention and infiltration or biofiltration BMPs into a possible joint use park on the future site of the San Jacinto Community College campus.
- Working with RCFCWCD on coordination of investments south of the I-15.
- Coordination with San Jacinto Community College site design for upstream enhancement, including any potential retrofits or Alternative Compliance features, as the new campus is developed.

The above list of on-site and off-site stormwater options were based on discussions with the City of Wildomar and the RCFCWCD regarding likely on-site BMPs based on recent developments and potential future opportunities. These options are preliminary and do not represent actual site BMP designs or planned off-site BMPs. For the purpose of this framework, it was assumed that both on-site and off-site BMPs consisted of above ground retention and infiltration or retention biofiltration type BMPs. Evaluation of the use of these BMP types for on-site stormwater management for the future development and redevelopment parcels is conducted as part of Step 3.

The list of off-site opportunities may be used to develop a list of possible sites for further consideration and evaluation if an Alternative Compliance Program is developed. For the purpose of this study, these options represent possible future opportunities that demonstrate that off-site BMP sites are available for further consideration. In order to determine off-site BMPs costs for this study, it was assumed that off-site stormwater Alternative Compliance sites

consisted of either above ground retention and infiltration or retention/biofiltration type BMPs, and that sites were available to meet the required area and size for the stormwater scenarios. No site specific assessment was performed to determine the feasibility of implementation of these types of BMPs on the identified potential off-site locations. This can be conducted as part of a local, private or regional Alternative Compliance Program or Project.

Murrieta

The boundaries for the base case scenario for Murrieta are illustrated in **Figure 3-2**, which also includes a chart summarizing the 10-year build-out assumptions for the analysis. The study area includes a portion of the community located west of I-15 and east of Murrieta Creek, along Kalmia Street. The City has identified four future residential projects in this area that include 544 dwelling units on 40.4 acres, along with two commercial projects that include 57,600 square feet of building area on 4.3 acres, that are likely to develop during the 10-year study period. The base case study area in Murrieta represents a more mature development condition with limited large tracts for new development requiring higher-density residential and commercial development on often smaller more isolated parcels that have more site constraints for on-site stormwater management.

Characteristics and Opportunities

The following characteristics and opportunities have been identified for this study area:

1. Community Place Type – The areas in which these development projects are planned would be considered as typical neighborhoods within a Suburban Community place type setting. The existing and proposed development is generally lower-density residential detached and medium-density attached residential, and the commercial development appears to be primarily local-serving.
2. Land Development Patterns – The residential projects in this study area appear to be relative small in-fill sites, ranging in size from 4.6 to 17.9 acres in an area that is predominantly developed. The commercial projects are also small in-fill sites, ranging from 1.6 to 2.7 acres in size.

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Proposed Development Summary

Project	Land Use	DU/SF	Acres
1	Residential	268 - MFD	17.9
2	Park	–	6.1
3	Residential	138 - MFD	9.2
4	Driving Range	–	14.6
5	Residential	130 - MFD	8.7
6	Commercial	35,300	2.7
7	Commercial	22,300	1.6
8	Residential	8 - SFD	4.6
Total Residential		544	40.4
Total Commercial		57,600	4.3
Total		544/57,600	47.7

Study Area: 145.6 Acres
Proposed Development: 44.7 Acres/31% of Study Area
Existing Development: 100.9 Acres/69% of Study Area
Residential Density Assumption: 15 DU/AC
Commercial FAR Assumption: 0.3 FAR

SOURCE: ESRI Imagery

Figure 3-2
City of Murrieta Study Area

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3. Open Space and Green Infrastructure Characteristics and Opportunities – Murrieta Creek traverses the western portion of the study area. It is our understanding that the City of Murrieta has been actively supporting the development of a regional linear park and trail system along Murrieta Creek, which would include trail improvements within the portion of the creek corridor located in Murrieta. In addition, there is a 6.1-acre site for a future park located south of Kalmia Street, as well as an existing 14.6-acre privately owned golf driving range located at the northwest corner of Washington Avenue and Kalmia Street, both of which could provide opportunities for off-site stormwater mitigation projects.

4. Transportation System and Public Transit Characteristics and Opportunities - The existing and planned transportation system for the City of Murrieta consists almost entirely of a network of local roads that are connected to I-15 and a limited number of regional arterials, which connect Murrieta to adjoining communities. Public transit in the study area is currently limited to local bus service, and no regional or intercity transit corridor projects are funded at this time. It should also be noted that in the future the California High Speed Rail System could include a rail station in a location east of the study area. However, it is our understanding that the specific station site has not been selected at this time.

Stormwater Control and Mitigation Options

The planning analysis for the Murrieta study area looked at the following possible options for meeting stormwater control and mitigation requirements for the previously identified development projects as well as the future public park project:

On-site control measures

- Similar to those outlined for Wildomar

Off-site stormwater Alternative Compliance projects, such as:

- A mitigation banking project (possibly a regional BMP) on the future park site
- Protection and enhancement of the riparian corridor along Murrieta Creek through land or easement acquisition, buffer enhancements, and stormwater management (biofiltration cells along trail) integration.
- Using of a portion of the potential senior residential development site for a regional retention infiltration or biofiltration BMPs,
- Retrofitting existing stormwater treatment systems in developed residential neighborhoods, where the systems were under-designed compared to current more stringent regulations.
- Mitigation banking project (possibly a combination of surface and sub-surface treatment and/or landscape re-use) on the existing driving range site

The above list of on-site and off-site stormwater options were based on discussions with the City of Murrieta and the RCFCWCD regarding likely on-site BMPs based on recent developments and potential future opportunities. These options are preliminary and do not represent actual site BMP designs or planned off-site BMPs. For the purpose of this framework, it was assumed that both on-site and off-site BMPs consisted of above ground retention and infiltration or retention biofiltration type BMPs. Evaluation of the use of these BMP types for on-site stormwater management for the future development and redevelopment parcels is conducted as part of Step 3.

In order to determine off-site BMPs costs for this study, it was assumed that off-site stormwater Alternative Compliance sites were available to meet the required area and size for the stormwater scenarios. No site specific assessment was performed to determine the feasibility of implementation of these types of BMPs on the identified potential off-site locations.

Temecula

The boundaries and locations for future development for the base case scenario for Temecula are illustrated in **Figure 3-3**, which also includes a chart summarizing the 10-year build-out assumptions for the analysis. The study area includes a portion of the community located west of I-15 and east of Murrieta Creek, along the Jefferson Avenue corridor, bounded on the north by the City boundary and on the south by Rancho California Road.

Unlike the other two scenarios, which are based on actual development project applications that are pending within each city, the base case scenario for Temecula is based on a phased build-out analysis provided by City staff pursuant to the draft Jefferson Avenue Corridor Specific Plan. The City of Temecula staff has forecasted that future development during the next 10-year period will consist of mixed-use development projects in three locations within the Specific Plan area—as stated, the Temecula base case represents future redevelopment in an already urbanized setting. This type of redevelopment site is anticipated to have the greatest constraints to achieve the new on-site stormwater management requirements. The new regulations require for redevelopment priority sites retaining on-site the 85 percentile storm event for the predevelopment (native vegetation) condition. The following are the three planned future developments:

- Development of 125 dwelling units and 100,700 square feet of commercial building area on 13.1 acres in the Uptown Center District (on a former grocery store site)
- Build-out of the Creekside Village District (587 dwelling units and 126,000 square feet of commercial building area on 28.1 acres)
- Build-out of the Uptown/Hotel District (360 dwelling units and 96,000 square feet of commercial building area on 18.8 acres)

Proposed Development Summary

Project	Applicant	Land Use	DU/SF	Acres
1	Uptown Center District	Mixed Use	125/100,700	13.1
2	Creekside Village District	Mixed Use	587/126,000	28.1
3	Uptown/Hotel District	Mixed Use	360/96,000	18.8

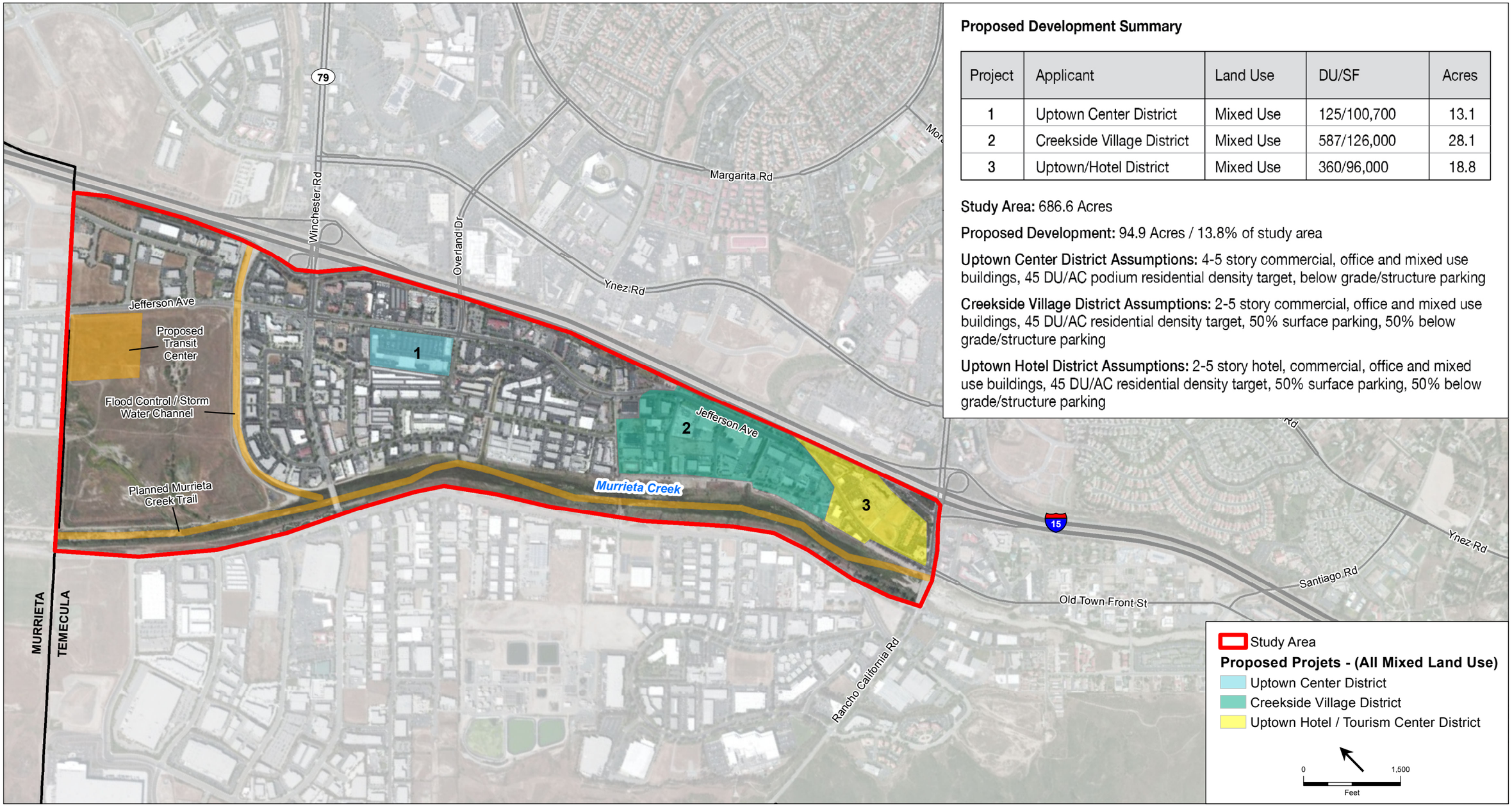
Study Area: 686.6 Acres

Proposed Development: 94.9 Acres / 13.8% of study area

Uptown Center District Assumptions: 4-5 story commercial, office and mixed use buildings, 45 DU/AC podium residential density target, below grade/structure parking

Creekside Village District Assumptions: 2-5 story commercial, office and mixed use buildings, 45 DU/AC residential density target, 50% surface parking, 50% below grade/structure parking

Uptown Hotel District Assumptions: 2-5 story hotel, commercial, office and mixed use buildings, 45 DU/AC residential density target, 50% surface parking, 50% below grade/structure parking



SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 3-3

City of Temecula Study Area - Uptown Jefferson Specific Plan Study Area

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Characteristics and Opportunities

The following characteristics and opportunities have been identified for this study area:

1. Community Place Type – The Jefferson Avenue Corridor Specific Plan area is considered a future Community Center within a Suburban Community place type setting. Community Centers are defined as "mid-size and small downtowns, lifestyle centers, or other activity centers embedded within suburban communities." They often reflect a greater degree of community design control than suburban neighborhoods, and may include mixed-use development.
2. Land Development Patterns – Development in the Jefferson Avenue Corridor Specific Plan area will involve redevelopment of an existing urbanized area, in contrast to the greenfield development pattern observed in the Wildomar study area and the in-fill development pattern observed in the Murrieta study area.
3. Open Space and Green Infrastructure Characteristics and Opportunities – Murrieta Creek traverses the western portion of the study area. It is our understanding that, like the Cities of Wildomar and Murrieta, the City of Temecula has been actively supporting the development of a regional linear park and trail system along Murrieta Creek, which would include trail improvements within the portion of the creek located in Temecula.
4. Transportation System and Public Transit Characteristics and Opportunities – The existing and planned transportation system for the City of Temecula consists almost entirely of a network of local roads that are connected to I-15 and a limited number of regional arterials, which connect Temecula to adjoining communities. However, it should be noted that the Specific Plan for this area calls for a grid pattern of future local streets to serve the mixed-use development projects that are planned for this area. The addition of grid streets would change both the transportation pattern and the stormwater management needs and opportunities in the study area. It should also be noted that, as with the other two cities, public transit in the Temecula study area is currently limited primarily to local bus service.

Stormwater Control and Mitigation Options

The planning analysis for the Temecula study area looked at the following possible options for meeting stormwater control and mitigation requirements for private development projects as well as public street improvements and the transit center project:

1. On-site control measures (primarily underground treatment and control).
2. Use of the existing and planned transportation system for stormwater treatment and control, particularly the use of "Green Street" design methods consistent with the Permit.

3. Off-site mitigation projects, such as a mitigation banking project on the undeveloped portions of properties in the Auto Park area, which is upstream of the study area and which features large surface parking lots and substantial setbacks off I-15—each of which could be evaluated for stormwater treatment and control.

The above list of on-site and off-site stormwater options were based on discussions with the City of Temecula and the RCFCWCD regarding likely on-site BMPs based on recent developments and potential future opportunities. These options are preliminary and do not represent actual site BMP designs or planned off-site BMPs. For the purpose of this framework, it was assumed that both on-site and off-site BMPs consisted of above ground retention and infiltration or retention biofiltration type BMPs. Evaluation of the use of these BMP types for on-site stormwater management for the future development and redevelopment parcels is conducted as part of Step 3. It was assumed that off-site stormwater Alternative Compliance sites were available to meet the required area and size for the stormwater scenarios. No site specific assessment was performed to determine the feasibility of these types of BMPs on potential off-site locations.

section 4

Development Parcel Analysis – Step 3 (Part A)

Step 3: Stormwater Management Options and Costs, includes two parts: **Part A: Development of Parcel Analysis**; and, Part B: Stormwater Analysis. Step 3, Part A consists of translating information from each individual redevelopment and development project in the base case scenarios into specific land use and site plan scenarios. While this process is familiar to civil engineers who prepare real estate development plans and land use planners who review them, some of the terms and approaches are less commonly used and understood in watershed and stormwater management. Stepping through this part of the analysis thus illustrates where and how land use regulations at the site plan level interact with, and greatly affect, the sizing and design of on-site stormwater management practices.

Site Development Analysis

As the first component of this analysis, the team projected the specific land use components (i.e., building footprint, landscaped area, parking and circulation, and remaining open space) likely to be built for each of the development projects anticipated in the base case scenario. This process allowed the team to answer the three following questions that bridge between anticipated land development and stormwater management outcomes:

1. Given a development plan and the applicable local land use regulations, how much impervious area (building, parking/circulation) and how much permeable area (landscaping, setbacks, open space) would be constructed on each project parcel? Forecasting these detailed development outcomes on each site allows the team to project the volumes of stormwater runoff that will be generated from each site.
2. Once the land use requirements are met, how much surface area on the parcel would be available to accommodate stormwater management? This step determines how much of the site remains after building footprints, parking lots, required landscape areas, access/circulation space, and features such as stream setbacks or fire protection areas have been laid out on the site. Subtracting the square footage of each of these areas (outlined in Section 4.3) from the total square footage of the parcel yields the available surface area for stormwater treatment. Moreover, the gross area of each site devoted to different types of land cover (e.g., parking lot and roadway, building footprint, ornamental landscaping, and open space) is used to calculate the volume of stormwater runoff that must be managed to meet MS4 permit requirements.
3. Could the volume of stormwater that must be managed on-site under the MS4 permit requirements be accommodated through surface bioretention or biofiltration treatment? The outcome of the analysis in (1) and (2) illustrates whether, where and in what configuration the required stormwater volume under the MS4 permit can be accommodated without interfering with the

intended development plans and associated requirements for the site. By understanding the physical implications for site development, and the financial implications, this process helps illustrate where and under what conditions developers will face challenges under the MS4 permit, and potentially would seek to use Alternative Compliance to meet permit requirements. This process also illustrated how municipal code provisions and practices unrelated to stormwater management, such as parking requirements, prescriptive landscape standards, and public safety access requirements, can affect significantly the feasibility of on-site stormwater management practices.

Estimating Impervious Coverage, Landscaping Area, and Available Space for Stormwater Management

To begin the analysis, the team created a rough site plan for each of the development projects in the base case scenario for each city. While each site development plan will of course be unique based on the developer or landowner's objectives, a site's physical conditions, and the outcome of the discretionary portion of a review process, the land development regulations applicable to a site and certain consistent aspects of the land development finance process do provide some "fixed points" for how a prospective project will be developed. For each of the development parcels in the base case scenario, the team developed a hypothetical site plan and walked through a five-part analysis outlined below and in the following pages, and provided in Appendix A. In **Tables 4.1** through **4.3**, the site development parcel calculations for each set of base case scenario development projects is provided. Appendix A provides a comprehensive summary of these site development parcel calculations under Step 3 Part A along with the results of the calculations for the following steps in this process discussed in the following sections.

- **Building footprint**: Using comparable development projects in Riverside County as a baseline, the team estimated each project's building footprint: The total area of each site that would be occupied by a building or buildings. For commercial buildings, this figure is a function of the total square footage (gross floor area) in the base case scenario, and the number of building stories likely to be constructed given the planned land use (retail, school, light industry, etc.). Both the planned land use for the site and local real estate economics affect the number of stories anticipated. Warehouses or light-industrial facilities, for example, are almost always one-story buildings; retail and office development may be multi-story if there is sufficient economic demand for higher density. For residential projects, building footprints will reflect both the density of a project and the type of dwelling units to be built. In the base case scenario, two-story dwellings with a square footage typical for Western Riverside County were assumed for the single-family projects. For multi-family or higher-density projects, the team looked at common multi-family housing types in the area (i.e., three-story garden apartments at a

density of 7 to 12 units per acre, and four- or five-story multi-family buildings at 15 units per acre or more), and assigned a building footprint accordingly. In order to verify and refine the individual parcel calculations, specific parcels were further analyzed through sketching out a potential site layout on the actual parcel. **Figure 4.1** shows an example of a hypothetical multi-family building footprint layout for one of the projects in the base case scenario. By laying out a potential site plan through these examples, the individual site parcel calculations were reviewed and some adjustments made to the area available for stormwater management. This is discussed further under Step 3 Part B.

- **Required surface parking**: The amount of land devoted to vehicle parking is a function of the demand for parking created by different land uses (commercial, single-family residential, assisted living, etc.), the minimum (or maximum) number of parking spaces required in the applicable zoning code, and the amount of area required both for parking spaces (which can range from 8–17 feet to 10–20 feet) and associated circulation. Since parking requirements in a zoning code typically can be modified in the land use review process, the team applied a set of commonly used "parking ratios" to the various land uses in the base case scenarios. For example, retail uses typically are "parked" at a ratio of one space per 250 square feet of gross floor area; multi-family housing is typically parked at 1.3 to 1.5 spaces per dwelling, plus an allowance for guest and service parking. These standard ratios were applied to each of the projects in the base case scenario and multiplied by a sizing factor of 350 square feet per space, reflecting a typical parking stall size (9 by 18 or 162 SF) and associated circulation areas (drive aisles, handicapped-accessible spaces, and turning areas). For single-family residential units, individual driveways were assumed to be 22 feet wide by 50 feet long, which provides for two parking spaces behind a sidewalk in a typical lot configuration. . In order to verify and refine the individual parcel calculations, specific parcels were further analyzed through sketching out a potential site layout on the actual parcel. **Figure 4-2** shows an example of a hypothetical commercial property layout for one of the projects in the base case scenario. By laying out a potential site plan through these examples, the individual site parcel calculations were reviewed and adjustments made to the area available or stormwater management. This is discussed further under Step 3 Part B.

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Table 4.1 MURRIETA LAND USE

parcel #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Develop-ment Cost per SF (excluding land)	Parcel (Acres)	Density (Units/Ac or FAR)	Parcel SF (Total)	Resident-ial Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Land-scaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot land-scaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total parking lot landscape (SF)	Total SF Parking/ Driveway + Road/ Service	TOTAL IMPER-VIOUS AREA	Total Remaining Land-scaped/ Open Area
1	Residential	Residential	268	Multi-Family	$225	17.9	14.97	779,724	n/a	750	250	n/a	469	164,150	32,830	15%	116,959	160,800	67,000	32,830	281,109	441,909	270,815
2	Park	Open Space	n/a	n/a	$0	6.1	n/a	265,716	n/a	1,500	n/a	n/a	150	52,500	10,500	5%	13,286	1,500	13,286	10,500	65,786	67,286	185,144
3	Residential	Residential	138	Multi-Family	$225	9.2	15.00	400,752	n/a	750	250	n/a	242	84,700	16,940	15%	60,113	82,800	34,500	16,905	144,638	227,438	138,814
4	Driving Range	Open Space	n/a	n/a	$0	14.6	n/a	635,976	n/a	500	n/a	n/a	50	17,500	3,500	1%	6,360	500	19,079	3,500	23,860	24,360	592,537
5	Residential	Residential	130	Multi-Family	$225	8.7	14.94	378,972	n/a	750	250	n/a	228	79,800	15,960	15%	56,846	78,000	32,500	15,925	136,471	214,471	132,001
6	Commercial	Commercial	35,300	n/a	$250	2.7	0.30	117,612	n/a	35,300	n/a	n/a	141	49,350	9,870	5%	5,881	35,300	21,645	9,884	55,301	90,601	5,366
7	Commercial	Commercial	22,300	n/a	$250	1.6	0.32	69,696	n/a	22,300	n/a	n/a	89	31,150	6,230	5%	3,485	22,300	13,214	6,244	34,705	57,005	0
8	Residential	Residential	8	Single-Family	$150	4.6	1.74	200,376	15,000	2,000	11,275	69,000	n/a	8,800	n/a	15%	30,056	16,000	90,200	n/a	38,856	54,856	55,320

Table 4.2 TEMECULA LAND USE

Map #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Develop-ment Cost per SF (excluding land)	Parcel (Acres)	Density (Units/ Ac or FAR)	Parcel SF (Total)	Resident-ial Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Land-scaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot land-scaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total parking lot landscape (SF)	Total SF Parking/ Driveway + Road/ Service	TOTAL IMPER-VIOUS AREA	Total Remaining Landscaped / Open Area
1	Uptown Center District	Residential	125	Multi-Family	$300	2.8	45	121,968	n/a	62,500	250	n/a	44	15,313	3,063	5%	6,050	62,500	15,163	3,063	21,363	83,863	22,943
1	Uptown Center District	Office/Retail	100,700	Office/Retail	$300	4.6	0.5	200,376	n/a	120,840	n/a	n/a	81	28,196	5,639	5%	10,070	120,840	25,779	5,639	38,266	159,106	15,491
1	Uptown Center District	Circulation		(allowance)		5.7		248,292	n/a			n/a											
TOTAL Uptown Center District						**13.1**		**570,636**		**183,340**									**40,942**	**8,702**	**59,629**	**242,969**	**38,434**
2	Creekside Village District	Residential	587	Multi-Family	$300	13.0	45	568,216	n/a	293,500	250	n/a	411	143,815	28,763	5%	28,411	293,500	85,585	28,763	172,226	465,726	14,970
2	Creekside Village District	Retail	126,000	Retail	$300	8.3	0.35	360,000	n/a	63,000	n/a	n/a	473	165,375	33,075	5%	18,000	63,000	69,075	33,075	183,375	246,375	46,098
2	Creekside Village District	Circulation		(allowance)		6.8		295,619	n/a			n/a											
TOTAL Creekside Village District						**28**		**1,223,835**		**356,500**				**309,190**	**61,838**		**46,411**	**356,500**	**154,660**	**61,838**	**355,601**	**712,101**	**61,068**
3	Uptown/Hotel District	Residential	360	Multi-Family	$300	8.0	45	348,480	n/a	180,000	250	n/a	252	88,200	17,640	5%	17,424	180,000	52,488	17,640	105,624	285,624	10,368
3	Uptown/Hotel District	Office/Retail	96,000	Office/Retail	$300	5.5	0.4	239,580	n/a	120,000	n/a	n/a	230	80,640	16,128	5%	12,000	120,000	40,128	16,128	92,640	212,640	0
3	Uptown/Hotel District	Circulation		(allowance)		5.3		230,868	n/a			n/a											
TOTAL Uptown/Hotel District								**818,928**		**300,000**									**92,616**	**33,768**	**198,264**	**498,264**	**10,368**

Table 4.3 WILDOMAR LAND USE

Map #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Develop-ment Cost per SF (excluding land)	Parcel (Acres)	Density (Units/Ac or FAR)	Parcel SF (Total)	Residential Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Land-scaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot land-scaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total SF Parking/ Driveway + Road/ Service	TOTAL IMPERVIOUS AREA	Total Remaining Landscaped/ Open Area
1	Lennar Residential	Residential	67	Single-Family	$150	26.8	2.50	1,167,408	10,000	1,650	6,625	670,000	n/a	73,700	n/a	15%	175,111	110,550	443,875	248,811	359,361	364,172
2	CV Communities	Residential	102	Single-Family	$150	42.0	2.43	1,829,520	12,500	2,000	8,775	1,275,000	n/a	112,200	n/a	15%	274,428	204,000	895,050	386,628	590,628	343,842
3	Lennar Homes North Ranch	Residential	84	Single-Family	$150	27.2	3.09	1,184,832	10,000	1,650	6,625	840,000	n/a	92,400	n/a	15%	177,725	138,600	556,500	270,125	408,725	219,607
4	McVicar	Residential	49	Single-Family	$150	12.9	3.80	561,924	8,000	1,250	5,025	392,000	n/a	53,900	n/a	15%	84,289	61,250	246,225	138,189	199,439	116,260
5	Grove Park	Residential	162	Multi-Family		10.3	15.73	448,668	n/a	750	250	n/a	324	113,400	22,680	20%	89,734	121,500	63,180	203,134	324,634	60,854
5	Strata/Clinton Keith	Commercial	40,000	n/a		10.3	0.09	448,668	n/a	40,000	n/a	n/a	160	56,000	11,200	5%	22,433	40,000	56,067	78,433	118,433	274,168
TOTAL Grove Park Mixed Use Project					$225														119,247	281,567		
6	Horizons/Strata	Residential	140	Townhomes		13.2	10.61	574,992	n/a	1,200	400	n/a	280	98,000	19,600	20%	114,998	168,000	75,600	212,998	380,998	118,394
6	Horizons/Strata	Assisted Living	86	Assisted Living		6.8	12.65	296,208	n/a	800	n/a	n/a	145	50,575	10,115	20%	59,242	68,800	39,736	109,817	178,617	77,856
TOTAL Horizons/Strata					$225														115,336	322,815		
8	Beazer Homes	Residential	108	Single-Family	$150	35.2	3.07	1,533,312	10,000	2,000	6,275	1,080,000	n/a	118,800	n/a	15%	229,997	216,000	677,700	348,797	564,797	290,815
9	Clinton Keith condominiums	Residential	101	Multi-Family	$225	12.9	7.84	561,488	n/a	750	250	n/a	202	70,700	14,140	20%	112,298	75,750	39,390	182,998	258,748	263,351
10	Rancon Medical/Retail	Office/ Commercial	96,240	n/a		7.2	0.31	315,107	n/a	64,160	n/a	n/a	385	134,736	26,947	5%	15,755	64,160	58,458	150,491	214,651	41,998
10	Rancon business park	Industrial	294,900	n/a		22.2	0.31	965,557	n/a	294,900	n/a	n/a	737	258,038	51,608	20%	193,111	294,900	148,163	451,149	746,049	71,345
TOTAL Rancon					$300														206,621	601,640		
11	Westpark Promenade	Commercial	86,000	n/a		6.6	0.30	286,667	n/a	57,333	n/a	n/a	344	120,400	24,080	5%	14,333	57,333	52,747	134,733	192,067	41,853
11	Westpark Promenade	Residential	322	Multi-Family		21.7	14.83	946,081	n/a	750	250	n/a	644	225,400	45,080	20%	189,216	241,500	125,580	414,616	656,116	164,385
TOTAL Westpark Promenade					$250														178,327	549,350		206,238
12	Clinton Keith commercial (19-Acre Commercial)	Commercial	248,292	n/a	$225	19.0	0.30	827,640	n/a	248,292	n/a	n/a	993	347,609	69,522	5%	41,382	248,292	152,286	388,991	637,283	38,071
13	Business Park	Industrial	261,360	n/a	$150	20.0	0.30	871,200	n/a	261,360	n/a	n/a	653	228,690	45,738	20%	174,240	261,360	132,858	402,930	664,290	74,052
14	Sycamore Academy	Educational	28,000	n/a	$300	10.0	0.06	435,600	n/a	28,000	n/a	n/a	280	98,000	19,600	20%	87,120	28,000	63,160	185,120	213,120	159,320
15	College and Joint Use Park	Mixed-use/ Open Space	210,000	n/a	$300	48.0	0.10	2,090,880	n/a	210,000	n/a	n/a	1,400	490,000	98,000	20%	418,176	210,000	307,088	908,176	1,118,176	665,616

SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 4.1

Sample Multi-Family Building Footprint Layout

SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 4.2

Sample Commercial Property Layout

- **Ornamental and parking lot landscaping**: In any land development project, some area of a site will be devoted to ornamental landscaping, and to landscaped islands or perimeters associated with surface parking lots. In many communities, the amount, configuration, dimensions, and planting plans for these required landscaped areas are prescribed in detail in zoning or design regulations. In others, landscape requirements may be expressed only as required yards, setbacks or other unbuilt areas, with the design and planting plan left up to the developer. Whether chosen by developers or prescribed by zoning, the amount and configuration of ornamental and parking lot landscaping that is typically used can be estimated for different land use types. Multi-family developments, for example, will have landscaped common areas while single-family developments are likely to include front, side and rear turf grass yard areas for each unit. For each of the projects in the base case scenario, the team applied an ornamental landscaping percentage based both on local land development regulations, and common landscape plans used in Western Riverside. Ornamental landscaping was assumed to occupy 10% of each commercial site, a set amount per unit for multi-family development, and the remaining portion of single-family residential lots after building footprint, driveways and a 25-ft by 25-ft allowance for patios and sidewalks are subtracted from the projected lot size. Parking lot landscaping was assumed to be 20% of the total surface parking area, including circulation and turn-around space. The potential to use ornamental and parking lot landscaping areas as areas for surface stormwater treatment and control—which is not yet common in Western Riverside County, though it is increasingly encouraged—is discussed in on the following page.

- **Area within residential lot boundaries**: For single-family residential developments in the base case scenario, the team created a hypothetical subdivision plan, and estimated the amount of land area that was likely to be absorbed within individual residential lots rather than remaining as common open space. This is important to evaluating the amount of land area available for stormwater treatment, since in nearly all cases, stormwater treatment areas must be on land that is under some form of common control (e.g., Homeowners' Association) rather than contained within individual, privately owned lots, where maintenance and performance cannot be ensured as readily. For this project, residential lot sizes were assumed based on prevailing development patterns within the zoning district and/or adjacent residentially developed areas. In order to verify and refine the individual parcel calculations, specific parcels were further analyzed through sketching out a potential site layout on the actual parcel. **Figure 4.3** shows an example of a hypothetical single-family building footprint layout for one of the projects in the base case scenario. By laying out a potential site plan through these examples, the individual site parcel calculations were reviewed and some adjustments made to the area available or stormwater management. This is discussed further under Step 3 Part B.

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SOURCE: ESRI Imagery

WRCOG Land Use, Transportation and Water Quality Planning Framework

Figure 4-3

Sample Single-Family Residential Layout

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- **Roadway circulation and service area:** Finally, an allowance was made for additional paved surfaces on each site associated with site access, internal circulation, and service areas such as loading docks, trash handling areas, or (in residential projects) common amenities such as clubhouses or recreation facilities. The percentage of each site's area assumed to be occupied by these surfaces ranged from 5% on retail and commercial sites (which have larger, common parking areas reflected in the amount of required surface parking) to 15% to 20% for residential projects (which have more extensive internal roadway networks providing access to individual buildings or residences).

Once these areas were estimated for each parcel or project, the team was able to consolidate different types of land cover to determine the total amount of impervious surface, "developed" or landscaped permeable surface, and remaining unallocated area, which presumably would be left as some sort of permeable area and/or used as the location for stormwater management facilities. These equations, used in developing Table 4.1 to 4.3 for each study area, are as follows:

Impervious Surface = Total SF Building Footprint + Total SF Surface Parking + Total SF Road/Service Area

Developed Landscaping = Total SF Parking Lot Landscaping + Total SF Ornamental Landscaping

Available Open Space = Parcel Area – Impervious Surface – Developed Landscaping

Refining the Parcel Scenarios: The Impact of Local Conditions and Codes

While the framework and a detailed methodology for evaluating sites in this manner is both grounded in real estate development, and reflective of sound planning practices, it is important to bear in mind aspects of the land development and review process that can have significant and often unpredictable impacts on-site layouts, and thus stormwater volumes, as projects are built. The process of laying out the example site plans (however rough) in Figures 4.1 through 4.3 illustrates some of these potential impacts.

First, the land area that is typically devoted to ornamental landscaping and parking lot landscaping could, in some cases, be co-designed to provide stormwater management areas but most often is not. While ornamental landscape areas generate less stormwater runoff than impervious surfaces, these areas still represent both a source runoff that must be managed and a lost "opportunity zone" that could accommodate stormwater volumes if designed to take in and manage runoff. Promoting this use of landscaping, however, usually requires changes both to municipal design guidelines and zoning regulations as well as staff and review board cooperation on the design and permitting of landscaping and stormwater management plans.

The existing developed parcels shown on Figure 4.2 (example commercial property) provide a good example of the setback areas along the public right-of-way in Murrieta. In this area, the properties adjacent to the potential development sites have been landscaped along the right-of-way with grass, street trees at specific intervals, and shrubs, which is not compatible with co-design as a bioretention facility to provide stormwater management. This landscaped area is thus "lost" as an opportunity zone for accommodating a stormwater volume on site. Changing the requirements and what might be termed the "aesthetic expectations" of the community and review boards, as well as an engineering approach consistent with the Riverside County Low Impact Development BMP Design Manual's bioretention facility illustrations (RCFCWCD, Section 3.5), would be required in order to use this area for stormwater treatment. Using this approach on Parcel 6 would free up roughly 3,600 square feet of the site, providing at least some area for bioretention on a site that otherwise does not have space for on-site treatment. As described later in Section 8 of this report, even marginal changes to the available land area for less costly on-site practices such as infiltration basins may tip the stormwater management equation towards project viability, making this type of consideration particularly important.

A second and perhaps more direct issue concerns regulations, practices and preferences at the municipal level that can add substantial amounts of impervious surface to a site over and above what would otherwise be required to accommodate parking, building footprint and access. Examples of this issue are requirements (or in some cases requests by applicants) for more surface parking spaces, preferences for wider driveways or drive aisles in parking lots, and particularly access areas for public safety. These small increases in impervious area, cumulatively, will increase runoff volumes that must be managed and take away space for stormwater treatment measures; for example, in Figure 4.2 (example commercial property), if the parking lot area depicted in the site plan were assumed to use a larger base size (10 feet by 20 feet rather than 9 feet by 18 feet), the total impervious area on-site would have to be increased by 5,358 SF square feet. While this increase would not have a significant impact on the runoff volume required to be managed, the land area available on the site available for treating stormwater would be completely eliminated, placing the developer in the position of requiring 100% off-site compliance. The same would hold true if a paved area for firefighting were required around all four sides of the building; a paved fire protection access road of 30 feet by 175 feet along the rear of the building would likewise add 5,250 SF of paved area and eliminate the entire area available for surface stormwater treatment.

section 5

Stormwater Analysis – Step 3 (Part B)

Step 3: Stormwater Management Options and Costs, includes two parts: Part A: Development of Parcel Analysis; and, **Part B: Stormwater Analysis**. Step 3, Part B consists of taking the specific land use and site plan scenarios developed in Step 3 Part A, and determining the required stormwater volumes to be retained on-site and either infiltrated or filtered through biofiltration BMPs to meet the more stringent MS4 Permit requirements. Following the calculation of the required stormwater management volumes, on-site BMPs are then sized to meet these required volumes and other regulatory standards such as drawdown times. Step B then includes assessing if sufficient area is available on site to manage these volumes and what portion will require off-site management through an Alternative Compliance program/project. The costs for the on-site and off-site BMPs are then calculated and used for the financial analysis under Step 4. For this framework, four stormwater scenarios were used that included use of two types of BMPs for two off-site stormwater management scenarios. These four scenarios are discussed in more detail in this section.

In Southern California, provisions of the MS4 permit require that a significant portion of the storm-related water runoff from a new development or redevelopment project site be retained on-site to prevent adverse effects on downstream areas, filtered through a medium to remove pollutants, and either infiltrated, evaporated, or taken up by plants to 'naturalize' the water cycle on-site. The engineered and natural systems needed to accomplish this process affect the pattern and cost of land development: Stormwater systems either take up part of the surface area of a development site (as ponds, landscaped bioretention areas, and swales) or require costly underground storage and infiltration structures. The choice of stormwater treatment systems, and the volume of water that must be retained to meet permit requirements, thus have significant implications for developers' *pro formas* and ongoing operating costs. This section discusses the analysis of different stormwater systems and the costs associated with each.

BMP Sizing Approach and Assumptions

Two types of BMPS were analyzed for this report: above ground retention and infiltration basins and retention/biofiltration facilities. These two types of BMPs were used based on the following:

- Accepted under the MS4 permit for managing the required stormwater volumes;
- Established BMP design guidelines for both Riverside and San Diego Counties;
- Published data on efficiencies and costs; and,
- Developed water quality equivalency factors for Alternative Development project as presented in the draft Water Quality Equivalency Document prepared by the San Diego County co-permittees.

The sizes of BMPs were determined by using the development parcel analysis and an analysis of the stormwater runoff for each site. As discussed in Section 4, the development parcel analysis determined the areas of land that would be impervious, landscaped, or available for stormwater treatment. The area of land available for stormwater treatment sets the limit for the size of the BMP. If the size of a BMP needed to treat a site's stormwater is greater than the area available or it is otherwise determined to be infeasible, then some amount of stormwater would need to be treated off-site.

Stormwater Runoff Volume

Two methods were used to determine the amount of stormwater runoff that each site would need to treat based on the San Diego Region NPDES Permit and Waste Discharge Requirements (2013). The provisions under the San Diego Region Permit for new and redevelopment for priority projects were used as these will likely be the basis for the reissued Riverside County NPDES Permit within the San Diego Regional Water Quality Control Board jurisdiction. The permit present the two sets of requirements for calculating the stormwater treatment volume: the Stormwater Pollutant Control BMP Requirements and the Hydromodification Management BMP Requirements. The larger of the two stormwater volumes calculated under these requirements is used to size the BMPs.

The Stormwater Pollutant Control BMP Requirements instruct permitees to retain on-site the volume of stormwater runoff produced from a 24-hour 85th percentile storm event. According to the Santa Ana Region Water Quality Management Plan (2012), the rain produced from a 24-hour 85th percentile storm is 0.8, 0.9, and 0.7 inches in Murrieta, Temecula, and Wildomar respectively. Using the runoff coefficients presented in **Table 5-1** and the areas of each type of land use, the rain depth can be converted to a runoff volume.

TABLE 5-1: RUNOFF COEFFICIENTS

Land Use	Runoff Coefficient
Building	1.00
Parking, driveway, or road	0.83
Landscape	0.10
Open land	0.20

The second set of requirements, the Hydromodification Management BMP Requirements, instruct permitees to retain on-site the volume of stormwater runoff that could result in increased potential for erosion or degraded habitat downstream. As a result, sites with hardened channels downstream are exempt. San Diego County has developed a spreadsheet model, which was used to calculate the volume of stormwater required for on-site treatment (pers. comm. Charles Mohrlock March 11, 2015).

Infiltration Basin Sizing

Infiltration BMPs use the interaction of chemical, physical, and biological processes between soil and water to filter out sediments and constituents from stormwater. Water ponds in an infiltration basin during a storm event, then infiltrates into the underlying soils. Infiltration BMPs require a maximum drawdown time to avoid nuisance issues. Drawdown time is contingent on the depth of water in a basin and the infiltration rate of the underlying soils. Therefore, basin sizes must be large enough to minimize water depths and to allow for infiltration within a certain amount of time.

Once the volume of stormwater to be treated on-site was determined, the infiltration rate was calculated to determine the time it would take to draw down the water levels. The infiltration rate depends on soil types, which were determined for each site using the National Resources Conservation Service Web Soil Survey (**Table 5-2**). Since the exact location of building on each site has not yet been determined, an average of the soil types at the site was used. The Riverside County Hydrology Manual (1978) provided a method for calculating infiltration rates from soil types. A safety factor of 9 (the most conservative value) was chosen since the soil types were averaged over the site.

TABLE 5-2: INFILTRATION RATES

Site	Infiltration Rate (in/hr)
Murrieta	0.036
Temecula	0.027
Wildomar	0.031

In Riverside County, the required drawdown time for infiltration basins is 72 hours. Using the drawdown time, the infiltration rate, and the stormwater volume, the required footprint of the infiltration basin can be calculated.

Biofiltration Facility Sizing

Like infiltration BMPs, biofiltration BMPS use the interaction of chemical, physical, and biological processes between soil and water to filter out sediments and constituents from stormwater. Water enters a biofiltration facility, which has different layers of bed material where microorganisms attach and grow, and filters through the layers to receive treatment. The San Diego Region Model BMP Design Manual (2015) recommends calculating the volume of water that can infiltrate into the BMP within 36 hours, and then treating 1.5 times the remaining volume through biofiltration. The size of the facility can then be determined based on different inputs including media thickness, aggregate storage, media available pore space, and media filtration rates.

On-Site Versus Off-Site Treatment

If the size of the infiltration basin or biofiltration facility is larger than the area available for stormwater management, some of the volume would have to be treated off-site. The same sizing methods as described in Sections 1.1.2 and 1.1.3 would be used to design treatment facilities at an off-site location.

Stormwater Management Scenarios

Two types of BMPs have been used for this analysis: above ground retention and infiltration basins and retention/biofiltration facilities. In order to assess the capacity of the individual parcels in each of the base case scenarios to manage the required on-site stormwater volumes, the two initial stormwater management scenarios assumed 100% on-site management. The BMP sizing calculations were then completed to determine if the parcel had sufficient area and capacity to manage these volumes on-site. If there was insufficient capacity, the remaining volume was then identified for off-site management through an Alternative Compliance program or project, and includes for BMP costing. This scenario was assessed for the two types of BMPs. Based on this 100% on-site stormwater scenario, it was determined that two additional stormwater management scenarios would be assessed assuming 70% on-site management and 30% off-site management for each of the two BMP types. The stormwater management scenarios for each of the three base case scenarios therefore include:

- **Scenario 1**: 100% on-site (if feasible, off-site required volume identified and used for BMP costing) for Retention and Infiltration BMP
- **Scenario 2**: 100% on-site (if feasible, off-site required volume identified and used for BMP costing) for Retention/Biofiltration BMP
- **Scenario 3**: 70% on-site (if feasible) and 30% off-site for Retention and Infiltration BMP
- **Scenario 4**: 70% on-site (if feasible) and 30% off-site for Retention/Biofiltration BMP

BMP Sizing Results

The calculated BMP sizes are presented in **Tables 5-3** through **5-5**. In Murrieta, all the sites, except Parcel Number 7, could fit both infiltration and biofiltration BMPs. At Parcel Number 7, there is no space available for stormwater treatment, so the entire volume would have to be treated off-site. A comprehensive table of the results of each part of Step 3, from individual parcel data to BMP costing, including stormwater volume determination and BMP sizing for each of the four scenarios, is provided in Appendix A.

TABLE 5-3: MURRIETA BMP SIZES

Parcel Number	Project Name	Total Site Area (SF)	Area Available for Stormwater Management (SF)	Stormwater Volume to be treated (CF)	Stormwater Volume Method[1]	BMP Sizes for 100% On-Site		BMP Sized for 70% On-Site	
						Infiltration Footprint (SF)	Biofiltration Footprint (SF)	Infiltration Footprint (SF)	Biofiltration Footprint (SF)
1	Residential	779,724	155,945	41,122	HMP	-	14,500	134,933	9,843
2	Park	265,716	53,143	6,297	85th percentile	29,519	2,200	20,663	1,463
3	Residential	400,752	80,150	21,165	HMP	-	7,500	59,249	4,182
4	Driving Range	635,976	127,195	9,381	85th percentile	43,975	3,300	30,782	2,176
5	Residential	378,972	75,794	19,958	HMP	-	7,000	55,918	3,952
6	Commercial	117,612	5,366	8,503	HMP	-	3,000	-	1,303
7	Commercial	69,696	0	5,347	HMP	-	-	-	-
8	Residential	200,376	40,075	5,855	HMP	27,447	2,100	14,948	1,057

HMP = Hydromodification method, 85th percentile = Stormwater Pollutant Control method

TABLE 5-4: TEMECULA BMP SIZES

Parcel Number	Project Name	Total Site Area (SF)	Area Available for Stormwater Management (SF)	Stormwater Volume to be treated (CF)	Stormwater Volume Method[1]	BMP Sizes for 100% On-Site		BMP Sizes for 70% On-Site	
						Infiltration Footprint (SF)	Biofiltration Footprint (SF)	Infiltration Footprint (SF)	Biofiltration Footprint (SF)
1	Uptown Center District	570,636	38,434	18,346	85th percentile	-	6,600	-	4,377
2	Creekside Village District	1,224,036	46,098	50,950	85th percentile	-	18,400	-	12,159
3	Uptown/Hotel District	818,928	0	35,692	85th percentile	-	-	-	-

85th percentile = Stormwater Pollutant Control method; Temecula sites are exempt from the Hydromodification method

TABLE 5-5: WILDOMAR BMP SIZES

Parcel Number	Project Name	Total Site Area (SF)	Area Available for Stormwater Management (SF)	Stormwater Volume to be treated (CF)	Stormwater Volume Method[1]	BMP Sizes for 100% On-Site		BMP Sizes for 70% On-Site	
						Infiltration Footprint (SF)	Biofiltration Footprint (SF)	Infiltration Footprint (SF)	Biofiltration Footprint (SF)
1	Lennar Residential	1,167,408	233,482	28,599	HMP	153,200	10,400	107,246	6,888
2	CV Communities	1,829,520	343,842	62,346	HMP	334,000	23,300	233,796	15,755
3	Lennar Homes North Ranch	1,184,832	219,607	42,568	HMP	-	15,900	159,629	10,770
4	McVicar	561,924	112,385	20,539	HMP	110,000	7,700	77,021	5,187
5	Grove Park Mixed-Use Project	897,336	150,588	32,817	HMP	175,800	12,800	123,062	8,849
6	Horizons/Strata	871,200	174,240	40,345	HMP	-	15,900	151,292	10,971
8	Beazer Homes	1,533,312	290,815	52,714	HMP	282,400	19,600	197,677	13,171
9	Clinton Keith condominiums	561,488	112,298	17,537	HMP	94,000	6,400	65,765	4,267
10	Rancon Medical/Retail	1,280,664	113,343	80,934	HMP	-	30,900	-	21,070
11	Westpark Promenade	287,496	206,238	13,034	85th percentile	-	16,900	178,035	11,849
12	Clinton Keith commercial	1,772,892	38,071	72,168	HMP	-	25,700	-	19,293
13	Business Park	871,200	74,052	57,835	HMP	-	21,800	-	14,720
14	Sycamore Academy	435,600	87,120	12,823	85th percentile	68,700	4,700	48,088	3,120
15	College and Joint Use Park	2,090,880	418,176	86,988	HMP	-	32,400	326,207	21,820

In Temecula, Parcel Numbers 1 and 2 could treat 100% of the design volume on-site with biofiltration, but not with infiltration. Parcel Number 3 does not have enough space to treat 70% or more of the stormwater on-site.

In Wildomar, all of the sites can treat 100% of stormwater through biofiltration. Parcel Numbers 1, 5, 9, and 14 could also treat 100% of stormwater on-site through infiltration. At 70% of the stormwater, Parcel Numbers 2, 3, 4, 6, 8, 11, and 15 could also use infiltration.

Because the soils in Riverside County have low infiltration rates, the infiltration BMP footprints are an order of magnitude larger than the biofiltration footprints. In Murrieta and Wildomar, many of the sites would not be able to treat 100% of the stormwater on-site, but could treat up to 70%, with only 30% of the volume going off-site.

Basis for BMP Costs

The next step in the Stormwater Analysis process is developing estimated capital and operations and maintenance costs for the types of BMP that will be used to meet both on-site and off-site Alternative Compliance stormwater requirements. Estimating the BMP costs follows the development of the stormwater volumes and flows for each of the anticipated new development and redevelopment parcels for the selected period of time (for this case study, 10 years) within each of the three study areas developed under Step 2: base case scenarios. For the stormwater management scenarios developed under this framework, the on-site BMP used to meet the stormwater management requirements include retention and infiltration; and, retention and bio-filtration options. These two options were used to be consistent with the allowable stormwater management options to address the site stormwater retention requirements under the 2013 San Diego MS4 permit. As summarized previously, the BMPs were then sized to meet the new stormwater requirements for both pollutant reduction and hydromodification for the volumes calculated to meet these requirements. The outcome of this process provides the size and capacity of these two types of BMPs for on-site management. For these two on-site BMP scenarios, parcels that did not have sufficient area to accommodate the on-site BMPs, the volumes needed for off-site Alternative Compliance were identified for these same two types of BMPs. Two additional scenarios were developed that used a 70% on-site and 30% off-site stormwater management scenario for each of the two types of BMPs (retention and infiltration; and, retention and bio-filtration options). The following discussion presents the approach to estimating the capital and O&M costs of these four scenarios as part of the overall Stormwater Analysis Step 3. The BMP costs will then be used for the Financial Analysis Step 4.

BMP costs were developed using published data from a cost study on LID type BMPs that include retention and biofiltration type BMP. The BMP costs presented in this published study are based on 13 published sources and specific case studies of BMPs constructed and operated in Orange County (Stormwater Magazine Article by M. Grey, D. Sorem, C. Alexander & R. Boon, LID BMP Installation and O&M Costs in

Orange County, CA, February 13, 2013). The reported costs based on the 13 published sources indicated a wide range in costs. For the purpose of this framework, the maximum of the range of capital and O&M costs for the BMP listed were used to compare with the case study costs. These costs are shown in **Table 5-6** for the three types of infiltration BMP and for a biofiltration (including retention) type BMP. Costs are provided on a square foot of BMP and gallons of stormwater managed basis. There is greater range in costs between the BMP on a square foot of BMP than volume management basis. In addition, the cost of the bioretention BMP is higher than any of the infiltration BMP. This is due to the additional cost of providing filter media and in some cases underground additional storage and underdrain systems for biofiltration systems. The infiltration basin is lower in cost, but requires favorable sub-surface conditions for retained stormwater to percolate through underlying soils and eliminate ponding water within a maximum of 72 hours for vector management and 72 hours per the Riverside County guidelines. Both sub-surface and space constraints can limit the use of infiltration basins on many sites. The cost of installing a sub-surface infiltration system is much higher. Costs for these type of systems were not included in the published data set.

TABLE 5-6: PUBLISHED BMP COSTS

BMP Type/Category	Capital & O&M on Square Foot of BMP Basis – Max Literature Value (1)	Capital & O&M on Gallon Managed by BMP Basis – Max Literature Value(1)	Annual O&M Cost as Percentage of Construction Costs – Range of Lit. Value(1)
Infiltration – Trench	$43.00	$1.00	5–20%
Infiltration – Basin	$15.00	$3.00	1–10%
Infiltration – Pavers	$37.00	$22.00	1–2%
Biofiltration – Biofilter/ Bioretention	$69.00	$6.00	1–11%

(1) BMP Costs based on 13 published sources provided in Stormwater Magazine Article by M. Grey, D. Sorem, C. Alexander & R. Boon, LID BMP Installation and O&M Costs in Orange County, CA, February 13, 2013.

The published data also included BMP costs based on case studies for different BMP types and land uses. These published data were used for this framework because the costs were based on recent actual BMP capital and O&M costs, included costs for the two BMP options used in the stormwater analysis, and provided a land use relationship that matched well with the land-use basis for the base case scenario development. A summary of the published cost data for each of the BMP types and land use types is provided in **Appendix B.** BMP cost data is also provided on a square foot of impervious area, capture design volume in gallons, and square foot of BMP basis. A review of these cost basses and comparison to the published data (see Table 5-6), resulted in concluding that the volume basis using the stormwater capture volume provided the best approach for this framework. Summary tables comparing the BMP costs using the various unit cost approaches are included in Appendix B. The reasons include that the costs between the BMP types and land use are not as

variable for the per gallon basis, and are more comparable to the published values based on 13 different sources. Some best professional judgement was also used based on experience in the design and costing of these types of BMPs in Southern California. **Table 5-7** provides the unit costs for the BMP types and land uses on a volume captured basis. These are the unit costs that are used for developing the BMP costs for the four scenarios discussed above.

TABLE 5-7: SUMMARY OF BMP UNIT COSTS ON VOLUME CAPTURE BASIS ($/GALLONS)

Category	Capital & 20-yr O&M on Design Capture Volume(gallon) Basis – Commercial Site (2)	Capital & 20-yr O&M on Design Capture Volume(gallon) Basis – Single Family Residential Site (2)	Capital & 20-yr O&M on Design Capture Volume(gallon) Basis - Urban Mixed-Use – Commercial/ Residential Site (2)	Capital & 20-yr O&M on Design Capture Volume (gallon) Basis – Commercial/ Retail (Big Box) Site (2)
Infiltration - Basin	$4.02	$1.90	Not Available	$1.48
Infiltration - Pavers	$5.81	$3.45	$17.94	$3.19
Biofiltration - Biofilter/ Bioretention	$5.60	$3.86	$20.50	$1.94

(2) BMP costs from case studies presented in article referenced under (1).

BMP Cost Development

Using the basis developed in Section 1.3, a range of costs was developed for different types of BMPs for each site. Initially, infiltration basins, infiltration pavers, and biofiltration facilities were evaluated using costs per square foot of impervious area, per gallon of design volume, and per square foot of the BMP. The prices were applied to each site in accordance with the land use and the size of the site. This resulted in a range of costs from $47,000 to $3,507,000.

Because the costs were based on literature values that do not necessarily scale up with the size of the BMP, some of these costs were unrealistically high. To narrow the range of costs while still being conservative, infiltration pavers were dropped from the analysis and the prices per gallon of design volume were used. **Table 5-6** through **5-8** present the costs for treating 100% of the stormwater on-site where possible, or for treating 70% on-site and 30% off-site. The off-site costs assumed the land use with the highest pricing as a conservative estimate.

TABLE 5-6. MURRIETA BMP COSTS

Parcel Number	Project Name	100% Stormwater Treated On-Site[1]		70% Stormwater Treated On-Site,[2] 30% Treated Off-Site					
		Infiltration Basin	Biofiltration	Infiltration Basin			Biofiltration		
		On-Site	On-Site	On-Site	Off-Site	Total Cost	On-Site	Off-Site	Total Cost
1	Residential	-	$1,188,000	$409,000	$371,000	$780,000	$832,000	$517,000	$1,349,000
2	Park	$189,000	$264,000	$132,000	$57,000	$189,000	$185,000	$79,000	$264,000
3	Residential	-	$611,000	$211,000	$191,000	$402,000	$428,000	$266,000	$694,000
4	Driving Range	$282,000	$393,000	$197,000	$85,000	$282,000	$275,000	$118,000	$393,000
5	Residential	-	$577,000	$199,000	$180,000	$379,000	$404,000	$251,000	$655,000
6	Commercial	-	$356,000	-	$255,000	$255,000	$250,000	$107,000	$357,000
7	Commercial	-	-	-	$161,000	$161,000	-	$224,000	$224,000
8	Residential	$83,000	$169,000	$58,000	$53,000	$111,000	$118,000	$74,000	$192,000

1. Where possible.
2. Where possible. If 70% could not be treated on-site, assumed 100% treated off-site.

TABLE 5-7. TEMECULA BMP COSTS

Parcel Number	Project Name	100% Stormwater Treated On-Site[1]		70% Stormwater Treated On-Site,[2] 30% Treated Off-Site					
		Infiltration Basin	Biofiltration	Infiltration Basin			Biofiltration		
		On-Site	On-Site	On-Site	Off-Site	Total Cost	On-Site	Off-Site	Total Cost
1	Uptown Center District	-	$1,188,000	$409,000	$371,000	$780,000	$832,000	$517,000	$1,349,000
2	Creekside Village District	$189,000	$264,000	$132,000	$57,000	$189,000	$185,000	$79,000	$264,000
3	Creekside Village District	-	-	-	$1,072,000	$1,072,000	-	$1,496,000	$1,496,000

1. Where possible.
2. Where possible. If 70% could not be treated on-site, assumed 100% treated off-site.

TABLE 5-8. WILDOMAR BMP COSTS

Parcel Number	Project Name	100% Stormwater Treated On-Site[1]		70% Stormwater Treated On-Site,[2] 30% Treated Off-Site					
		Infiltration Basin	Biofiltration	Infiltration Basin			Biofiltration		
		On-Site	On-Site	On-Site	Off-Site	Total Cost	On-Site	Off-Site	Total Cost
1	Lennar Residential	$407,000	$826,000	$285,000	$258,000	$543,000	$578,000	$360,000	$938,000
2	CV Communities	$887,000	$1,801,000	$621,000	$562,000	$1,183,000	$1,261,000	$784,000	$2,045,000
3	Lennar Homes North Ranch	-	$1,230,000	$424,000	$384,000	$808,000	$861,000	$535,000	$1,396,000
4	McVicar	$292,000	$593,000	$205,000	$185,000	$390,000	$415,000	$258,000	$673,000
5	Grove Park Mixed-Use Project	$467,000	$948,000	$327,000	$296,000	$623,000	$664,000	$413,000	$1,077,000
6	Horizons/Strata	-	$1,165,000	$402,000	$364,000	$766,000	$816,000	$507,000	$1,323,000
8	Beazer Homes	$750,000	$1,523,000	$525,000	$475,000	$1,000,000	$1,066,000	$663,000	$1,729,000
9	Clinton Keith condominiums	$249,000	$507,000	$175,000	$158,000	$333,000	$355,000	$221,000	$576,000
10	Rancon Medical/Retail	-	$3,393,000	-	$2,431,000	$2,431,000	$2,375,000	$1,018,000	$3,393,000
11	Westpark Promenade	-	$546,000	$274,000	$117,000	$391,000	$382,000	$164,000	$546,000
12	Clinton Keith commercial	$2,168,000	$4,181,000	-	$2,996,000	$2,996,000	$2,927,000	$1,254,000	$4,181,000
13	Business Park	-	$2,424,000	-	$1,737,000	$1,737,000	$1,697,000	$727,000	$2,424,000
14	Sycamore Academy	$385,000	$538,000	$270,000	$116,000	$386,000	$376,000	$161,000	$537,000
15	College and Joint Use Park	$249,000	$507,000	$1,829,000	$784,000	$2,613,000	$2,552,000	$1,094,000	$3,646,000

1. Where possible.
2. Where possible. If 70% could not be treated on-site, assumed 100% treated off-site.

Findings

The cost analysis shows that, where it is possible, infiltration basins on-site are the cheaper option. Because biofiltration facilities require construction of an often more complex system consisting of media or amended soil filter layers, an underdrain system, and an additional storage layer, they are more expensive to construct than the simple infiltration basin. However, due to the low infiltration rates of soils in Riverside County, not all of the sites have enough open space to treat stormwater on-site relying solely on infiltration and meeting required drawdown rates. So in some cases, the biofiltration facility is the only option for on-site treatment.

The assumption that off-site treatment would require higher costs resulted in higher costs for the 70% treatment on-site/30% treatment off-site option. Again however, because not all sites can treat 100% of the stormwater on-site, this would be the more feasible option.

section 6

Financial Feasibility Analysis and Implementation Options – Step 4

Objective

The objective of **Step 4 – Policy and Financing Options** is to evaluate available methods of financing and implementing the stormwater management alternatives for the base case land use scenarios. In Step 2, the team identified base case land use scenarios for each municipality. In Step 3, the team first evaluated the available land area on each site in the base case land use scenario for on-site, surface stormwater management, and then formulated on- and off-site compliance alternatives needed to meet regulatory requirements for the planned development. Using the base case land use scenarios (Step 2) and the resulting alternative stormwater approaches (Step 3), the Project Team prepared preliminary financial models demonstrating the potential cost burdens for each development project in the base case scenarios. Subsequently, the Project Team reviewed potential financing mechanisms and funding sources that could be applied to advance or offset the cost of off-site stormwater management alternatives.

The Project Team review reflects our understanding of market and financial feasibility parameters for private development projects of various land use types in the market area encompassed by the three municipalities. The Project Team also considered the range of public financing approaches that have long been used to fund transportation, parks, schools, and other public improvements throughout California. One or more of these financing tools could potentially be extended to encompass an Alternative Compliance framework for stormwater management.

Preliminary Cost Share Allocation

Overview of Methodology

As described above, Step 2 resulted in the formulation of base case land use scenarios for study areas in the three municipalities. The base case scenarios encompass a mix of planned single-family, multi-family, retail, office/business park, mixed-use, and institutional land uses. In the Murrieta and Wildomar study areas, these proposed projects are generally planned as low-density, surface-parked developments. Within the Temecula study area, a portion of the proposed Uptown Jefferson Specific Plan, the City of Temecula envisions higher-density, mixed-use developments with structured parking. The Project Team evaluated current market valuation and development trends for each major private land use category included in the base Case scenarios. Using these market findings, the Project Team estimated the probable value for the projected development in the three study areas. The team estimated that most of the proposed developments included in the base case scenarios could be absorbed within an approximate 10-year timeframe. The expectation is that this timeframe would also be sufficient for planning, permitting, and construction of the off-site watershed projects needed to implement an Alternative Compliance option.

In the second part of Step 3, described in Section 5.0 of this report, the Project Team formulated on- and off-site alternatives for stormwater facilities for the base case scenarios. Specifically, the Project Team identified the necessary stormwater treatment and management facilities, and the associated capital costs, that would be required for build-out of the 10-year development pipeline in the three study areas. the Project Team addressed a total of four alternatives:

- **Scenario 1**: 100% on-site (if feasible, off-site required volume identified and used for BMP costing) for Retention and Infiltration BMP
- **Scenario 2**: 100% on-site (if feasible, off-site required volume identified and used for BMP costing) for Retention/Biofiltration BMP
- **Scenario 3**: 70% on-site (if feasible) and 30% off-site for Retention and Infiltration BMP
- **Scenario 4**: 70% on-site (if feasible) and 30% off-site for Retention/Biofiltration BMP

For each alternative, the Project Team estimated the total capital costs to develop the necessary facilities. The off-site alternatives assume that 30% of the required stormwater treatment and management is conducted off-site, with the balance addressed on-site. The Step 4 cost estimates do not assign a land value for any public property that might be used for the off-site compliance facilities.

Feasibility Analysis

Using the Step 4 cost estimates, the Project Team conducted an extensive analysis of the impacts of each alternative stormwater approach on the economic feasibility of each development project. The Project Team modeled the potential allocation of stormwater facility costs to the anticipated new development. For comparative purposes, the allocated cost burden was expressed relative to land area, proposed project size (building area or units), and estimated development costs.

For this framework, the Project Team uses percent of estimated development costs as the primary metric in this analysis. For this purpose, the Project Team prepared independent estimates of order-of-magnitude development costs for each planned development project/land use type. The Project Team further reviewed the financial impact outcomes by City and land use type, enabling the Project Team to evaluate the feasibility of the various stormwater management alternatives for development projects of different types and locations. Based on this in-depth analysis, the Project Team identified which types of private development projects, and locations, were most likely to experience feasibility challenges in terms of the ability to absorb the capital costs for the respective on- and off-site compliance alternatives.

Table 6-1 lists the 25 planned development projects in the three cities/study areas with brief project descriptions, combined with the Project Team assumptions

regarding market characteristics and approximate development budget. Tables 6-2 through 6-5 distribute the projects by City; Tables 6-6 through 6-9 distribute the projects by land use type. For both series of tables, the four tables address the four stormwater management alternatives, respectively. For each project, the Project Team has ranked the feasibility of a particular stormwater management scenario based on the estimated facility cost as percent of total development costs as follows:

- Low Impact: 0% to 1% of total estimated development costs
- Medium Impact: 2% to 3% of total development costs
- High Impact: 4% to 6% of development costs

All projects were ranked within this range, i.e., no stormwater scenario exceeded 6% of development costs for any of the planned development projects. In the Project Team's view, stormwater alternatives in the 0% to 1% of total costs range are judged to have nominal impact on project feasibility. Stormwater alternatives with costs in the 2% to 3% range may raise some concerns for project feasibility. Finally, it is the the Project Team's judgement that stormwater alternatives with cost impacts in the 4% to 6% range may result in an infeasible project; in other words, the cost of stormwater compliance may, in this case, directly affect a project's financial viability. The sections below present the Project Team principal findings regarding the economic feasibility of the various stormwater alternatives.

Scenario 1: 100% On-Site Infiltration Basin (Tables 6-2 and 6-6)

Based on the Step 3 results, it was found that this scenario was only viable for a small proportion of the 25 planned development projects in the study area, based on the limited remaining land area on-site relative to the projected stormwater volumes to be treated. The Project Team concluded that 100% on-site infiltration basin could not be accomplished for any of the Temecula projects, all of which are mixed-use developments with high site coverage (building footprints). Only three of the eight Murrieta projects and nine of the 14 Wildomar projects could treat 100% of stormwater solely with on-site infiltration basin. In general, this approach appears to be feasible primarily for the lowest-density development, e.g., single-family or institutional uses. For more dense development, the competing needs of building footprint, surface parking or circulation area, and required landscaping and setbacks limits the utility of infiltration as a stormwater management BMP.

Scenario 2: 100% On-Site Biofiltration (Tables 6-3 and 6-7)

Based on the Step 3 results, it was found that this stormwater scenario was physically viable for all but two of the 25 planned development projects, but the cost of biofiltration makes this a relatively expensive and potentially limiting option for all but the most densely developed sites in the base case scenario. Using the Project Team feasibility metric based on percent of development costs, this on-site solution appears most feasible for the mixed-use developments in Temecula, where it represents just 0% to 1% of total development costs. The 100% on-site biofiltration scenario was

significantly more costly as a percent of total development costs for the residential and commercial development projects in both Murrieta and Wildomar, where development densities per acre are projected to be lower.

Scenario 3: On-Site (70%) and Off-Site Infiltration Basin (30%) (Tables 6-4 and 6-8)

This scenario appears to be the most consistently feasible across all three cities and various projects, with most cost impacts measured in the 1% range (Temecula) or 1% to 3% range (Murrieta and Wildomar). It appears to be particularly well suited in terms of financial feasibility for mixed-use developments (Temecula) and multi-family housing (Murrieta and Wildomar).

Scenario 4: On-Site (70%) and Off-Site Biofiltration (30%) (Tables 6-5 and 6-9)

This stormwater scenario appears to work primarily for the mixed-use developments in Temecula, with cost impacts in the 1% range. All other planned development projects in Murrieta and Wildomar exhibited relatively high cost impacts, in the 2% to 6% range. In fact, this approach seems financially infeasible for three of the eight projects in Murrieta and nine of the 14 projects in Wildomar, which all demonstrate cost impacts in the 4% to 6% range. The highest cost impacts were found for low-density single-family and commercial development. This provides an important cost consideration point in selecting off-site compliance alternatives.

Overall Feasibility of Alternative Compliance

Based on the foregoing Step 4 analysis, the following principal conclusions regarding the relative feasibility of Alternative Compliance methods are offered.

- Where physically viable – as on the selected sites in Murrieta and Wildomar – Scenario 1, on-site infiltration basin, is the most feasible alternative. In other words, in lower-density settings and for development projects with larger areas of open space, on-site compliance with the MS4 permit appears to be readily achievable, physically and financially, using on-site infiltration measures. This scenario may not be feasible if on-site soils do not have favorable infiltration rates that allow for required drawdown rates.
- Scenario 1 on-site infiltration basins are not viable for the Temecula mixed-use development sites. As these are planned as the most intensely developed parcels in the base case scenario, the lack of available land area makes this approach physically infeasible. However, the other three alternative stormwater scenarios for these sites in Temecula are all relatively comparable in cost impact—approximately 1% of total development costs.
- For most Murrieta and Wildomar projects, the optimal solution financially is Scenario 3, the off-site infiltration basin (30%). The least feasible scenario is

Scenario 4, off-site biofiltration (30%), due to the higher cost of biofiltration. From a physical standpoint, the off-site infiltration option developed in this scenario yields more flexibility in site planning in addition to providing a lower-cost option.

- For most residential and mixed-use developments, the cost impact of Scenario 3, the off-site infiltration basin (30%), is in the 1% to 2% range. For commercial and industrial development, the cost impact is higher -- in the 2% to 4% range – but this still represents the optimal financial solution.

Potential Financing Approaches to Implement Off-Site Alternative Compliance

As noted in the previous section, the Project Team found that developers may experience both physical/site development and financial feasibility challenges in implementing on-site stormwater management facilities. Overall, in this example and using the assumptions outlined in Sections 4 and 5 of this Report, the most feasible approach for developers to manage and treat stormwater is Scenario 3, the off-site infiltration basin option. Use of this option presupposes, of course, that an Alternative Compliance program has been adopted by the municipality, approved by the Regional Water Quality Control Board, and priced in a manner consistent with the assumptions in this report. In addition, it assumes sites are available with favorable geotechnical properties that allow for infiltration of captured stormwater volumes that meet reasonable sizing requirements and required drawdown rates.

The Alternative Compliance language in the MS4 permit does not specify the particular mechanism by which a local program would be implemented, leaving development of the ordinance, framework, or other provisions to each municipality to invent and propose. However, Alternative Compliance for stormwater is essentially identical in intent and effect to the many existing systems by which California municipalities have implemented fee-in-lieu or mitigation provisions. Fees to offset capacity impacts on traffic, school, park, water and sewer, and other comparable systems are assessed through many methods, including the use of Area Drainage Plans to mutually agreed-upon conditions in Development Agreements. In nearly all cases, a fee-in-lieu program requires authorization by the municipal legislative body and a supporting evaluation to establish proportionality between impact and mitigation.

Overview of Financing Options for Off-Site Alternative Compliance

The sections below discuss different existing, legally valid financing options through which a stormwater Alternative Compliance program could be implemented. The consultant team researched the potential to fund off-site stormwater facilities as part of an integrated public facilities financing approach. To this end, the Project Team identified a range of public financing mechanisms and their applicability to stormwater facilities. The Project Team prepared a matrix evaluation of potential financing options

for capital costs in terms of applicability, ease of implementation, economic viability, and other factors. The Project Team evaluated the following potential financing options:

- Reimbursement Agreements
- Development Impact Fees (DIFs)
- Special Assessment Districts/Community Facilities Districts (CFDs)
- Landscaping/Maintenance Districts/Business Improvement Districts (BIDs)
- Infrastructure Financing Districts (IFDs)
- Infrastructure State Revolving Fund Loans (I-Bank)

Table 6-10 presents an overview of each of these financing mechanisms in terms of description, eligible uses, formation procedure, and funding parameters. **Table 6-11** assesses the potential applicability of each financing option for capital and operating costs associated with off-site stormwater management and treatment facilities.

Financing Approaches for Capital Facilities

The range of options for financing off-site stormwater facilities include developer funding mandates, city financial contributions, and State low-interest loans, as discussed below.

- *Reimbursement Agreements:* This approach uses an agreement between a first-phase developer and the city for situations where the developer advances funds to develop an off-site facility subject to future reimbursement through contributions from future developers. The viability of this approach is a function of the location, size, and timing of development (and demand for the facility). This approach works best where one or more developers undertake a large-scale development project in a first phase.
- *Development Impact Fees (DIFs):* Each city can establish a new DIF to collect funds from developers at time of building permit to pay for development of an off-site. The major challenge with this approach is that the facilities are typically needed upfront before most development has occurred (and paid the DIF). The city may also establish a DIF program in conjunction with a reimbursement agreement with the first major development project to proceed.
- *Community Facilities Districts (CFDs)/Special Assessment Districts (SAD):* Working with property owners, cities can form either a CFD or SAD to impose taxes or assessments on parcels within a designated boundary. Developers typically use CFDs to pass a portion of the upfront costs for public infrastructure and facilities through to future homeowners. The CFD or SAD can issue bonds to raise upfront funds to pay for the required facilities. Formation of a CFD or SAD requires approval of the property owners and may

require the levy of assessments prior to commencement of development. One of the benefits of this approach is that it formalizes the allocation of capital facility costs across multiple property owners. The city may also establish a CFD or SAD in conjunction with a reimbursement agreement with the first major development project to proceed. A downside to this approach is that CFD funding capacity allocated to stormwater facilities reduces the remaining capacity available to developers to pay for other needed public facilities.

- *Infrastructure Financing Districts or I-Bank Loans:* A city can form an Infrastructure Financing District (IFD) or Enhanced Infrastructure Financing District (EIFD) to dedicate future tax increment generated by the new development toward the cost of infrastructure improvements. Once the IFD tax increment revenue is stabilized, the IFD can issue bonds. The IFD can also be used to reimburse a developer that has advanced funds for the initial investment in stormwater facilities. The IFD or EIFD provides a new funding source for public facilities, although it reduces the revenue stream available to the General Fund to pay for municipal services. Another option is for the city to apply for a low-interest infrastructure loan from the California Infrastructure and Economic Development Bank (I-Bank) to pay for public facilities. Loan payments can be made either from IFD tax increment, CFD/SAD assessments, or other available sources.

In the Project Team's view, the most likely funding mechanisms for capital facilities are Reimbursement Agreements, followed by Development Impact Fees, Community Facilities Districts, and/or I-Bank loans.

Financing Approaches for Ongoing Operations and Maintenance

Once off-site stormwater facilities have been constructed, the city and property owners will be faced with a recurring annual operations and maintenance obligation. Industry research indicates that these annual expenditures range from 1% to 12% of the original capital investment, with typical operations and maintenance expenditures in the 6% to 7% range. For discussion purposes, the Project Team has assumed a conservative estimate of annual operations and maintenance expenditures equivalent to 10% of the original capital cost of the facility. The range of options to pay for this expenditure is limited to city and property owner obligations. All of the options reviewed below pass the operations and maintenance expenditure through to the property owner and/or future user of the property.

- *Community Facilities Districts (CFD):* As a condition of approval, the city can mandate that each development pay its fair share of the annual operations and maintenance expenditure for off-site stormwater treatment facilities. This can be accomplished through imposition of a CFD or LMD (see next section). In addition to funding capital facility costs, CFDs can also be used to pay for annual operations and maintenance expenditures. As development proceeds, the city and property owners can work to establish one or more CFDs (or an

annexable CFD) with an appropriate annual special tax, both to amortize the public facility costs and cover the annual maintenance expenditures.

- *Landscaping/Maintenance Districts (LMD):* Cities and developers typically form landscaping or maintenance districts to assume responsibility for streetscape and landscape maintenance in the public right-of-way. LMDs are funded through assessments on property owners. These districts are used both in older developed areas, where they are approved by a vote of the affected residents, as well as newly developing areas, where they require only property owner approval. Since the off-site stormwater facilities may be located in the public right-of-way, it may be appropriate for the LMD to incorporate the further obligation for its operations and maintenance.
- *Business Improvement Districts (BIDs):* Another option for funding recurring operations and maintenance expenditures is formation of a Property-based BID. BIDs are typically used to pay for streetscape and landscape maintenance, security, marketing, and promotion. The BID's maintenance obligations could be extended to include the stormwater treatment facility. Formation of a BID requires property owner approval; therefore, this approach may present concerns if the property owners elect not to renew the BID.

In the Project Team's view, the most likely funding mechanisms for ongoing operations and maintenance are Landscaping/Maintenance Districts, followed by Community Facilities Districts.

TABLE 6-1

MARKET CHARACTERISTICS OF PROJECTED DEVELOPMENT INVENTORY
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

Parcel	Project	Project Name	Land Use	City	Site Area (SF)	Number of Units	Assumed Unit Size (1)	Non-Residential SF	Total SF GBA	Estimated Development Costs Per SF (excluding land) (1)
6	--	Commercial	Commercial	Murrieta	117,612	0	0	35,300	35,300	$250
7	--	Commercial	Commercial	Murrieta	69,696	0	0	22,300	22,300	$250
4	--	Driving Range	Driving Range	Murrieta	635,976	0	0	0	0	0
2	--	Park	Park	Murrieta	265,716	0	0	0	0	0
1	--	Residential	Residential - Multi-Family	Murrieta	779,724	268	900	0	241,200	$225
3	--	Residential	Residential - Multi-Family	Murrieta	400,752	138	900	0	124,200	$225
5	--	Residential	Residential - Multi-Family	Murrieta	378,972	130	900	0	117,000	$225
8	--	Residential	Residential - Single-Family	Murrieta	200,376	8	3,200	0	25,600	$150
--	1	Uptown Center District	Mixed-Use	Temecula	322,400	125	900	100,700	213,200	$300
--	2	Creekside Village District	Mixed-Use	Temecula	928,216	587	900	126,000	654,300	$300
--	3	Uptown/Hotel District	Mixed-Use	Temecula	588,480	360	900	96,000	420,000	$300
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	1,232,748	322	1,000	86,000	408,000	$250
33	14	Sycamore Academy	Educational	Wildomar	435,600	0	0	28,000	28,000	$300
--	13	Business Park	Industrial	Wildomar	871,200	0	0	261,360	261,360	$150
--	12	Clinton Keith	Commercial	Wildomar	827,640	0	0	248,292	248,292	$225
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	1,280,664	0	0	391,140	391,140	$300
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	2,090,880	0	0	210,000	210,000	$300
17	6	Horizons/Strata	Residential	Wildomar	871,200	226	1,372	0	310,000	$225
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	561,488	101	1,000	0	101,000	$225
1	1	Lennar Residential	Residential - Single-Family	Wildomar	1,167,408	67	2,400	0	160,800	$150
3	2	CV Communities	Residential - Single-Family	Wildomar	1,829,520	102	3,000	0	306,000	$150
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	1,184,832	84	2,400	0	201,600	$150
9	4	McVicar	Residential - Single-Family	Wildomar	561,924	49	2,200	0	107,800	$150
32	8	Beazer Homes	Residential - Single-Family	Wildomar	1,533,312	108	2,700	0	291,600	$150
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	448,668	162	1,000	40,000	202,000	$225

(1) market assumption.

TABLE 6-2

COST ALLOCATION FOR 100% ON-SITE INFILTRATION BASIN
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					100% ON-SITE				
					Infiltration Basin				
Parcel	Project	Project Name	Land Use	City	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	-	--	--	--	--
7	--	Commercial	Commercial	Murrieta	-	--	--	--	--
4	--	Driving Range	Driving Range	Murrieta	$282,000	$0	n/a	n/a	n/a
2	--	Park	Park	Murrieta	$189,000	$1	n/a	n/a	n/a
1	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
3	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
5	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
8	--	Residential	Residential - Single-Family	Murrieta	$83,000	$0	$3	$10,375	2%
--	1	Uptown Center District	Mixed-Use	Temecula	-	--	--	--	--
--	2	Creekside Village District	Mixed-Use	Temecula	-	--	--	--	--
--	3	Uptown/Hotel District	Mixed-Use	Temecula	-	--	--	--	--
33	14	Sycamore Academy	Educational	Wildomar	$385,000	$1	$14	n/a	5%
--	13	Business Park	Industrial	Wildomar	-	--	--	--	--
--	12	Clinton Keith	Commercial	Wildomar	$2,168,000	$3	$9	n/a	4%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	-	--	--	--	--
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	-	--	--	--	--
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$249,000	$0	$1	n/a	0%
17	6	Horizons/Strata	Residential	Wildomar	-	--	--	--	--
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$249,000	$0	$2	$2,465	1%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$407,000	$0	$3	$6,075	2%
3	2	CV Communities	Residential - Single-Family	Wildomar	$887,000	$0	$3	$8,696	2%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	-	--	--	--	--
9	4	McVicar	Residential - Single-Family	Wildomar	$292,000	$1	$3	$5,959	2%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$750,000	$0	$3	$6,944	2%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$467,000	$1	$2	$2,883	1%

TABLE 6-3

COST ALLOCATION FOR 100% ON-SITE BIOFILTRATION
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					100% ON-SITE				
					Biofiltration				
Parcel	Project	Project Name	Land Use	City	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$356,000	$3	$10	n/a	4%
7	--	Commercial	Commercial	Murrieta	-	--	--	--	--
4	--	Driving Range	Driving Range	Murrieta	$393,000	$1	n/a	n/a	n/a
2	--	Park	Park	Murrieta	$264,000	$1	n/a	n/a	n/a
1	--	Residential	Residential - Multi-Family	Murrieta	$1,188,000	$2	$5	$4,433	2%
3	--	Residential	Residential - Multi-Family	Murrieta	$611,000	$2	$5	$4,428	2%
5	--	Residential	Residential - Multi-Family	Murrieta	$577,000	$2	$5	$4,438	2%
8	--	Residential	Residential - Single-Family	Murrieta	$169,000	$1	$7	$21,125	4%
--	1	Uptown Center District	Mixed-Use	Temecula	$530,000	$2	$2	$4,240	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$739,000	$1	$1	$1,259	0%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	-	--	--	--	--
33	14	Sycamore Academy	Educational	Wildomar	$538,000	$1	$19	n/a	6%
--	13	Business Park	Industrial	Wildomar	$2,424,000	$3	$9	n/a	6%
--	12	Clinton Keith	Commercial	Wildomar	$3,025,000	$4	$12	n/a	5%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$3,393,000	$3	$9	n/a	3%
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$1,990,000	$2	$5	$6,180	2%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$507,000	$0	$2	n/a	1%
17	6	Horizons/Strata	Residential	Wildomar	$1,165,000	$1	$4	$5,155	2%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$507,000	$1	$5	$5,020	2%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$826,000	$1	$5	$12,328	3%
3	2	CV Communities	Residential - Single-Family	Wildomar	$1,801,000	$1	$6	$17,657	4%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$1,230,000	$1	$6	$14,643	4%
9	4	McVicar	Residential - Single-Family	Wildomar	$593,000	$1	$6	$12,102	4%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$1,523,000	$1	$5	$14,102	3%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$948,000	$2	$5	$5,852	2%

TABLE 6-4

COST ALLOCATION FOR 30% OFF-SITE / 70% ON-SITE INFILTRATION BASIN
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					30% OFF-SITE / 70% ON-SITE							
					Infiltration Basin							
Parcel	Project	Project Name	Land Use	City	On-Site	+ Off-Site	= Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$0	$255,000	$255,000	$2	$7	n/a	3%
7	--	Commercial	Commercial	Murrieta	$0	$161,000	$161,000	$2	$7	n/a	3%
4	--	Driving Range	Driving Range	Murrieta	$197,000	$85,000	$282,000	$0	n/a	n/a	n/a
2	--	Park	Park	Murrieta	$132,000	$57,000	$189,000	$1	n/a	n/a	n/a
1	--	Residential	Residential - Multi-Family	Murrieta	$409,000	$371,000	$780,000	$1	$3	$2,910	1%
3	--	Residential	Residential - Multi-Family	Murrieta	$211,000	$191,000	$402,000	$1	$3	$2,913	1%
5	--	Residential	Residential - Multi-Family	Murrieta	$199,000	$180,000	$379,000	$1	$3	$2,915	1%
8	--	Residential	Residential - Single-Family	Murrieta	$58,000	$53,000	$111,000	$1	$4	$13,875	3%
--	1	Uptown Center District	Mixed-Use	Temecula	$0	$551,000	$551,000	$2	$3	$4,408	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$0	$1,531,000	$1,531,000	$2	$2	$2,608	1%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	$0	$1,072,000	$1,072,000	$2	$3	$2,978	1%
33	14	Sycamore Academy	Educational	Wildomar	$270,000	$116,000	$386,000	$1	$14	n/a	5%
--	13	Business Park	Industrial	Wildomar	$0	$1,737,000	$1,737,000	$2	$7	n/a	4%
--	12	Clinton Keith	Commercial	Wildomar	$0	$2,168,000	$2,168,000	$3	$9	n/a	4%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$0	$2,431,000	$2,431,000	$2	$6	n/a	2%
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$998,000	$428,000	$1,426,000	$1	$3	$4,429	1%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$1,829,000	$784,000	$2,613,000	$1	$12	n/a	4%
17	6	Horizons/Strata	Residential	Wildomar	$402,000	$364,000	$766,000	$1	$2	$3,389	1%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$175,000	$158,000	$333,000	$1	$3	$3,297	1%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$285,000	$258,000	$543,000	$0	$3	$8,104	2%
3	2	CV Communities	Residential - Single-Family	Wildomar	$621,000	$562,000	$1,183,000	$1	$4	$11,598	3%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$424,000	$384,000	$808,000	$1	$4	$9,619	3%
9	4	McVicar	Residential - Single-Family	Wildomar	$205,000	$185,000	$390,000	$1	$4	$7,959	2%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$525,000	$475,000	$1,000,000	$1	$3	$9,259	2%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$327,000	$296,000	$623,000	$1	$3	$3,846	1%

TABLE 6-5

COST ALLOCATION FOR 30% OFF-SITE / 70% ON-SITE BIOFILTRATION
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					30% OFF-SITE / 70% ON-SITE								
					Biofiltration								
Parcel	Project	Project Name	Land Use	City	On-Site	+	Off-Site	=	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$250,000		$107,000		$357,000	$3	$10	n/a	4%
7	--	Commercial	Commercial	Murrieta	$0		$224,000		$224,000	$3	$10	n/a	4%
4	--	Driving Range	Driving Range	Murrieta	$275,000		$118,000		$393,000	$1	n/a	n/a	n/a
2	--	Park	Park	Murrieta	$185,000		$79,000		$264,000	$1	n/a	n/a	n/a
1	--	Residential	Residential - Multi-Family	Murrieta	$832,000		$517,000		$1,349,000	$2	$6	$5,034	2%
3	--	Residential	Residential - Multi-Family	Murrieta	$428,000		$266,000		$694,000	$2	$6	$5,029	2%
5	--	Residential	Residential - Multi-Family	Murrieta	$404,000		$251,000		$655,000	$2	$6	$5,038	2%
8	--	Residential	Residential - Single-Family	Murrieta	$118,000		$74,000		$192,000	$1	$8	$24,000	5%
--	1	Uptown Center District	Mixed-Use	Temecula	$371,000		$231,000		$602,000	$2	$3	$4,816	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$517,000		$641,000		$1,158,000	$1	$2	$1,973	1%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	$0		$1,496,000		$1,496,000	$3	$4	$4,156	1%
33	14	Sycamore Academy	Educational	Wildomar	$376,000		$161,000		$537,000	$1	$19	n/a	6%
--	13	Business Park	Industrial	Wildomar	$1,697,000		$727,000		$2,424,000	$3	$9	n/a	6%
--	12	Clinton Keith	Commercial	Wildomar	$2,118,000		$908,000		$3,026,000	$4	$12	n/a	5%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$2,375,000		$1,018,000		$3,393,000	$3	$9	n/a	3%
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$1,393,000		$597,000		$1,990,000	$2	$5	$6,180	2%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$2,552,000		$1,094,000		$3,646,000	$2	$17	n/a	6%
17	6	Horizons/Strata	Residential	Wildomar	$816,000		$507,000		$1,323,000	$2	$4	$5,854	2%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$355,000		$221,000		$576,000	$1	$6	$5,703	3%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$578,000		$360,000		$938,000	$1	$6	$14,000	4%
3	2	CV Communities	Residential - Single-Family	Wildomar	$1,261,000		$784,000		$2,045,000	$1	$7	$20,049	4%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$861,000		$535,000		$1,396,000	$1	$7	$16,619	5%
9	4	McVicar	Residential - Single-Family	Wildomar	$415,000		$258,000		$673,000	$1	$6	$13,735	4%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$1,066,000		$663,000		$1,729,000	$1	$6	$16,009	4%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$664,000		$413,000		$1,077,000	$2	$5	$6,648	2%

TABLE 6-6

COST ALLOCATION FOR 100% ON-SITE INFILTRATION BASIN
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					100% ON-SITE				
					Infiltration Basin				
Parcel	Project	Project Name	Land Use	City	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	-	--	--	--	--
7	--	Commercial	Commercial	Murrieta	-	--	--	--	--
--	12	Clinton Keith	Commercial	Wildomar	$2,168,000	$3	$9	n/a	4%
4	--	Driving Range	Driving Range	Murrieta	$282,000	$0	n/a	n/a	n/a
33	14	Sycamore Academy	Educational	Wildomar	$385,000	$1	$14	n/a	5%
--	13	Business Park	Industrial	Wildomar	-	--	--	--	--
--	1	Uptown Center District	Mixed-Use	Temecula	-	--	--	--	--
--	2	Creekside Village District	Mixed-Use	Temecula	-	--	--	--	--
--	3	Uptown/Hotel District	Mixed-Use	Temecula	-	--	--	--	--
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	-	--	--	--	--
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	-	--	--	--	--
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$249,000	$0	$1	n/a	0%
2	--	Park	Park	Murrieta	$189,000	$1	n/a	n/a	n/a
17	6	Horizons/Strata	Residential	Wildomar	-	--	--	--	--
1	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
3	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
5	--	Residential	Residential - Multi-Family	Murrieta	-	--	--	--	--
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$249,000	$0	$2	$2,465	1%
8	--	Residential	Residential - Single-Family	Murrieta	$83,000	$0	$3	$10,375	2%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$407,000	$0	$3	$6,075	2%
3	2	CV Communities	Residential - Single-Family	Wildomar	$887,000	$0	$3	$8,696	2%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	-	--	--	--	--
9	4	McVicar	Residential - Single-Family	Wildomar	$292,000	$1	$3	$5,959	2%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$750,000	$0	$3	$6,944	2%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$467,000	$1	$2	$2,883	1%

TABLE 6-7

COST ALLOCATION FOR 100% ON-SITE BIOFILTRATION
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					100% ON-SITE				
					Biofiltration				
Parcel	Project	Project Name	Land Use	City	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$356,000	$3	$10	n/a	4%
7	--	Commercial	Commercial	Murrieta	-	--	--	--	--
--	12	Clinton Keith	Commercial	Wildomar	$3,025,000	$4	$12	n/a	5%
4	--	Driving Range	Driving Range	Murrieta	$393,000	$1	n/a	n/a	n/a
33	14	Sycamore Academy	Educational	Wildomar	$538,000	$1	$19	n/a	6%
--	13	Business Park	Industrial	Wildomar	$2,424,000	$3	$9	n/a	6%
--	1	Uptown Center District	Mixed-Use	Temecula	$530,000	$2	$2	$4,240	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$739,000	$1	$1	$1,259	0%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	-	--	--	--	--
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$1,990,000	$2	$5	$6,180	2%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$3,393,000	$3	$9	n/a	3%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$507,000	$0	$2	n/a	1%
2	--	Park	Park	Murrieta	$264,000	$1	n/a	n/a	n/a
17	6	Horizons/Strata	Residential	Wildomar	$1,165,000	$1	$4	$5,155	2%
1	--	Residential	Residential - Multi-Family	Murrieta	$1,188,000	$2	$5	$4,433	2%
3	--	Residential	Residential - Multi-Family	Murrieta	$611,000	$2	$5	$4,428	2%
5	--	Residential	Residential - Multi-Family	Murrieta	$577,000	$2	$5	$4,438	2%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$507,000	$1	$5	$5,020	2%
8	--	Residential	Residential - Single-Family	Murrieta	$169,000	$1	$7	$21,125	4%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$826,000	$1	$5	$12,328	3%
3	2	CV Communities	Residential - Single-Family	Wildomar	$1,801,000	$1	$6	$17,657	4%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$1,230,000	$1	$6	$14,643	4%
9	4	McVicar	Residential - Single-Family	Wildomar	$593,000	$1	$6	$12,102	4%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$1,523,000	$1	$5	$14,102	3%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$948,000	$2	$5	$5,852	2%

TABLE 6-8

COST ALLOCATION FOR 30% OFF-SITE / 70% ON-SITE INFILTRATION BASIN
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					30% OFF-SITE / 70% ON-SITE							
					Infiltration Basin							
Parcel	Project	Project Name	Land Use	City	On-Site	+ Off-Site	= Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$0	$255,000	$255,000	$2	$7	n/a	3%
7	--	Commercial	Commercial	Murrieta	$0	$161,000	$161,000	$2	$7	n/a	3%
--	12	Clinton Keith	Commercial	Wildomar	$0	$2,168,000	$2,168,000	$3	$9	n/a	4%
4	--	Driving Range	Driving Range	Murrieta	$197,000	$85,000	$282,000	$0	n/a	n/a	n/a
33	14	Sycamore Academy	Educational	Wildomar	$270,000	$116,000	$386,000	$1	$14	n/a	5%
--	13	Business Park	Industrial	Wildomar	$0	$1,737,000	$1,737,000	$2	$7	n/a	4%
--	1	Uptown Center District	Mixed-Use	Temecula	$0	$551,000	$551,000	$2	$3	$4,408	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$0	$1,531,000	$1,531,000	$2	$2	$2,608	1%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	$0	$1,072,000	$1,072,000	$2	$3	$2,978	1%
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$998,000	$428,000	$1,426,000	$1	$3	$4,429	1%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$0	$2,431,000	$2,431,000	$2	$6	n/a	2%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$1,829,000	$784,000	$2,613,000	$1	$12	n/a	4%
2	--	Park	Park	Murrieta	$132,000	$57,000	$189,000	$1	n/a	n/a	n/a
17	6	Horizons/Strata	Residential	Wildomar	$402,000	$364,000	$766,000	$1	$2	$3,389	1%
1	--	Residential	Residential - Multi-Family	Murrieta	$409,000	$371,000	$780,000	$1	$3	$2,910	1%
3	--	Residential	Residential - Multi-Family	Murrieta	$211,000	$191,000	$402,000	$1	$3	$2,913	1%
5	--	Residential	Residential - Multi-Family	Murrieta	$199,000	$180,000	$379,000	$1	$3	$2,915	1%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$175,000	$158,000	$333,000	$1	$3	$3,297	1%
8	--	Residential	Residential - Single-Family	Murrieta	$58,000	$53,000	$111,000	$1	$4	$13,875	3%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$285,000	$258,000	$543,000	$0	$3	$8,104	2%
3	2	CV Communities	Residential - Single-Family	Wildomar	$621,000	$562,000	$1,183,000	$1	$4	$11,598	3%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$424,000	$384,000	$808,000	$1	$4	$9,619	3%
9	4	McVicar	Residential - Single-Family	Wildomar	$205,000	$185,000	$390,000	$1	$4	$7,959	2%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$525,000	$475,000	$1,000,000	$1	$3	$9,259	2%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$327,000	$296,000	$623,000	$1	$3	$3,846	1%

TABLE 6-9

COST ALLOCATION FOR 30% OFF-SITE / 70% ON-SITE BIOFILTRATION
BASE CASE LAND USE SCENARIOS
WRCOG STORMWATER QUALITY FRAMEWORK

					30% OFF-SITE / 70% ON-SITE								
					Biofiltration								
Parcel	Project	Project Name	Land Use	City	On-Site	+	Off-Site	=	Cost Estimate	Per SF Land	Per SF GBA	Per Unit	% of Total Development Costs
6	--	Commercial	Commercial	Murrieta	$250,000		$107,000		$357,000	$3	$10	n/a	4%
7	--	Commercial	Commercial	Murrieta	$0		$224,000		$224,000	$3	$10	n/a	4%
--	12	Clinton Keith	Commercial	Wildomar	$2,118,000		$908,000		$3,026,000	$4	$12	n/a	5%
4	--	Driving Range	Driving Range	Murrieta	$275,000		$118,000		$393,000	$1	n/a	n/a	n/a
33	14	Sycamore Academy	Educational	Wildomar	$376,000		$161,000		$537,000	$1	$19	n/a	6%
--	13	Business Park	Industrial	Wildomar	$1,697,000		$727,000		$2,424,000	$3	$9	n/a	6%
--	1	Uptown Center District	Mixed-Use	Temecula	$371,000		$231,000		$602,000	$2	$3	$4,816	1%
--	2	Creekside Village District	Mixed-Use	Temecula	$517,000		$641,000		$1,158,000	$1	$2	$1,973	1%
--	3	Uptown/Hotel District	Mixed-Use	Temecula	$0		$1,496,000		$1,496,000	$3	$4	$4,156	1%
13	11/12	Westpark Promenade	Mixed-Use	Wildomar	$1,393,000		$597,000		$1,990,000	$2	$5	$6,180	2%
5	10	Rancon Medical/Retail	Mixed-Use	Wildomar	$2,375,000		$1,018,000		$3,393,000	$3	$9	n/a	3%
--	15	College and Joint Use Park	Mixed-use/Open Space	Wildomar	$2,552,000		$1,094,000		$3,646,000	$2	$17	n/a	6%
2	--	Park	Park	Murrieta	$185,000		$79,000		$264,000	$1	n/a	n/a	n/a
17	6	Horizons/Strata	Residential	Wildomar	$816,000		$507,000		$1,323,000	$2	$4	$5,854	2%
1	--	Residential	Residential - Multi-Family	Murrieta	$832,000		$517,000		$1,349,000	$2	$6	$5,034	2%
3	--	Residential	Residential - Multi-Family	Murrieta	$428,000		$266,000		$694,000	$2	$6	$5,029	2%
5	--	Residential	Residential - Multi-Family	Murrieta	$404,000		$251,000		$655,000	$2	$6	$5,038	2%
--	9	Clinton Keith	Residential - Multi-Family	Wildomar	$355,000		$221,000		$576,000	$1	$6	$5,703	3%
8	--	Residential	Residential - Single-Family	Murrieta	$118,000		$74,000		$192,000	$1	$8	$24,000	5%
1	1	Lennar Residential	Residential - Single-Family	Wildomar	$578,000		$360,000		$938,000	$1	$6	$14,000	4%
3	2	CV Communities	Residential - Single-Family	Wildomar	$1,261,000		$784,000		$2,045,000	$1	$7	$20,049	4%
4	3	Lennar Homes North Ranch	Residential - Single-Family	Wildomar	$861,000		$535,000		$1,396,000	$1	$7	$16,619	5%
9	4	McVicar	Residential - Single-Family	Wildomar	$415,000		$258,000		$673,000	$1	$6	$13,735	4%
32	8	Beazer Homes	Residential - Single-Family	Wildomar	$1,066,000		$663,000		$1,729,000	$1	$6	$16,009	4%
15	5	Grove Park Mixed-Use	Residential/Commercial	Wildomar	$664,000		$413,000		$1,077,000	$2	$5	$6,648	2%

TABLE 6-10

OVERVIEW OF POTENTIAL FINANCING MECHANISMS

WRCOG STORMWATER QUALITY FRAMEWORK

	DEVELOPER / PROPERTY OWNER / USER			
	REIMBURSEMENT AGREEEMENTS	**DEVELOPMENT IMPACT FEES**	**COMMUNITY FACILITIES DISTRICTS**	**SPECIAL ASSESSMENT DISCTRICTS**
DESCRIPTION	• Advance of funds from developers for use toward backbone infrastructure • Alternatively, developers construct and deliver specific improvements • City and developer enter into Reimbursement Agreement	• Fees paid by developers to pay all or a portion of the costs of any public facility that benefits their development	• A special tax placed against property located within an established district to fund public facilities and services	• Similar to a CFD but shifts the funding of infrastructure from all taxpayers to only those who benefit specifically from the improvement • Sets a fixed lien on every parcel within the assessment district • Municipal bonds supported by special assessments provide upfront funding
ELIGIBLE USES	• Backbone infrastructure such as roads, wet and dry utilities, police and fire facilities, parks, etc. • Determined through negotiation of Development Agreement	• Capital facilities or ongoing services: ◦ school impact fee ◦ mitigation fee (police, fire, park) ◦ water meter installation ◦ sanitation capacity charge ◦ water system facility	• Construction of capital facilities: ◦ parks ◦ schools ◦ fire stations ◦ water and sewer systems ◦ government facilities • Purchase, construction, and improvement or rehabilitation of real property • Ongoing maintenance costs	• Construction of capital facilities such as roads, water, sewer, and flood control
FORMATION PROCEDURE	• Two-party Development Agreement between City and Developer	• City council action to adopt DIFs subject to Public Facilities Financing Plan	• Requires 2/3 vote of qualified electors in district. If fewer than 12 residents, vote is conducted on current landowners • Assessment based on allocation formula, not necessarily in proportion to the benefit received	• Typically property owners petition a City to form a district to finance large-scale infrastructure improvements • Assessments on property owners are determined in proportion to the benefit received
FUNDING PARAMETERS	• Typically repaid from Community Facilities District (CFD) bond proceeds and/or Development Impact Fees collected from future developers	• Fees are paid in the form of a specified amount as a condition to the issuance of building permits, an occupancy permit, or subdivision map approval	• Municipal bonds supported by revenues from the special tax are sold by the CFD to provide upfront funding to build improvements or fund services • Requires value to lien ratio of 3:1	• Municipal bonds supported by revenues from the Special Assessment District are sold by the District to provide upfront funding to build improvements • Requires value to lien ratio of 3:1

TABLE 6-~~10~~

OVERVIEW OF POTENTIAL FINANCING MECHANISMS
WRCOG STORMWATER QUALITY FRAMEWORK

	DEVELOPER / PROPERTY OWNER / USER		CITY / LOCALLY CONTROLLED	STATE
	LANDSCAPING/ MAINTENANCE DISTRICTS	**PROPERTY-BASED IMPROVEMENT DISTRICTS**	**INFRASTRUCTURE FINANCING DISTRICTS**	**INFRASTRUCTURE STATE REVOLVING FUND LOANS**
DESCRIPTION	• Assessment on properties located within a specific district that benefit from landscaping improvements and ongoing maintenance	• A legal mechanism for property owners in a defined geographic area to jointly plan and put in place a sustainable funding source that can pay for a set of services to improve their area	• Allows local agencies (e.g., City and/or County) to invest in infrastructure through tax increment collected from local agencies who have voluntarily agreed to contribute funds • School districts cannot participate	• Provides low-cost, long-term financing to public agencies and non-profit corporations for a wide-variety of infrastructure and economic development projects
ELIGIBLE USES	• Funding of lights, recreational equipment, landscaping, and irrigation	• Public space maintenance • Security • Marketing and promotions • Landscaping • Community services • Capital improvements	• Highways, interchanges, bridges, and ramps • Sewage treatment and water reclamation plants • Flood control levees, retention basins, and drainage channels • Parks and recreational facilities	• Finances capital costs of public infrastructure such as land, construction of facilities, the purchase and installation of equipment as well as project soft costs: ◦ design ◦ environmental ◦ engineering ◦ permits and construction management
FORMATION PROCEDURE	• A Resolution of Intention is adopted stating that the agency intends to form an assessment district, ballots are mailed to each property owner within the district. If the majority vote in favor for formation, and public hearing is concluded, the district is formed	• Approval of stakeholders representing at least 50% of property assessment value is required • PBID Legislation allows for a maximum life of 5 years. Upon renewal, a district may be established for a maximum of 10 years. Once the district is completed, the provisions for establishment are repeated in order to continue to fund special benefit services	• Allowed without need for voter approval • Requires voter approval (threshold of 55%) to issue tax increment bonds; if less than 12 persons are registered to vote in the district, the vote can be determined by the landowners of the district • May remain in place for up to 45 years from the date on which the issuance of bonds is approved	• Application required • Eligible applicants include any subdivision of a local government, including cities, counties, special districts, assessment districts, joint powers authorities and non-profit corporations formed on behalf of a local government
FUNDING PARAMETERS	• Funds are typically collected concurrently with the annual business license tax or property tax bill, with varying formulas for retail vs. non-retail businesses, and residential vs. non-residential property	• County collects assessments from property owners for Property and Business Improvement Districts (PBIDs) and distributes money back to PBID	• Tax increment revenues can be used to pay debt service on bonds/loans • May not finance routine maintenance or repair work, or ongoing operating costs	• Amounts range from $50,000 to $25 million with loan terms up to 30 years • Loan amounts may exceed $25 million on a case-by-case basis • Interest rates vary and are based on a number of factors

TABLE 6-11

PRELIMINARY FEASIBILITY ASSESSMENT OF POTENTIAL FINANCING MECHANISMS
WRCOG STORMWATER QUALITY FRAMEWORK

	DEVELOPER / PROPERTY OWNER / USER						CITY / LOCALLY CONTROLLED	STATE
	REIMBURSEMENT AGREEEMENTS	DEVELOPMENT IMPACT FEES	COMMUNITY FACILITIES DISTRICTS	SPECIAL ASSESSMENT DISCTRICTS	LANDSCAPING/ MAINTENANCE DISTRICTS	PROPERTY-BASED IMPROVEMENT DISTRICTS	INFRASTRUCTURE FINANCING DISTRICTS	INFRASTRUCTURE STATE REVOLVING FUND LOANS
CAPITAL FACILITIES								
Applicability to Stormwater Facilities	√	√	√	√	X	X	√	√
Feasibility Ranking	HIGH	MEDIUM	MEDIUM	LOW			LOW	MEDIUM
ONGOING OPERATIONS & MAINTENANCE								
Applicability to Stormwater Facilities	X	X	√	X	√	√	X	X
Feasibility Ranking			MEDIUM		HIGH	LOW		
OPPORTUNITIES & CHALLENGES	• Requires one or more large developments to proceed in first phase • Maintenance costs may be excessive until balance of development proceeds	• Requires an alternative funding source to pay for capital facilities upfront pending receipt of DIFs	• Establishment of a CFD formalizes the allocation of capital facility costs across multiple property owners • As development proceeds, the city and property owners can establish CFDs with an annual special tax sufficient for both capital public facility costs and annual maintenance • CFD funding capacity allocated to stormwater facilities reduces the capacity available to pay for other public facilities	• Formation of a Special Assessment District formalizes the allocation of capital facility costs across multiple property owners • Funding capacity allocated to stormwater facilities reduces the capacity available to pay for other public facilities • Cannot pay for annual maintenance	• Since off-site stormwater facilities may be located in public ROW, it may be appropriate to fund operations and maintenance through LMD	• BIDs are renewed at five-year intervals; therefore, this approach raises concerns that property owners will not renew the BID	• Can be used to reimburse a developer that has advanced funds for the initial investment in stormwater facilities • Prohibits a city or county with a former redevelopment agency from creating an EIFD until the Department of Finance certifies that no further redevelopment agency assets are subject to litigation • Reduces revenue stream to the City General Fund	• Low-interest funding source • Other financing mechanisms – IFD tax increment, CFD/SAD assessments, etc. – can be used to repay loan • Requires pledge of committed revenue stream to repay loan • Waiting list for funding requires getting the project into the system early

section 7

CEQA Streamlining Analysis – Step 5

Step 5: CEQA Streamlining includes a review of the current CEQA legislation (Public Resources Code 21000–21189) and the CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387) that provides for a more streamlined process for projects that are integrated with Transit Priority Projects. Where off-site alternative compliance stormwater projects are integrated with these urban transit systems, a more stream-lined CEQA process can reduce the time and effort for upfront environmental documentation for these projects. As part of the development of the Land Use, Transportation and Water Quality Framework Plan, opportunities to streamline the CEQA process for subsequent surface water quality projects are discussed below.

Opportunity for California Environmental Quality Act Streamlining

CEQA (Public Resources Code, Division 13, 21000–21889.3) and the accompanying State CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3. 15000–15387) requires that all discretionary projects be evaluated for their effect on the environment and must propose mitigation measures to reduce or lessen any identified significant adverse impacts to less than significant levels. CEQA also requires that government decision makers and the public be informed about the project's identified potentially significant project impacts and requires the development of alternatives and/or mitigation measures to reduce or eliminate these identified impacts, to the extent feasible. Future development within the study area will most likely be discretionary and will be subject to some form of CEQA review. It is anticipated that many of the stormwater quality projects studied in the Framework Plan will also be implemented in conjunction with other land use and transportation projects that may have their own CEQA documentation process, or exemption from. The CEQA process can be expensive and time consuming, and a variety of approaches to streamlining the process are available to certain types of projects and programs. Typical preparation and processing time for Environmental Impact Reports (EIRs) can stretch across multiple years and have to potential to substantially delay project implementation and result in financial infeasibility due to delays and/or increased costs. A strategic approach to CEQA streamlining and compliance should be an integral part of any project's overall management approach. Complying with the requirements of CEQA while at the same time minimizing exposure to excessive document and process-related schedule delays is paramount.

Provisions for Streamlined Environmental Review

Over the years since CEQA was enacted in 1970, the California legislature has developed several provisions within the CEQA Statute and Guidelines to streamline (exempt or minimize) the required CEQA documentation and review process for a variety of project types that are considered to be either minor in nature and/or of benefit to the environment. SB 375 and SB 743 are the primary legislative tools that have created the CEQA streamlining provisions, and both are centered around transit oriented development and mixed-use in-fill projects that have the potential to reduce

traffic, air quality and GHG impacts. These streamlining provisions have been incorporated into the Public Resource Code and the CEQA Guidelines in a variety of locations, including Categorical Exemptions, Statutory Exemptions and various streamlining sections, including streamlining for infill projects (15183.3). Additional provisions for expedited environmental review of environmentally mandated projects is found in Section 21159 of the statute and focuses on relief for pollution control equipment/treatment requirements associated with the Global Warming Solutions of 2006.

Categorical Exemptions (Article 19, 15300–15333)

Depending on the nature and extent of the proposed projects, a variety of Categorical Exemptions could be applicable, which would exempt the project from CEQA review. Categorical Exemptions apply to an established list of categories/types of projects and can be employed, provided that they can meet the individual exemption requirements. The entire list of 33 Categorical Exemptions should always be reviewed for each project to determine applicability. Categorical Exemptions that could be applicable include: Replacement of Reconstruction (15302), New Construction/Small Structures (15303), or In-fill Development Projects (15332).

Statutory Exemptions (Article 18, 15260–15285)

Depending on the nature and extent of the proposed projects, a variety of Statutory Exemptions could be applicable, which would exempt the project from CEQA review. The entire list of 22 Statutory Exemptions should always be reviewed for each project to determine applicability. Statutory Exemptions that could be applicable include: Discharge Requirements (15263), Transportation Improvement and Congestion Management Plans (15276) and Specified Mass Transit Project (15275) or Other Statutory Exemptions (15282).

Appropriate Type and Level of CEQA Documentation

Depending on the nature and extent of the proposed project, CEQA document requirements can substantially vary in complexity and duration. To the extent possible, discretionary projects should always seek to leverage existing CEQA environmental documentation to the extent practicable and complete the most basic CEQA documents possible while still meeting the intent of the law. Comprehensive EIRs should be the last resort after attempting to determine if lesser CEQA document types would suffice, including Categorical/Statutory Exemptions, Negative Declarations, Mitigated Negative Declarations, Focused EIRs and tiering off of other master, program and project EIRs. Self-mitigating project design features should be incorporated into water quality projects to the extent feasible to minimize the requirement to develop mitigation measures and to assist with making the determination of less than significant impacts during the Initial Study process, which would lead to the less onerous Negative Declaration CEQA process. Where individual projects can be grouped together into a single cohesive program, Programmatic EIRs (15168) can be useful in evaluating programs at a high overview level, providing CEQA

coverage at the program level, and allowing the overall program to move forward, with individual project potentially subject to future CEQA review at the time that specific design details become available.

Sustainable Communities Strategy

SB 375 has amended CEQA to add Chapter 4.2 (Implementation of the Sustainable Communities Strategy (21155.1-3), which allows for CEQA exemptions for certain transit priority projects, as well as reduced CEQA analysis requirements. CEQA streamlining may be available for the WRCOG Land Use, Transportation and Water Quality Planning Framework projects, pursuant to provisions incorporated in CEQA and the CEQA Guidelines following adoption of Senate Bill 375, in 2011. These CEQA streamlining provisions are available to Transit Priority projects that are consistent with an adopted Regional Transportation Plans/Sustainable Communities Strategies (RTP/SCS), which have been approved by the local Metropolitan Planning Organization (SCAG), accepted by the California Air Resources Board, and if implemented would reduce greenhouse gasses (GHG) and help to achieve GHG reduction targets. The RTP/SCS 2012–2035 was adopted by SCAG in 2012 and these CEQA streamlining provisions. These provisions are outlined in Sections 21155–21159 of the CEQA statute and allow for the following types of streamlining: (1) CEQA Exemption for transit priority projects (21155.1); (2) Sustainable Communities Environmental Assessment and Limited EIR for transit priority projects (21155.2); and (3) limited analysis for mixed-use residential projects.

It is recognized that the current scenarios evaluated in the framework plan do not include any transit priority project types that could benefit from these streamlining provisions, although future actual projects may. The increasingly stringent stormwater quality regulations that have been recently enacted by the RWQCB place substantial additional burden on individual development and transportation projects that are specifically designed to reduce GHG emissions. As noted in this narrative, in many cases it is unlikely that new development and redevelopment will be able, physically or economically, to comply with these stormwater requirements on-site; an off-site or regional/cooperative approach will be particularly important and warranted to assist projects that meet the above GHG reduction requirements. Therefore, integration of land use, transportation and regional water quality improvement projects, though development of an integrated master plan, regional solution or impact/user fee program would most likely qualify for the above described CEQA streamlining.

All future projects that meet these requirements could be exempted from further CEQA review or have their CEQA documents tier off the RTP/SCS CEQA document and focus the analysis onto just those areas of importance to the proposed project. Future stormwater quality projects determined to be in compliance with the streamlined CEQA document would be subjected to no or minimal additional CEQA documentation.

A full CEQA exemption is provided for a special class of Transit Priority Project (TPP) determined to be a Sustainable Communities Project (SCP) by the local jurisdiction (Section 21155.1 (a)). As a threshold matter, to qualify as a TPP, a project must be consistent with the general use designation, density, building intensity and applicable policies in an approved SCS or APS. The TPP must also:

- Be at least 50% residential use based on area;
- Be at least 20 units/acre; and
- Be within ½ mile of a major transit stop or high-quality transit corridor included in the RTP (a high-quality transit corridor is defined as one with 15-minute frequencies during peak commute hours)

A Sustainable Communities Project (SCP) is a TPP that is consistent with the SCS or APS and meets additional criteria including numerous land use and environmental standards, such as being 15 percent more efficient than Title 24 standards and using 25 percent less water than the regional average household. In addition, the site cannot be more than 8 acres or contain more than 200 units. The proposed project must be located within one-half mile of rail transit station or ferry terminal included in RTP or one-fourth mile from a high-quality transit corridor. Lastly, the project must meet additional requirements for the provision of affordable housing and open space. After a public hearing where a legislative body finds that a TPP meets all the requirements, a project can be declared to be an SCP and be exempted from CEQA.

Sustainable Communities Environmental Assessment (SCEA) Limited EIR CEQA relief is provided for TPPs that incorporate all feasible mitigation measures, performance standards, or criteria set forth in the prior applicable EIRs and adopted in findings as described in Sections 21155.2 (a), (b), and (c). This type of streamlining applies to initial studies that meet the following criteria:

- Avoids or mitigates impacts to a level of less than significant
- Incorporates all feasible mitigation measures, performance standards, or criteria set forth in applicable EIRs
- Identifies all significant/potentially significant impacts and identifies adequately addressed cumulative effects in prior applicable certified EIRs

An SCEA is not required to reference, describe or discuss growth-inducing impacts, project-specific impacts and cumulative impacts from cars and light-duty truck trips generated by the project. If a lead agency determines that a cumulative effect has been adequately addressed and mitigated, that cumulative effect shall not be treated as cumulatively considerable, and the SCEA will be reviewed under the substantial evidence standard. The lead agency is required to circulate the document for a 30-day comment period, consider all comments received, conduct a public hearing, and make findings that

The project has fully mitigated impacts. If a TPP requires an EIR, certain CEQA relief also applies for projects that incorporate all feasible mitigation measures, identify all significant and potentially significant impacts, and identify adequately addressed cumulative effects in prior applicable certified EIRs. The streamlined EIR is not required to analyze off-site alternatives to the TPP or discuss a reduced residential density alternative to address the effects of car and light-duty truck trips generated by the project. Furthermore, the EIR is not required to include an analysis of growth inducing impacts or any project specific or cumulative impacts from cars and light-duty truck trips generated by the project on climate change or the regional transportation network. The initial study must identify any cumulative effects that have been adequately addressed and mitigated in prior applicable certified EIRs and these cumulative effects are not to be treated as cumulatively considerable in the EIR. As with the SCEA, the Streamlined EIR will be reviewed under the substantial evidence standard. The certification process is consistent with CEQA Guidelines Section 15090.

Limited Analysis for Residential Mixed-Use Projects

SB 375 also provides for general CEQA streamlining for residential and mixed-use residential projects as well as TPPs pursuant to Section 21159.28 of the Public Resources Code. Projects that meet the following requirements can be eligible for streamlined CEQA review:

- A residential or mixed-use residential project (or a TPP) consistent with the designation, density, building intensity, and applicable policies specified for the project area in an accepted SCS or APS (a residential or mixed-use residential project where at least 75 percent of the total building square footage consists of residential use or a project that is a transit priority project)
- A residential or mixed-use project that incorporates the mitigation measures required by an applicable prior environmental document; if a project meets these requirements, any exemptions, negative declarations, mitigated negative declarations, SCEA, EIR, or addenda prepared for the project shall not be required to reference, describe, or discuss growth-inducing impacts
- Any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on climate change or the regional transportation network; and a reduced density alternative (EIRs only)

Pursuant to Section 21155.3, a legislative body or a local jurisdiction may adopt traffic mitigation measures that would apply only to TPPs that may include requirements for the installation of traffic control improvements, street or road improvements, and contributions to road improvement or transit funds, transit passes for future residents, or other measures that will avoid or mitigate traffic impacts of TPPs. A TPP does not need to comply with any additional mitigation measures for the traffic impacts of that project on streets, highways, intersections, or mass transit if the local jurisdiction has adopted these traffic mitigation measures. The traffic mitigation measures must be updated at least every 5 years.

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section 8

Conclusions, Outreach & Steps Forward

In establishing an Alternative Compliance option in the MS4 permit, it is clear that the Regional Water Quality Control Board anticipated that more stringent on-site control standards could affect development potential, if an off-site option was not made available. In addition, the Board recognized that certain types of Alternative Compliance projects could provide multiple benefits to a community that would not necessarily be achieved through on-site projects. This analysis has made clear that development potential is likely to be affected by the new regulations if Alternative Compliance is not put in place, both by the amount of land area that could be occupied by lower-cost stormwater BMPs, and by the cost impact on overall development financing when higher-cost BMPs must be used to meet required stormwater retention volumes on site through infiltration or biofiltration type BMP's. Options for retention and beneficial use of captured stormwater is also an available option, but one that has not been readily used due to higher costs for this option. On-site geotechnical characteristics may also limit the options for on-site stormwater management where soils are characterized by low infiltration rates. Unless a municipality is willing to establish an active system for Alternative Compliance with available capacity, then development projects with smaller sites, more dense development footprints, or higher overall development costs per square foot are likely to face substantial financial challenges.

At the same time, municipalities can look at an Alternative Compliance Program as an opportunity to provide cost-effective stormwater mitigation options for public agency projects, including not only projects being constructed by the municipality itself (such as parks, libraries, fire stations, etc.) , but also for projects being constructed by other agencies such as school districts, state and regional transportation agencies, and the like. Just as importantly, the municipality can look at an Alternative Compliance Program as an opportunity to obtain funding for desirable public projects such as ecological restoration projects, parks, community gardens, and other "green infrastructure" projects that can be designed to provide multiple benefits to the community.

In addition, from a comprehensive planning standpoint, an "Alternative Compliance" approach to stormwater mitigation projects can also be complementary to other regional and community planning goals. For example, in the Temecula example discussed previously, if the regional transit planning agency ultimately decides to build a regional transit center within or near the Jefferson Avenue Specific Plan area, the use of off-site stormwater mitigation projects can make it more feasible for the City to accommodate the kinds of land uses and densities that would lead to greater use of public transit by residents, visitors and employees, thus facilitating the creation of a "Transit-Oriented Development" (TOD) District in this location. In turn, the City would be able to offer "CEQA Streamlining" opportunities for new projects in this District, thus further improving the financial feasibility of constructing these projects.

Finding the "Pinch Points" for Stormwater and Development Finance

One of the most challenging questions in discussions of Alternative Compliance is whether there is some discernible point, be it a volume requirement or cost per residential unit, at which stormwater requirements seriously affect the viability of a development project. Introducing the language and practice of site development and real estate financial analysis into stormwater engineering has illustrated some of the potential situations where the MS4 permit's on-site requirements are likely to become challenging. The analysis provided the following key findings:

- Stormwater cost burdens may affect project viability, making the availability and pricing of Alternative Compliance important to community development goals. The preliminary financial models prepared in this report illustrate the potential cost burdens on a wide range of development projects in western Riverside County, and have found that stormwater costs under the MS4 permit may affect project viability on constrained sites, and/or projects with higher per-unit costs. Evaluating stormwater cost on a per square foot or per residential unit basis appears, from this analysis, to be a less important metric for the impact of stormwater regulations than the cost of stormwater compliance as a percent of total development costs. Per unit costs varied widely, but were not necessarily correlated with those projects where the combination of site area constraints, and BMP costs associated with those constraints, pushed the stormwater costs above the identified threshold of 5% to 6% of total development costs.

- An Alternative Compliance option using lower-cost BMPs could provide cost advantages across nearly any development setting or type. In lower-density settings, and for development projects with larger areas of open space, on-site compliance with the MS4 permit appears to be readily achievable, physically and financially, using on-site infiltration measures. This changes in higher-density settings: An approach using on-site infiltration basins is not viable for the major mixed-use developments planned in Temecula due to the lack of available land area. Nonetheless, even for most of the lower-density Murrieta and Wildomar projects, the optimal solution financially still involves off-site treatment and Alternative Compliance (Scenario 3 – 30% off-site infiltration). Use of this option presupposes, of course, that an Alternative Compliance program has been adopted by the municipality, approved by the Regional Water Quality Control Board, and priced in a manner consistent with the assumptions in this report. The least feasible solution in this report is Alternative Compliance Option 4 (off-site biofiltration of 30%), simply due to the higher cost of biofiltration as a BMP. This argues for the development of less expensive, but presumably more land-consumptive, off-site infiltration or similar BMPs that can be used as Alternative Compliance "banks."

- Although biofiltration scenarios are more costly, they provide flexibility in that they do not require high infiltration rate for subsoils and often less area. However, the use of lower cost infiltration basin is dependent on finding sites with suitable geotechnical conditions. This scenario is only viable if off-site locations are available with subsoils that have infiltration rates that meet required drawdown rates.

- Development of alternative stormwater management options for Alternative Compliance is needed to provide the development community, municipalities and agencies greater flexibility in meeting these new stormwater requirements that can provide equivalent water quality benefit as well additional benefits. For this framework, retention and infiltration and retention/biofiltration type BMPs were used as these are accepted approaches to meeting the stormwater retention requirements and have developed water quality equivalency factors for use as off-site Alternative Compliance options that were developed by the San Diego Copermittees as part of the development of the Draft Water Quality Equivalency document. The San Diego Copermittees have also identified land purchases, flow through treatment BMPs, stream enhancement and beneficial use of stormwater as other options for which the development of water quality equivalency factors (the ratio used to determine the off-site "credits" needed to acquire for mitigating on-site stormwater volumes that are to be managed at an off-site Alternative Compliance facilities or program) is undergoing development. These additional Alternative Compliance options for which water quality equivalency can be established, can provide for greater flexibility in an Alternative Compliance program allowing for more cost effective options that can provide multi-benefits. As these options and associated water quality equivalency developed, further assessment of how these options can provide more cost effective approaches is needed. For example, the use of stream enhancement as a potential off-site Alternative Compliance option could provide for funding of these projects that provide water quality, habitat restoration, flood risk management and community benefits.

- Providing land area for stormwater treatment and Alternative Compliance could help make projects viable: Perhaps the most substantial way municipalities and regional agencies price an Alternative Compliance program effectively is by providing land area where stormwater can be treated, and pricing the resulting stormwater capacity in a way that works financially with the principles and assumptions outlined in this report. Municipalities either can construct Alternative Compliance BMPs on public land, and price “credits” in a manner that makes Alternative Compliance appealing for developers who need it; or, municipalities can allow the construction of BMPs that treat runoff from private development on public lands or rights-of-way. In either case, the municipality can use its position as the land owner to offset some portion of the cost of stormwater capacity. The important caveat to this is operation and maintenance: In addition to land value, some implied or

explicit private contribution to the cost of operation and maintenance over the life cycle of a stormwater BMP – or a strong agreement for the private entity and its successors to provide maintenance – must also be part of the cost equation.

- Incorporating Alternative Compliance into Reimbursement Agreements, DIFs and CFDs. The Alternative Compliance language in the MS4 permit does not specify the particular mechanism by which a local program would be implemented, leaving development of the ordinance, framework, or other provisions to each municipality to invent and propose. However, Alternative Compliance for stormwater is, essentially, identical in intent and effect to the many existing systems by which California municipalities have implemented fee-in-lieu or mitigation provisions. Fees to offset capacity impacts on traffic, school, park, water and sewer, and other comparable systems are assessed through many methods, including the use of Area Drainage Plans (ADPs) to mutually-agreed conditions in Development Agreements. The most likely funding mechanisms for capital facilities are Reimbursement Agreements, followed by Development Impact Fees, Community Facilities Districts, and/or I-Bank loans. For ongoing operations and maintenance, the most likely funding mechanisms are Landscaping/Maintenance Districts and Community Facilities Districts.

Adapting Municipal Planning & Policy to Support Alternative Compliance

Shifting municipal development planning from treating stormwater management as purely a project-by-project, largely developer-funded issue to one with active municipal engagement, more akin to roads, sidewalks, traffic controls, can be supported with the use of the framework outlined in this report. The findings in this study suggest a number of actions or practices that can help communities assess the extent of need, potential opportunities, and likely timing of an Alternative Compliance program. Potential steps forward are listed below for discussion purposes during the stakeholder engagement efforts under this project to be led by WRCOG.

- Ensuring water quality features are noted in existing conditions assessments: One important step is to begin to evaluate any and all unbuilt areas under public ownership and control as potential sites for Alternative Compliance BMPs. Any basic land use study or existing conditions assessment for a municipal or regional study should include (as available) identification and mapping of public rights-of-way, drainage easements, existing and planned parks or open space, and existing or planned public facilities that may have sufficient physical space to incorporate or “over-size” stormwater BMPs. The potential linear trail project in Murrieta and Wildomar is a good example of such an area.
- Record keeping of impervious surface and stormwater costs: As municipalities prepare to develop Alternative Compliance programs, it will be

very useful to track stormwater-related data on development projects in the same manner that communities currently track wastewater and water flows, project value for bond requirements, or numbers of new residential units constructed. The most important data to track both for public and private projects will be (1) the amount of new impervious surface created by sub-watershed, (2) the types and costs of stormwater BMPs constructed, and (3) the cost per square foot of impervious surface treated and cubic foot (CF) of runoff managed of the stormwater BMPs. For public projects, operation and maintenance costs should be tracked by BMP as well, providing locally-specific information. Beginning to assess this information now will provide a strong basis for establishing a "bank" of Alternative Compliance credits and for pricing those credits effectively. This information also can be used within the spreadsheet framework presented in this report to further refine projections for how much Alternative Compliance credit may be needed, based on local experience and BMP costs.

- Develop or revisit policies on treatment of privately-generated stormwater in the public right-of-way. As illustrated in this report, municipalities planning for high-density, urban-scale redevelopment are the most likely to come under pressure to develop Alternative Compliance programs and provide other opportunities for off-site treatment of required stormwater volumes. As municipalities consider how to initiate an Alternative Compliance program, policies or codes may need to be developed or amended regarding the treatment of privately-generated stormwater in the public right-of-way. Establishing an approval process and criteria for use of land within the public right-of-way is particularly important for projects that, like the ones in Temecula illustrated in this report, are planned to be high-density; management of some runoff volume within adjacent public rights-of-way or landscaped areas, and financing of operation and maintenance through a CFD, represents an intermediate option between costly, on-site underground treatment (which has its own potential disadvantages) and pressure on the municipality to find and develop large-scale off-site compliance.

- Review of zoning and public works specifications for impacts on impervious surface and promotion of LID BMP design. Finally, as noted in the parcel assessment, even minor additions to impervious cover on a site may have substantial impacts on the ability of an applicant to comply with the MS4 permit and make a project financially viable. While building excess impervious surface on a site both increases the volume of runoff that must be managed – and in turn the size of the BMP – this analysis showed consistently that the more significant impact for Western Riverside County is that excess impervious surfaces take up land area on a site that, in many cases, is needed to accommodate stormwater BMPs. On commercial and mixed-use sites evaluated in this report, a few thousand square feet of extra impervious surface led to "make or break" situations for siting stormwater BMPs, and in some cases could result in an applicant having to use much more expensive

biofiltration rather than infiltration basins. Thus, in addition to identifying and changing dimensional requirements such as parking space sizes, parking ratios, or driveway and drive aisle widths that can lead to extra impervious surface on a site, an active effort to ensure that local regulations and review processes promote the co-design of perimeter and parking lot landscape areas as bioretention facilities (as promoted in Section 3.5 of the Riverside County Low Impact Development BMP Design Handbook) could substantially improve the feasibility of development and redevelopment projects.

- Further identification and assessment of potential Alternative Compliance sites and options using the findings of this framework would provide municipalities and regional agencies like the RCFCWCD with a basis to evaluate the type, extent and viability of an Alternative Compliance program. This framework provides a preliminary assessment of off-site Alternative Compliance sites and options for three study areas within Western Riverside County. A broader assessment of off-site stormwater management sites and water quality equivalency options that may include flow-through treatment BMPs, stream enhancement, land purchase, riparian corridor protection, etc. would be useful in evaluating viable alternatives on a wider scale within the region and likely provide greater flexibility and cost effectiveness in a regional program depending on the direction the local cities and regional agencies want to move toward. Efforts in this direction by the San Diego Copermittees can be used in developing a site assessment effort for Alternative Compliance. Collaboration with the San Diego Copermitees as occurred during this project (the Project Team participated in the Technical Advisory Committee for the Water Quality Equivalency) provides for more effective use of resources and lessons learned that can then be applied to the conditions and development in western Riverside County.

appendix a

Steps 2-4 Report Tables

Murrieta																																	
									(B*43,560)			{E - F - (1100 SF driveway - 625 SF patio/other impervious)}	(A * E)	2 per unit residential; 1/250 SF commercial; 1/400 SF other	(1100 SF * A) for SFR; all other uses, (I * 350 SF)	(J * 20%)		(D * L)	(A * F) residential; F non-residential	(A * G) SFR; {(A*G)+K} multi-family; {(D*10%)+K} non-residential		(J + M)	(N + P)	(D - O - Q)	Lesser of R>(.2*D) or (.2*D)									
parcel #	Map #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Development Cost per SF (excluding land)	Parcel (Acres)	Density (Units/Ac or FAR)	Parcel SF (Total)	Residential Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Landscaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot landscaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total parking lot landscape (SF)	Total SF Parking/ Driveway + Road/Service	TOTAL IMPERVIOUS AREA	Total Remaining Landscaped/ Open Area	Area Available for Stormwater Management (capped at 20% of total site area)	Volume to be Treated (CF)	Basis for Volume Calculation	Can volume be retained on site through infiltration?	Can volume be drawn down in 72 hours?	If yes, required footprint (SF)	Biofiltration Footprint (SF)	HMP Bioretention Footprint (SF)	Can voume be retained on site through bio-filtration?	30% Off-Site Volume
1		Residential	Residential	268	Multi-Family	$225	17.9	14.97	779,724	n/a	750	250	n/a	469	164,150	32,830	15%	116,959	160,800	67,000	32,830	281,109	441,909	270,815	155,945	41,122	HMP	Yes	NO		14,535	49,347	Yes	10,530
2		Park	Open Space	n/a	n/a	$0	6.1	n/a	265,716	n/a	1,500	n/a	n/a	150	52,500	10,500	5%	13,286	1,500	13,286	10,500	65,786	67,286	185,144	53,143	6,297	85th %	Yes	Yes	29,519	2,229	7,399	Yes	1,889
3		Residential	Residential	138	Multi-Family	$225	9.2	15.00	400,752	n/a	750	250	n/a	242	84,700	16,940	15%	60,113	82,800	34,500	16,905	144,638	227,438	138,814	80,150	21,165	HMP	Yes	NO		7,476	25,398	Yes	5,417
4		Driving Range	Open Space	n/a	n/a	$0	14.6	n/a	635,976	n/a	500	n/a	n/a	50	17,500	3,500	1%	6,360	500	19,079	3,500	23,860	24,360	592,537	127,195	9,381	85th %	Yes	Yes	43,975	3,317	2,889	Yes	2,814
5		Residential	Residential	130	Multi-Family	$225	8.7	14.94	378,972	n/a	750	250	n/a	228	79,800	15,960	15%	56,846	78,000	32,500	15,925	136,471	214,471	132,001	75,794	19,958	HMP	Yes	NO		7,045	23,949	Yes	5,112
6		Commercial	Commercial	35,300	n/a	$250	2.7	0.30	117,612	n/a	35,300	n/a	n/a	141	49,350	9,870	5%	5,881	35,300	21,645	9,884	55,301	90,601	5,366	5,366	8,503	HMP	Yes	NO	n/a	3,005	10,204	Yes	1,689
7		Commercial	Commercial	22,300	n/a	$250	1.6	0.32	69,696	n/a	22,300	n/a	n/a	89	31,150	6,230	5%	3,485	22,300	13,214	6,244	34,705	57,005	0	0	5,347	HMP	NO	NO	n/a	n/a	n/a	NO	1,049
8		Residential	Residential	8	Single-Family	$150	4.6	1.74	200,376	15,000	2,000	11,275	69,000	n/a	8,800	n/a	15%	30,056	16,000	90,200	n/a	38,856	54,856	55,320	40,075	5,855	HMP	Yes	Yes	27,447	2,064	7,026	Yes	1,367

Murrieta																							
				Option 1: 100% On-site/ Infiltration					Option 2: 100% On-site/ Biofiltration					Option 3: 30% Off-Site Infiltraiton					Option 4: 30% Off-Site Biofiltration				
parcel #	Map #	Applicant	Land Use	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost
1		Residential	Residential	n/a					$1,188,000	$2	$5	$4,433	2%	$780,000	$1	$3	$2,910	1%	$1,349,000	$2	$6	$5,034	2%
2		Park	Open Space	$189,000	$1	n/a	n/a	n/a	$264,000	$1	n/a	n/a	n/a	$189,000	$1	n/a	n/a	n/a	$264,000	$1	n/a	n/a	n/a
3		Residential	Residential	n/a					$611,000	$2	$5	$4,428	2%	$402,000	$1	$3	$2,913	1%	$694,000	$2	$6	$5,029	2%
4		Driving Range	Open Space	$282,000	$0	n/a	n/a	n/a	$393,000	$1	n/a	n/a	n/a	$282,000	$0	n/a	n/a	n/a	$393,000	$1	n/a	n/a	n/a
5		Residential	Residential	n/a					$577,000	$2	$5	$4,438	2%	$379,000	$1	$3	$2,915	1%	$655,000	$2	$6	$5,038	2%
6		Commercial	Commercial	n/a					$356,000	$3	$10	n/a	4%	$255,000	$2	$7	n/a	3%	$357,000	$3	$10	n/a	4%
7		Commercial	Commercial	n/a					n/a					$161,000	$2	$7	n/a	3%	$224,000	$3	$10	n/a	4%
8		Residential	Residential	$83,000	$0	$3	$10,375	2%	$169,000	$1	$7	$21,125	4%	$111,000	$1	$4	$13,875	3%	$192,000	$1	$8	$24,000	5%

Temecula																																		
									(B*43,560)			{E - F - (1100 SF driveway - 625 SF patio/other impervious)}	(A * E)	2 per unit residential; 1/250 SF commercial; 1/400 SF other	(1100 SF * A) for SFR; all other uses, (I * 350 SF)	(J * 20%)		(D * L)	(A * F) residential; F non-residential	(A * G) SFR; {(A*G)+K} multi-family; {(D*10%)+K} non-residential		(J + M)	(N + P)	(D - O - Q)	Lesser of R>(.2*D) or (.2*D)									
parcel #	Map #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Development Cost per SF (excluding land)	Parcel (Acres)	Density (Units/ Ac or FAR)	Parcel SF (Total)	Residential Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Landscaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot landscaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total parking lot landscape (SF)	Total SF Parking/ Driveway + Road/Service	TOTAL IMPERVIOUS AREA	Total Remaining Landscaped/ Open Area	Area Available for Stormwater Management (capped at 20% of total site area)	Volume to be Treated (CF)	Basis for Volume Calculation	Can volume be retained on site through infiltration?	Can volume be drawn down in 72 hours?	If yes, required footprint (SF)	Biofiltration Footprint (SF)	HMP Bioretention Footprint (SF)	Can voume be retained on site through bio-filtration?	30% Off-Site Volume
n/a	1	Uptown Center District	Residential	125	Multi-Family	$300	2.8	45	121,968	n/a	62,500	250	n/a	44	15,313	3,063	5%	6,050	62,500	15,163	3,063	21,363	83,863	22,943	22,943		85th %				2,336			
	1	Uptown Center District	Office/Retail	100,700	Office/Retail	$300	4.6	0.5	200,376	n/a	120,840	n/a	n/a	81	28,196	5,639	5%	10,070	120,840	25,779	5,639	38,266	159,106	15,491	15,491		85th %				4,272			
	1	Uptown Center District	Circulation		(allowance)		5.7		248,292	n/a			n/a																					
		TOTAL Uptown Center District					**13.1**		**570,636**		**183,340**									**40,942**	**8,702**	**59,629**	**242,969**	**38,434**	**38,434**	**18,346**		**Yes**	**NO**	**n/a**	**6,608**	**n/a**	**Yes**	**5,504**
	2	Creekside Village District	Residential	587	Multi-Family	$300	13.0	45	568,216	n/a	293,500	250	n/a	411	143,815	28,763	5%	28,411	293,500	85,585	28,763	172,226	465,726	14,970	0		85th %				12101			
	2	Creekside Village District	Retail	126,000	Retail	$300	8.3	0.35	360,000	n/a	63,000	n/a	n/a	473	165,375	33,075	5%	18,000	63,000	69,075	33,075	183,375	246,375	46,098	46,098		85th %				6254			
	2	Creekside Village District	Circulation		(allowance)		6.8		295,619	n/a			n/a																					
		TOTAL Creekside Village District					**28**		**1,223,835**		**356,500**				**309,190**	**61,838**		**46,411**	**356,500**	**154,660**	**61,838**	**355,601**	**712,101**	**61,068**	**46,098**	**50,950**		**Yes**	**NO**	**n/a**	**18,355**	**n/a**	**Yes**	**15,285**
	3	Uptown/Hotel District	Residential	360	Multi-Family	$300	8.0	45	348,480	n/a	180,000	250	n/a	252	88,200	17,640	5%	17,424	180,000	52,488	17,640	105,624	285,624	10,368	0		85th %				7431			
	3	Uptown/Hotel District	Office/Retail	96,000	Office/Retail	$300	5.5	0.4	239,580	n/a	120,000	n/a	n/a	230	80,640	16,128	5%	12,000	120,000	40,128	16,128	92,640	212,640	0	0		85th %				5430			
	3	Uptown/Hotel District	Circulation		(allowance)		5.3		230,868	n/a			n/a																					
		TOTAL Uptown/Hotel District							**818,928**		**300,000**									**92,616**	**33,768**	**198,264**	**498,264**	**10,368**	**0**	**35,692**		**NO**	**NO**	**n/a**	**n/a**	**n/a**	**No**	**10,708**

Temecula																						
				Option 1: 100% On-site/ Infiltration					Option 2: On-Site Biofiltration					Option 3: 30% Off-Site Infiltraiton					Option 4: 30% Off-Site Biofiltration				
parcel #	Map #	Applicant	Land Use	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost
n/a	1	Uptown Center District	Residential																			
	1	Uptown Center District	Office/Retail																			
	1	Uptown Center District	Circulation																			
		TOTAL Uptown Center District		**n/a**					**$530,000**	**$2**	**$2**	**$4,240**	**1%**	**$551,000**	**$2**	**$3**	**$4,408**	**1%**	**$602,000**	**$2**	**$3**	**$4,816**	**1%**
	2	Creekside Village District	Residential																			
	2	Creekside Village District	Retail																			
	2	Creekside Village District	Circulation																			
		TOTAL Creekside Village District		**n/a**					**$739,000**	**$1**	**$1**	**$1,259**	**0%**	**$1,531,000**	**$2**	**$2**	**$2,608**	**0**	**$1,158,000**	**$1**	**$2**	**$1,973**	**1%**
	3	Uptown/Hotel District	Residential																			
	3	Uptown/Hotel District	Office/Retail																			
	3	Uptown/Hotel District	Circulation																			
		TOTAL Uptown/Hotel District		**n/a**					**n/a**					**$1,072,000**	**$2**	**$3**	**$2,978**	**1%**	**$1,496,000**	**$3**	**$4**	**$4,156**	**1%**

	Wildomar																															
									(B*43,560)			{E - F - (1100 SF driveway - 625 SF patio/other impervious)}	(A * E)	2 per unit residential; 1/250 SF commercial; 1/400 SF other	(1100 SF * A) for SFR; all other uses, (I * 350 SF)	(J * 20%)		(D * L)	(A * F) residential; F non-residential	(A * G) SFR; {(A*G)+K) multi-family; {(D*10%)+K} non-residential	(J + M)	(N + P)	(D - O - Q)	Lesser of R>(.2*D) or (.2*D)									
parcel #	Map #	Applicant	Land Use	Units or SF	Residential Unit Type	Estimated Development Cost per SF (excluding land)	Parcel (Acres)	Density (Units/Ac or FAR)	Parcel SF (Total)	Residential Lot Size (SFR Only)	Building Footprint (Per unit for SFR)	Ornamental Landscaping (per residential lot or unit)	SF within residential lot boundaries (SFR only)	# surface parking spaces	Total SF of surface area of driveway (SFR only) or parking lot	Parking lot landscaping (SF)	Road/ service areas as % of site in addition to parking	Road/ service areas (SF)	Total building footprint (SF)	Total ornamental landscape (SF)	Total SF Parking/ Driveway + Road/Service	TOTAL IMPERVIOUS AREA	Total Remaining Landscaped/ Open Area	Area Available for Stormwater Management (capped at 20% of total site area)	Volume to be Treated (CF)	Basis for Volume Calculation	Can volume be retained on site through infiltration?	Can volume be drawn down in 72 hours?	If yes, required footprint (SF)	Biofiltration Footprint (SF)	HMP Bioretention Footprint (SF)	Can voume be retained on site through bio-filtration?	30% Off-Site Volume
1	1	Lennar Residential	Residential	67	Single-Family	$150	26.8	2.50	1,167,408	10,000	1,650	6,625	670,000	n/a	73,700	n/a	15%	175,111	110,550	443,875	248,811	359,361	364,172	233,482	28,599	HMP	Yes	Yes	153,208	10,366	34,319	Yes	
3	2	CV Communities	Residential	102	Single-Family	$150	42.0	2.43	1,829,520	12,500	2,000	8,775	1,275,000	n/a	112,200	n/a	15%	274,428	204,000	895,050	386,628	590,628	343,842	343,842	62,346	HMP	Yes	Yes	333,994	23,337	74,815	Yes	
4	3	Lennar Homes North Ranch	Residential	84	Single-Family	$150	27.2	3.09	1,184,832	10,000	1,650	6,625	840,000	n/a	92,400	n/a	15%	177,725	138,600	556,500	270,125	408,725	219,607	219,607	42,568	HMP	Yes	NO		15,947	51,081	Yes	
9	4	McVicar	Residential	49	Single-Family	$150	12.9	3.80	561,924	8,000	1,250	5,025	392,000	n/a	53,900	n/a	15%	84,289	61,250	246,225	138,189	199,439	116,260	112,385	20,539	HMP	Yes	Yes	110,030	7,685	24,647	Yes	
15	5	Grove Park	Residential	162	Multi-Family		10.3	15.73	448,668	n/a	750	250	n/a	324	113,400	22,680	20%	89,734	121,500	63,180	203,134	324,634	60,854	60,854									
15	5	Strata/Clinton Keith	Commercial	40,000	n/a		10.3	0.09	448,668	n/a	40,000	n/a	n/a	160	56,000	11,200	5%	22,433	40,000	56,067	78,433	118,433	274,168	89,734									
		TOTAL Grove Park Mixed Use Project				*$225*														*119,247*	*281,567*			*150,588*	*32,817*	*HMP*	*Yes*	*Yes*	*175,803*	*12,840*	*39,380*	*Yes*	
17	6	Horizons/Strata	Residential	140	Townhomes		13.2	10.61	574,992	n/a	1,200	400	n/a	280	98,000	19,600	20%	114,998	168,000	75,600	212,998	380,998	118,394	114,998									
17	6	Horizons/Strata	Assisted Living	86	Assisted Living		6.8	12.65	296,208	n/a	800	n/a	n/a	145	50,575	10,115	20%	59,242	68,800	39,736	109,817	178,617	77,856	59,242									
		TOTAL Horizons/Strata				*$225*														*115,336*	*322,815*			*174,240*	*40,345*	*HMP*	*Yes*	*NO*		*15,878*	*48,413*	*Yes*	
32	8	Beazer Homes	Residential	108	Single-Family	$150	35.2	3.07	1,533,312	10,000	2,000	6,275	1,080,000	n/a	118,800	n/a	15%	229,997	216,000	677,700	348,797	564,797	290,815	290,815	52,714	HMP	Yes	Yes	282,396	19,583	63,257	Yes	
?	9	Clinton Keith condominium	Residential	101	Multi-Family	$225	12.9	7.84	561,488	n/a	750	250	n/a	202	70,700	14,140	20%	112,298	75,750	39,390	182,998	258,748	263,351	112,298	17,537	HMP	Yes	Yes	93,950	6,400	21,045	Yes	
5	10	Rancon Medical/Retail	Office/ Commercial	96,240	n/a		7.2	0.31	315,107	n/a	64,160	n/a	n/a	385	134,736	26,947	5%	15,755	64,160	58,458	150,491	214,651	41,998	41,998									
5	10	Rancon business park	Industrial	294,900	n/a		22.2	0.31	965,557	n/a	294,900	n/a	n/a	737	258,038	51,608	20%	193,111	294,900	148,163	451,149	746,049	71,345	71,345									
		TOTAL Rancon				*$300*														*206,621*	*601,640*			*113,343*	*80,934*	*HMP*	*Yes*	*NO*		*30,914*	*97,120*	*Yes*	
13	11	Westpark Promenade	Commercial	86,000	n/a		6.6	0.30	286,667	n/a	57,333	n/a	n/a	344	120,400	24,080	5%	14,333	57,333	52,747	134,733	192,067	41,853	41,853	0		Yes	NO				Yes	
13	11	Westpark Promenade	Residential	322	Multi-Family		21.7	14.83	946,081	n/a	750	250	n/a	644	225,400	45,080	20%	189,216	241,500	125,580	414,616	656,116	164,385	164,385	0		NO	-	n/a	0		Yes	
		TOTAL Westpark Promenade				*$250*														*178,327*	*549,350*		*206,238*	*206,239*	*13,034*	*85th %*	*Yes*	*NO*		*16,927*	*34,319*	*Yes*	
n/a	12	Clinton Keith commercial (19-Acre Commercial)	Commercial	248,292	n/a	$225	19.0	0.30	827,640	n/a	248,292	n/a	n/a	993	347,609	69,522	5%	41,382	248,292	152,286	388,991	637,283	38,071	38,071	72,168	HMP	Yes	NO		25,749	34,319	Yes	
n/a	13	Business Park	Industrial	261,360	n/a	$150	20.0	0.30	871,200	n/a	261,360	n/a	n/a	653	228,690	45,738	20%	174,240	261,360	132,858	402,930	664,290	74,052	74,052	57,835	HMP	Yes	NO		21,754	69,402	Yes	
33	14	Sycamore Academy	Educational	28,000	n/a	$300	10.0	0.06	435,600	n/a	28,000	n/a	n/a	280	98,000	19,600	20%	87,120	28,000	63,160	185,120	213,120	159,320	87,120	12,823	85th %	Yes	Yes	68,697	4,680	13,554	Yes	
n/a	15	College and Joint Use Park	Mixed-use/ Open Space	210,000	n/a	$300	48.0	0.10	2,090,880	n/a	210,000	n/a	n/a	1,400	490,000	98,000	20%	418,176	210,000	307,088	908,176	1,118,176	665,616	418,176	86,988	HMP	Yes	NO		32,399	104,386	Yes	

SFR = Single Family Residential
SF = Square Feet
FAR = Floor Area Ratio
CF = Cubic Feet

Wildomar			Option 1: 100% On-site/ Infiltration					Option 2: On-Site Biofiltration					Option 3: 30% Off-Site Infiltration					Option 4: 30% Off-Site Biofiltration				
Map #	Applicant	Land Use	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost	BMP Cost Estimate	Cost/ SF Land	Cost/ SF Gross Building Area	Cost/ Res. Unit	Percent of Development Cost
1	Lennar Residential	Residential	$407,000	$0	$3	$6,075	2%	$826,000	$1	$5	$12,328	3%	$543,000	$0	$3	$8,104	2%	$938,000	$1	$6	$14,000	4%
2	CV Communities	Residential	$887,000	$0	$3	$8,696	2%	$1,801,000	$1	$6	$17,657	4%	$1,183,000	$1	$4	$11,598	3%	$2,045,000	$1	$7	$20,049	4%
3	Lennar Homes North Ranch	Residential	n/a					$1,230,000	$1	$6	$14,643	4%	$808,000	$1	$4	$9,619	3%	$1,396,000	$1	$7	$16,619	5%
4	McVicar	Residential	$292,000	$1	$3	$5,959	2%	$593,000	$1	$6	$12,102	4%	$390,000	$1	$4	$7,959	2%	$673,000	$1	$6	$13,735	4%
5	Grove Park	Residential																				
5	Strata/Clinton Keith	Commercial																				
	TOTAL Grove Park Mixed Use Project		*$467,000*	*$1*	*$2*	*$2,883*	*1%*	*$948,000*	*$2*	*$5*	*$5,852*	*2%*	*$623,000*	*$1*	*$3*	*$3,846*	*1%*	*$1,077,000*	*$2*	*$5*	*$6,648*	*2%*
6	Horizons/Strata	Residential																				
6	Horizons/Strata	Assisted Living																				
	TOTAL Horizons/Strata		*n/a*					*$1,165,000*	*$1*	*$4*	*$5,155*	*2%*	*$766,000*	*$1*	*$2*	*$3,389*	*1%*	*$1,323,000*	*$2*	*$4*	*$5,854*	*2%*
8	Beazer Homes	Residential	$750,000					$1,523,000	$1	$5	$14,102	3%	$1,000,000	$1	$3	$9,259	2%	$1,729,000	$1	$6	$16,009	4%
9	Clinton Keith condominium	Residential	$249,000	$0	$2	$2,465	1%	$507,000	$1	$5	$5,020	2%	$333,000	$1	$3	$3,297	1%	$576,000	$1	$6	$5,703	3%
10	Rancon Medical/Retail	Office/ Commercial																				
10	Rancon business park	Industrial																				
	TOTAL Rancon		*n/a*					*$3,393,000*	*$3*	*$9*	*n/a*	*3%*	*$2,431,000*	*$2*	*$6*	*n/a*	*2%*	*$3,393,000*	*$3*	*$9*	*n/a*	*3%*
11	Westpark Promenade	Commercial																				
11	Westpark Promenade	Residential																				
	TOTAL Westpark Promenade		*n/a*					*$1,990,000*	*$2*	*$5*	*$6,180*	*2%*	*$1,426,000*	*$1*	*$3*	*$4,429*	*1%*	*$1,990,000*	*$2*	*$5*	*$6,180*	*2%*
12	Clinton Keith commercial (19-Acre Commercial)	Commercial	$2,168,000					$3,025,000	$4	$12	n/a	5%	$2,168,000	$3	$9	n/a	4%	$3,026,000	$4	$12	n/a	5%
13	Business Park	Industrial	n/a					$2,424,000	$3	$9	n/a	6%	$1,737,000	$2	$7	n/a	4%	$2,424,000	$3	$9	n/a	6%
14	Sycamore Academy	Educational	$385,000	$1	$14	n/a	5%	$538,000	$1	$19	n/a	6%	$386,000	$1	$14	n/a	5%	$537,000	$1	$19	n/a	6%
15	College and Joint Use Park	Mixed-use/ Open Space	$249,000	$0	$1	n/a	0%	$507,000	$0	$2	n/a	1%	$2,613,000	$1	$12	n/a	4%	$3,646,000	$2	$17	n/a	6%

SFR = Single Family Residential
SF = Square Feet
FAR = Floor Area Ratio
CF = Cubic Feet

appendix b

BMP Costing Summary

Appendix B. Cost Basis

Category	Capital & 20 yr O&M on Impervious Site Area (sq. ft.) Basis - **Comercial Site (2)**	Capital & 20 yr O&M on Impervious Area (sq. ft.) Basis - **Single Family Residential Site (2)**	Capital & 20 yr O&M on Impervious Area (sq. ft.) Basis - **Urban Mixed Use - Comercial/ Residential Site (2)**	Capital & 20 yr O&M on Impervious Area (sq. ft.) Basis - **Comercial/ Retail (Big Box) Site (2)**	Capital & 20 yr O&M on Design Capture Volume(gallon) Basis - **Comercial Site (2)**	Capital & 20 yr O&M on Design Capture Volume(gallon) Basis - **Single Family Residential Site (2)**	Capital & 20 yr O&M on Design Capture Volume(gallon) Basis - **Urban Mixed Use - Comercial/ Residential Site (2)**	Capital & 20 yr O&M on Design Capture Volume (gallon) Basis - **Comercial/ Retail (Big Box) Site (2)**	Capital & O&M (5% of Construct) on BMP Area (sq. ft.) Basis - **Comercial Site (2)**	Capital & 20 yr O&M (5% of Construct) on BMP Area (sq. ft.) Basis - **Single Family Residential Site (2)**	Capital & 20 yr O&M (5% of Construct) on BMP Area (sq. ft.) Basis - **Urban Mixed Use - Comercial/ Residential Site (2)**	Capital & 20 yr O&M (5% of Construct) on BMP Area (sq. ft.) Basis - **Comercial/ Retail (Big Box) Site (2)**
Infiltration - Trench		$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	0	0	0
Infiltration - Basin	$ 1.95	$ 1.05	$ -	$ 0.66	$ 4.02	$ 1.90	$ -	$ 1.48	66.15	19.95	0	22.05
Infiltration - pavers	$ 2.82	$ 1.90	$ 8.97	$ 1.43	$ 5.81	$ 3.45	$ 17.94	$ 3.19	12.6	8.4	29.4	8.4
Biofiltration - Biofilter/ bioretention	$ 2.72	$ 2.13	$ 10.25	$ 0.87	$ 5.60	$ 3.86	$ 20.50	$ 1.94	91.35	30.45	105	37.8

(1) BMP Costs based on 13 published sources provided in Stormwater Magazine Article by M. Grey, D. Sorem, C. Alexander & R. Boon, "LID BMP Instalation and O&M Costs in Orange County, CA, February 13, 2013.
(2) BMP costs from case studies presented in article referenced under (1).

Total Impervious Area (Sq. Ft.)	39,204	217,800	5,600	486,130								
Total Design Capture Volume (Gallons)					19,000	120,000	2,800	218,175				
Factor Multiplied to Construction Costs for O&M					2,540	16,042	374	29,166	1.05			