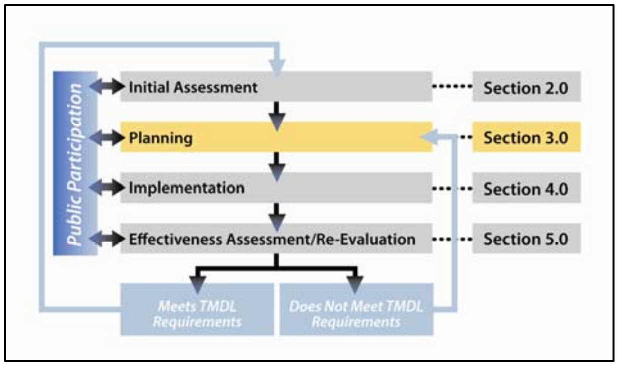
3.0 PLANNING



The Planning component of the Integrated TMDL Watershed Approach consists of identifying, prioritizing, and planning the implementation of watershed activities to meet the Dissolved Metals TMDL WLAs and to address bacteria, Diazinon, and trash. Individual Dischargers may identify and implement watershed activities that also address other priority water quality problems identified during the Initial Assessment and subsequent assessments. Dischargers used the tiered and phased strategies defined in the Integrated TMDL Watershed Approach to select activities for Phase I of this Implementation Plan (see Watershed Activity Lists in Appendix B). Dischargers may modify their Watershed Activity Lists based on the assessment findings of Phase I prior to planning subsequent implementation phases. Modifications will be made based on new water quality data or watershed activity information and the Dischargers' management goals.

In developing this Implementation Plan and long-term planning guidance, Dischargers incorporated public participation into the process. Stakeholders provided comments during the development of the Implementation Plan and participated in a watershed activity design workshop on March 30, 2009. For information regarding stakeholder involvement during the development of this Implementation Plan, see Section 3.4 and Appendix E.

3.1 Goal Setting

To create a starting point for their Planning efforts, Dischargers identified a target number of activities to implement, or "goal posts," for Phase I watershed activity planning and implementation (Tool B of Appendix D). As Dischargers began developing their Watershed Activity Lists, goals were established based on consideration of budgets along with other factors. The goals were used as a target in developing the proposed watershed activities for Phase I implementation.

3.2 Watershed Activity Implementation Opportunities and Constraints

Reduction of pollutant loads to receiving waters can be accomplished using three main methods developed in this Implementation Plan: Tier I non-structural BMPs, Tier II structural BMPs, and Tier III restoration and treatment BMPs. A complete list of the different types of BMPs proposed for each tier is presented in Tool C of Appendix D.

Each type of watershed activity achieves specific load reduction but is also subject to implementation constraints, as described in Section 3.2.1 through Section 3.2.3. In general, watershed activities have been grouped into tiers based on a general understanding of their relative cost-effectiveness, where Tier I activities were generally identified as being the most cost-effective, and Tier III activities were generally the least cost-effective.

A phased implementation of non-structural and structural BMPs in selected drainage areas in the Chollas Creek Watershed will allow the Dischargers to determine the actual effectiveness of the BMPs in reducing constituent concentrations in the Chollas Creek Watershed during early phases. This will also allow Dischargers to measure the design parameters required to implement more complex treatment systems. Effectiveness assessment activities during the early phases of the Implementation Plan will therefore accomplish two objectives: 1) assess the effectiveness of lower-impact BMPs (i.e., pollution prevention and source control Tier I BMPs and Tier II LID BMPs) in reducing pollutant loads and 2) assess the volume of storm water requiring development of more complex treatment. A detailed schematic of the BMP tiers and programmatic phases of the Integrated TMDL Watershed Approach is presented on Figure 3-1.

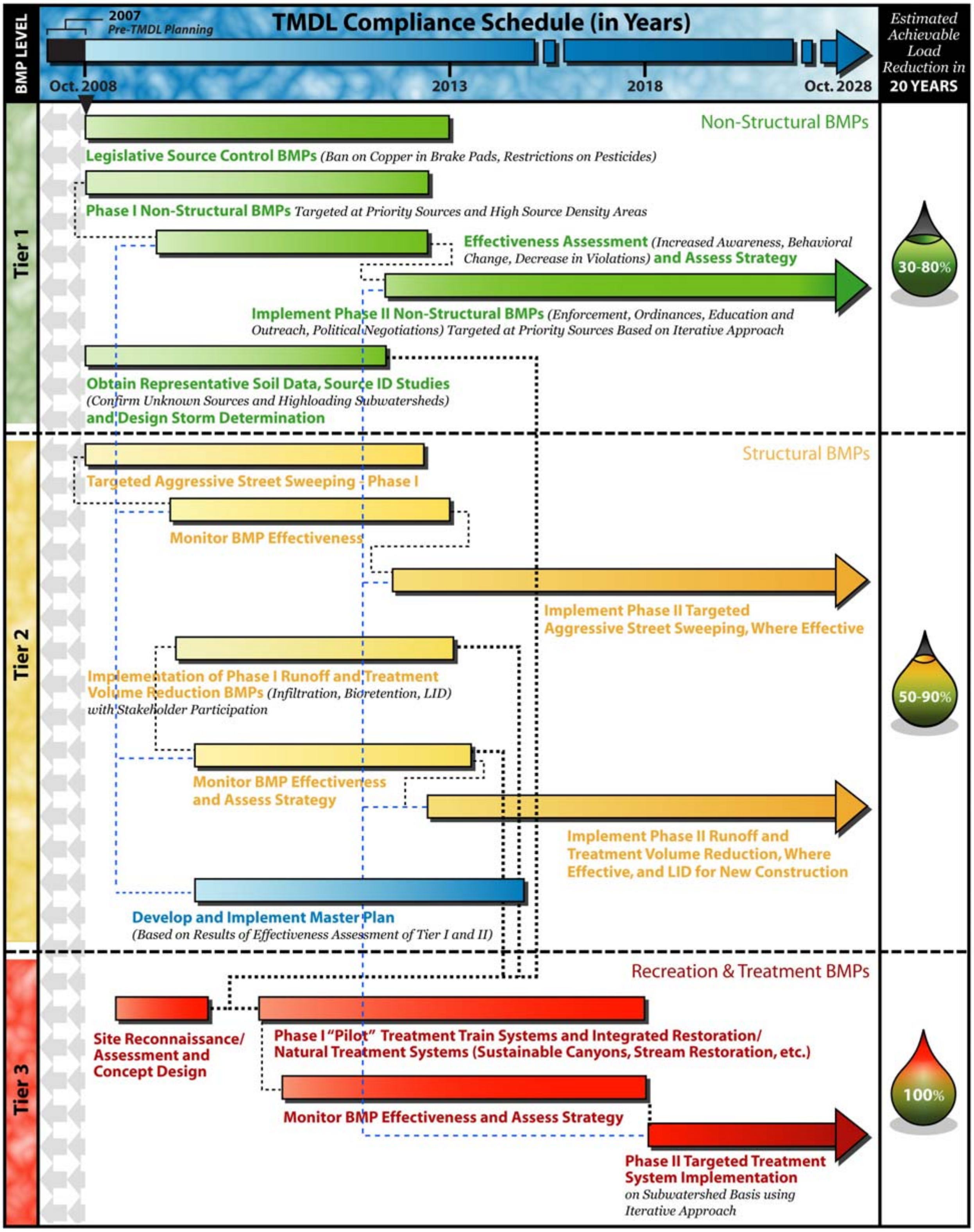


Figure 3-1. Integrated Total Maximum Daily Load Watershed Approach as Phases and Tiers of Best Management Practices

3.2.1 Tier I Best Management Practices Opportunities and Constraints

A non-structural BMP approach can include source control, runoff reduction, and pollution prevention measures that can be used to reduce pollutant sources and prevent pollutant pathways to receiving waters. Source control can be accomplished through watershed activities, such as legislative restrictions on the manufacture and use of potential pollutants. In addition, education of community stakeholders, taking into account the diverse languages and cultures that comprise the residents and businesses located in the Chollas Creek Watershed, may lead to source control by increasing awareness of the priority water quality problems and by promoting behavioral changes that may potentially lead to a reduction in pollution. Runoff reduction non-structural BMPs include activities (e.g., public education, economical incentives, and enforcement of responsible irrigation practices) that reduce the runoff volumes and peak flows for both dry weather and wet weather flows. Together, non-structural source control and runoff reduction are accomplished through public participation efforts (e.g., outreach, education, and enforcement programs) which aim to educate watershed stakeholders and users to practice techniques to prevent pollutants from entering the watershed. This approach has the added benefit of integrating water management strategies, such as watershed stewardship, water conservation, and water quality protections and improvement. This is also an opportunity for these TMDL compliance efforts to coordinate with other regional efforts, such as the education and outreach conducted by the San Diego Bay Watershed Urban Runoff Management Program (WURMP) Workgroup.

Tier I Source ID and special studies will help provide answers to the data gaps identified during the Initial Assessment and/or the watershed activity study questions during post-activity implementation effectiveness assessments. Dischargers may choose to pursue special studies based on the types of watershed activities to be implemented, prevailing water quality (or watershed activity design) circumstances, and budgetary constraints.

3.2.1.1 Watershed Stewardship and Community Based Social Marketing

To effectively achieve the goals of the Implementation Plan, ongoing public participation and education is critical. Failure to implement public outreach and promote watershed stewardship will prevent the success of source control BMPs and runoff reduction. Public participation and outreach must continue and expand during each year of implementation. Implementation of a Community Based Social Marketing (CBSM) strategy—a social science model used to engage the public and create positive behaviors that impact pollution prevention—is proposed based on lessons learned from previous efforts. CBSM is an attractive alternative to information-intensive campaigns. In contrast to conventional approaches, CBSM has been very effective in bringing about behavioral change due to its pragmatic approach. The approach used in the CBSM strategy is similar to the Integrated TMDL Watershed Approach. CBSM involves 1) identifying barriers to a sustainable behavior, 2) designing a strategy that uses behavior change tools, 3) piloting the strategy with a small segment of a community, and finally, 4) evaluating the impact of the program once it has been implemented across a community. Dischargers may choose to implement CBSM in the education and outreach efforts of their Watershed Activity Lists.

3.2.1.2 Effectiveness of Tier I Best Management Practices

The effectiveness of non-structural BMPs have been evaluated based on information presented in the United States Army Corps of Engineers (USACE)/USEPA BMP Database (USACE/USEPA, 2006), other technical publications, and best professional judgment. Published data indicate that the effectiveness of non-structural source control and runoff reduction measures can range widely from 30–70% pollutant reduction. The effectiveness of these non-structural BMPs will vary depending on the level of implementation and enforcement, watershed and regional hydrological characteristics, and constituent type. However, the effectiveness of non-structural BMPs in a particular watershed can not be accurately assessed without effectiveness data that compare drainage areas where these measures are fully implemented with a drainage area where little or no measures are established. Source control and pollution prevention measures can be more effective when targeting sources and activities with the greatest loading potential for the constituents of concern.

3.2.2 Tier II Best Management Practices Opportunities and Constraints

Tier II structural BMPs include source control and runoff reduction strategies that require infrastructure for implementation. Examples of Tier II BMPs include street sweeping, LID features, infiltration basins, and other techniques (Figure 3-2). Published data indicate that the effectiveness of structural BMPs in reducing pollutants varies from 50–90%. The effectiveness of different structural BMPs also varies depending on the level of implementation and enforcement, watershed and regional hydrological characteristics, and constituent type. Effectiveness assessment of structural BMPs in the context of local conditions is imperative to evaluate individual project pollutant reduction efforts.

LID features include infiltration, filtration, and facilitation of evapotranspiration and water harvesting. Siting and implementation of LID features in the Chollas Creek Watershed will require a holistic evaluation of opportunities and constraints. Site evaluation factors may include opportunities to address multiple pollutants, to attend to deferred maintenance and aged infrastructure, to utilize and/or enhance existing open spaces (such as parks, cemeteries, etc.), to incorporate water reuse and restoration, to conduct education and outreach, and for project partnering. The implementation of infiltration LID features in the Chollas Creek Watershed may be constrained by slope erosion, potential impacts and interactions with the groundwater table, and the low permeability of existing soil conditions (Section 1.0). As a result of field percolation studies completed under the *Strategic Plan for Watershed Activity Implementation* (WESTON, 2007) for infiltration projects, the City of San Diego modified its traditional LID design used in the Chollas Creek Watershed to include filtration and evapotranspiration techniques to reduce pollutant load instead of solely relying on cases where infiltration is feasible. The modified design includes installing granular drainage layers and/or modified soils as part of LID features to provide the necessary storage and prevent hydraulic head buildup above low permeable soils. This constrains the treatment system and requires a greater volume of storage or lower treatment volume. These additional engineering components also increase the cost of implementation and may preclude their use for larger storm water volumes and flows. Filtration LID features may also need to be lined depending on site conditions. A synthetic liner (impermeable barrier) will only be used where needed. Where liners are not necessary, there may still be some incidental infiltration that helps reduce pollutants. Additionally, whether a filtration or infiltration LID feature is used, if vegetation is part of the design, evapotranspiration may also contribute to reducing pollutant loads. However, vegetated landscaping may not be feasible in all cases if the landscaping needs so much supplemental irrigation during dry weather that increased water demand negates water conservation efforts. The feasibility of water harvesting or reuse should be considered as part of the design of LID features to augment water conservation efforts in addition to reducing runoff. Using a combination of augmented infiltration (e.g., modified soils and/or additional sand layer), filtration, evapotranspiration, bioretention, porous pavement, water harvesting, and other LID techniques has not been precluded in the Chollas Creek Watershed, but will require site-specific investigation and design. These factors will be taken into account during the planning and design of these types of watershed activities.

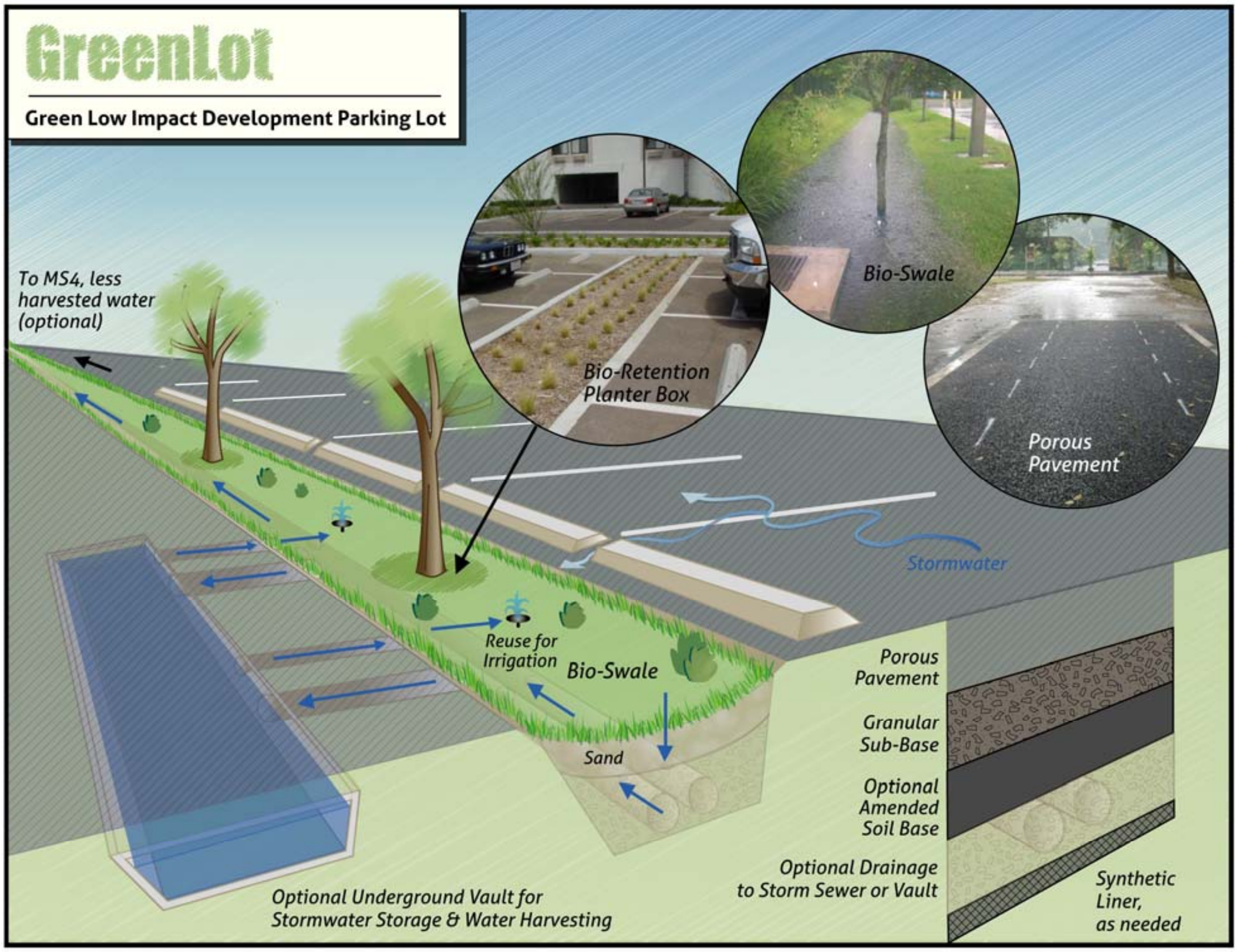


Figure 3-2. Example of Modified Low Impact Development Design – Green Lot Low Impact Development Parking Lot Schematic

3.2.3 Tier III Best Management Practices Opportunities and Constraints

A final method of pollutant load reduction can be accomplished through treatment BMP technologies that treat constituent concentrations. Published data indicate that pollutant reduction effectiveness of treatment BMPs can vary from 50–90% or more. The effectiveness of treatment BMPs have been evaluated based on information presented in the Treatment BMP Technology Report (Caltrans, 2006), USACE/USEPA BMP Database (USACE, 2006), and other technical publications. The structural BMP technologies feasibility assessment concluded that to meet dissolved/total metals, bacteria, and turbidity pollutant reduction goals, relatively complex treatment systems (treatment trains) were required to collect and treat the complete design storm events. The determination of the design storm is described in Section 3.2.4. These treatment train technologies often require relatively large areas and capital expenditure to design and install depending on the design storm volume required to meet pollutant reduction goals. The topography of the Chollas Creek Watershed, consisting of built-out urbanized mesas (Section 1.0), also poses a barrier to immediate implementation of treatment trains. Therefore, the concepts of tiered BMPs and programmatic phases that make up the Integrated TMDL Watershed Approach were developed. Implementing source control pollution prevention and runoff reduction BMPs during Phase I was anticipated to significantly reduce the need for more infrastructure-intensive treatment train BMPs.

3.2.4 Design Storm Determination

3.2.4.1 Background

As presented in Section 1 (Table 1-3), the compliance standard for the Chollas Creek Dissolved Metals TMDL is based on 90% of the dissolved metals numeric target per the California Toxics Rule. The California Toxics Rule allows for no more than one exceedance of the numeric targets every three years, and the compliance schedule requires 80% reduction in dissolved metals (i.e., copper, lead, and zinc) concentrations in ten years, with the remaining 20% reductions required by the end of the 20-year TMDL Compliance Schedule.

3.2.4.2 Basis for the Design Storm

Research conducted to evaluate TMDL programs where a design storm approach had been developed indicates no other TMDL efforts across the State of California have identified a similar or applicable design storm approach. As a result, the Dischargers based the development of the design storm on three areas of information:

1. *Scientific Data*: The data include the results of recent pollutograph sampling as part of the design storm development and historical data from the two mass loading stations sampled under the current Diazinon TMDL. The following findings to date support the design storm recommendations.
   - Pollutograph monitoring conducted in 2008–2009 in Chollas, Tecolote, and La Jolla watersheds indicates most of the dissolved and total metals loading occurs during the rise of the hydrograph.
   - Pollutograph and sediment grain size analysis indicates that the metals loading is predominately from clay and silt fractions that are not readily removed by standard treatment BMP approaches (e.g., detention basins and hydrodynamic separators).
   - Achieving dissolved metals water quality objectives (depending on load and hardness) will likely require infiltration, filtration, or sophisticated chemical treatment. Because of the potentially high costs and limited locations where these methods may be implemented, heavy emphasis will be placed on Tier I and Tier II pollution prevention and source control BMPs in the early compliance years.
   - A review of the historical water quality data collected from the two mass loading stations (SD8(1) and DPR2) indicate most of the storms[1] are less than 0.6 inches and dissolved copper concentrations have been reported to exceed the TMDL criteria at the highest frequency (i.e., seven times over seven years). In comparison, dissolved lead reported no exceedances, whereas dissolved zinc reported one exceedance in seven years. It is

[1] 364 of 7,476 storms (4.9%) recorded at Lindberg Field from 1905 to 1999 were greater than or equal to 0.60 inches of rain.

important to note that these exceedances were observed without the implementation of treatment methods by the Dischargers.

2. *Comparable Existing Treatment Requirements*: The Dischargers have two existing treatment standards. First, the Municipal Permit's Standard Urban Stormwater Mitigation Plan (SUSMP) 85th percentile volume-based treatment requirement provides a tried and accepted treatment standard that has been applied to new development and redevelopment projects in the region since 2002 (Section 4.3, Principle 8.1, County of San Diego, 2008). The SUSMP standard also has a flow-based requirement (Section 4.3, Principle 8.2, County of San Diego, 2008). For more information regarding the SUSMP standards see Table 3-2.

   Second, Caltrans has similar requirements for flow-based and volume-based treatment BMPs. For flow-based treatment BMPs (e.g., bioswales), Caltrans worked cooperatively with the State Water Resources Control Board and the nine Regional Water Quality Control Boards to establish rainfall intensities for the State of California. For Region 9 (San Diego), the intensity has been set to 0.2 inch/hr. For volume-based treatment BMPs (e.g., detention basins), Caltrans uses a method that is tied to the analysis of rainfall depths generated over 24-hour period or by drawdown time. In San Diego County, Caltrans uses a water quality depth (0.6 inches) set by the Regional Board. In other parts of California where the Regional Water Quality Control Boards don't have set criteria, Caltrans uses either the 85th percentile runoff capture ratio or local agency requirements.

3. *Implementation Constraints*: Information gained from the practical application of LID projects in San Diego County, such as the City of San Diego's LID retrofit projects, was considered in selecting the design storm. Based on three years of concept design efforts on multiple LID projects throughout the City of San Diego, most retrofit sites are constrained by existing infrastructure, available open space, and low-permeability soils in most of the mesas. These sites may have significant constraints that make treatment above a minimum first flush approach infeasible or cost prohibitive (i.e., it is more cost effective to achieve pollutant reductions through other methods or at other locations). At the same time, there may be limited opportunities for more aggressive infiltration, evapotranspiration, and/or filtration at larger park and other dual-use sites within the watershed that can off-set these design constraints. Therefore, the design storm should allow for a sliding-scale approach to address varying site conditions, while still working towards meeting an overall subwatershed or watershed treatment equivalent to the SUSMP or Caltrans existing treatment standards.

3.2.4.3 Design Storm

Ultimately, the Dischargers' goal is to meet the TMDL's compliance standards. The design storms identified below are simply a design objective to guide Discharger efforts when designing treatment BMPs and are not a representation of the TMDL's compliance standards. Additionally, the Dischargers are employing an iterative, adaptive management strategy that seeks to identify and implement more cost-effective BMPs as part of this Implementation Plan. Therefore, treatment BMPs will only be implemented to both the overall extent (in terms of total magnitude of implementation) and geospatial extent that Tier I and Tier II BMPs do not achieve the compliance standards. In terms of implementation, this means the following:

1. The Implementation Plan's overall BMP implementation approach is a tiered and iterative approach where Dischargers will attempt to meet the TMDL's compliance standards through

implementation of more cost-effective pollution prevention and source controls (Tier I and Tier II). The treatment BMP approaches (Tier III) will only be used where each Discharger determines that they are appropriate and to the extent that compliance is not anticipated to be achieved through Tier I and Tier II watershed activities alone.

2. Because pollutant sources are not evenly distributed throughout the Chollas Creek Watershed, Dischargers may treat higher polluting areas (in addition to implementing Tier I and Tier II BMPs), while relying only on Tier I and Tier II BMPs in other areas.

Table 3-1. Design Storms to be Used by Dischargers When Designing Treatment Best Management Practices (Tier III)

City of La Mesa, City of Lemon Grove, City of San Diego, County of San Diego, Port, and Navy	Caltrans – San Diego Region (Region 9)[2]
SUSMP 85th Percentile Storm[1]	▪ For water quality flow-based treatment BMPs, use 0.2 inch/hr. ▪ For water quality volumes based treatment BMPs, use 0.6 inch water quality depth.

1 The 85th percentile storm will be used as the subwatershed or watershed overall design objective or target, to both the overall extent (in terms of total magnitude of implementation) and the geospatial extent that Tier I and Tier II BMPs do not achieve the compliance standards. Therefore, individual treatment BMPs may be designed to a range of design storms, and treatment will be focused on the highest polluting areas. As such, higher polluting areas may receive aggressive treatment, whereas other areas may not require any Tier III treatment BMPs to achieve the TMDL's compliance standards. For a detailed description of the applicable design storms, see Table 3-2.

2 For detailed design standards of the various approved treatment BMPs, please refer to Caltrans Project Planning and Design Guide Manual dated May 2007.

Table 3-2. Design Storm Approaches for Capital Improvement Projects that are Implemented as Total Maximum Daily Load Compliance Activities [1]

Design Storm Approaches	Typical Types of BMPs	When Applicable
SUSMP 85th Percentile Storm[1]: Volume-Based Designs or the maximum flow rate requirements per the SUSMP[2] (approximately 0.6 inches – Volume-Based Design) (approximately 0.2 inch/hr rainfall intensity – Flow Rate Design)	**LID Designs – Green Street, Green Mall, and Green Lot Porous Pavement Designs** – Design approach is to reduce targeted pollutant loads using distributed smaller-scale hydrologic features such as porous pavement, bioretention, and cisterns. Selection of the type of treatment mechanism will be based on site-specific characteristics, and the sizing will be based on effective pollutant removal performance for the SUSMP 85th percentile storm. Example Project: Mira Mesa Library Bioretention Area. **Tier III "Pilot" Treatment Systems** – Because these are "pilot" projects and the current technology for treatment train systems are low flow devices, the 85th percentile storm is recommended for this assessment phase. Where possible, this lower capacity system should be integrated with LID projects to reduce the flow volumes and achieve a higher overall load reduction. Example Project: Bannock Avenue Green Street and Bacteria Treatment BMP.	Sites with moderate opportunities for infiltration and some areas and depths available for filtration/treatment due to the following conditions: ▪ Small to moderate area without site constraints. ▪ Poorly draining soils (treatment technique would primarily be filtration).
First Flush: Retrofits of highly constrained sites (0.25 inches)	**Green Street and Green Mall LID Infiltration and Filtration Projects** – The approach is to capture and infiltrate/filter a minimum of a quarter inch or the first-flush storm volume. Example Project: Mt. Abernathy Green Street.	Sites with little or no opportunity for infiltration and limited area and depth available for filtration/treatment due to the following conditions: ▪ Extensive constraints on entire site: - Underground infrastructure. - Adjacent buildings. - Adjacent slopes. - Within an area prone to landslides. - High water table. - Area available for BMP/highly urbanized site. - Poorly draining soils.
Aggressive Approaches: Limited Discharger-owned sites with highly favorable conditions	Dual Use Sites – Integrated LID/infiltration and water harvesting projects on Discharger-owned property. Example Projects: Southcrest Park and Memorial Park. These projects are located at sites with favorable geotechnical conditions and are adjacent to the receiving water or no extensive existing infrastructure.	Additional treatment may be achieved at sites with substantial opportunities for infiltration and large areas and depths available for filtration/treatment due to the following conditions: ▪ Soils suitable for infiltration. ▪ Adjacent to receiving waters for moderately sized areas. ▪ Large area without site constraints. ▪ Demand and opportunity for harvested water.

1. The 85th percentile storm will be used as the subwatershed or watershed overall design objective or target, to both the overall extent (in terms of total magnitude of implementation), and the geospatial extent that Tier I and Tier II BMPs do not achieve the compliance standards. Therefore, individual treatment BMPs may be designed to a range of design storms, and treatment will be focused on the highest polluting areas. As such, higher polluting areas may receive aggressive treatment, whereas other areas may not require any Tier III treatment BMPs to achieve the TMDL's compliance standards.
2. SUSMP Treatment Calculation Methods:

Volume

1. Volume-based BMPs shall be designed to mitigate (i.e., infiltrate, filter, or treat) any of the following:
   i. The volume of runoff produced from an 85th percentile storm event. Isopluvial maps for the 85th percentile storm event are contained in the County of San Diego Hydrology Manual (0.6 inch approximate average for the San Diego County area). See the County of San Diego's 85th percentile isopluvial map at www.sdcounty.ca.gov/dpw/docs/pct85.pdf. (Note: Applicants may calculate the 85th percentile storm event using local rain data, when available.),
   ii. The volume of runoff produced by the 85th percentile storm event, determined as the maximized capture urban runoff volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ ASCE Manual of Practice No. 87, page 175 Equation 5.2; (1998*), or
   iii. The volume of annual runoff based on unit basin storage volume, to achieve 90% or more volume treatment by the method recommended in the latest edition of the *California Stormwater Best Management Practices Handbook*.

OR

Flow

2. Flow-based BMPs shall be designed to mitigate (i.e., infiltrate, filter, or treat) any of the following:
   i. The maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch/hr for each hour of a storm event,
   ii. The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two, or
   iii. The maximum flow rate of runoff, as determined from the local historical rainfall record that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two.

3.3 Public Participation in the Implementation Plan Development Process

Dischargers encouraged public participation in the development of this Implementation Plan by inviting stakeholders to comment on the document (Annotated Outline comments accepted September 17, 2008 to October 17, 2008, 1st Draft comments accepted March 20, 2009 to April 10, 2009, and 2nd Draft comments accepted May 11, 2009 to May 25, 2009), and provide input during three stakeholder meetings and one watershed activity design workshop. The objective of the March 30, 2009 design workshop was for Dischargers to obtain feedback regarding the composition of watershed activities and the Chollas Creek Dissolved Metals TMDL Implementation Plan. After a brief synopsis of the draft version of the Implementation Plan, TMDL Compliance Monitoring Plan, and Special Studies, and after reviewing the progress to date, stakeholders were invited to propose and vote on the watershed activities to workshop. Stakeholders selected to workshop the following five watershed activities:

- **Restoration at Southcrest Park** (component of the Southcrest Park Large Infiltration BMP Project described in Section 4.1.1), Project Lead: City of San Diego.
- **Development Regulations Review for Barriers to LID**, Project Lead: City of Lemon Grove.
- **Sustainable Canyons – Maple Street Canyon**, Project Lead: City of San Diego.
- **TMDL Compliance Monitoring Plan and Special Studies**, All Dischargers.
- **Community Based Social Marketing (UPDATE)**, Project Lead: City of San Diego.

The comments obtained during all stakeholder meetings, workshops, and comment periods are presented in Appendix E. Stakeholder feedback regarding the composition of watershed activities has been incorporated into Discharger’s Watershed Activity Lists and extrapolated to other watershed activities, as appropriate (Appendix B).