# PASEO SANTE FE GREEN STREET PROJECT

## Monitoring Description

**Define the Problem**
Buena Vista Creek is a perennial stream that originates in the San Marcos Mountains, travels through the cities of Vista and Oceanside before terminating in the freshwater Buena Vista Lagoon. The relatively dense land use patterns and development in the watershed have led to increases in impervious areas. Currently, approximately 43% of the watershed is estimated to be impervious, with many of the drainage areas in the City of Vista ranging from 45-60% impervious. As development has progressed, increased runoff rates and volumes have caused erosion of the Creek, leading to a degraded benthic community within the Creek and sedimentation downstream in the Lagoon. Water quality in the Creek has been degraded and hydromodification has impacted the beneficial uses in the watershed. The Creek is listed as impaired for both sediment toxicity and Selenium and the Lagoon is listed for nutrients, bacteria and sedimentation/siltation.

The Paseo Green Street Project is a vital component of the larger Paseo Santa Fe Corridor Revitalization Project and will improve storm water mitigation and maximize the benefits of the streetscape design for this urban corridor. Project goals include implementing LID to reduce sediment, nutrient, and bacteria loading to Buena Vista Creek as well as protecting natural downstream channels from increased peak storm flows in order to restore beneficial uses. The specific LID techniques include increasing landscaped and pervious surfaces (e.g. porous pavers and filtration strips) along the street right of way and selected areas of parking spaces that are both aesthetic and low maintenance. These features will provide for water quality and storm water management using filtration and bioretention that meet or exceed the minimum water quality and hydromodification NPDES permit requirements and address anticipated TMDL requirements. The LID will use irrigation controllers and drought tolerant species to reduce urban runoff. The filtration strips and bioretention areas will use filtration layers and underdrains to address underlying low permeability soils, and barrier geomembranes to address preferential pathways by utilities. The filtration layers will be designed to address the specific pollutants identified as priorities in the watershed, nutrients, bacteria, and TSS. The proposed LID will be assessed for effectiveness in meeting project goals.

**Known Sources of Pollutants**

Based on regional NPDES Permit monitoring (Weston;2011) of Buena Vista Creek, the priority constituents include nutrients and bacteria in dry weather flows and sediment, and bacteria in storm flows. The sources of potential hydromodfication in the creek are from increased peak and sustained peak flows from increased impervious surfaces due to urbanization. Likely sources of the water quality priority constituents based on the San Diego Copermittees 5-year Program Effectiveness Assessment (Ogawa, Weston & LWA; 2010) include over-fertilizing of grassed and landscaped areas in both residential and commercial landscaping, leaf litter and other organic material in the storm drains, and groundwater that increases nutrient inputs to creeks. In addition, a key transport mechanism is provided through over irrigation. This transport mechanism moves nutrients and bacteria from the watershed to the receiving waters of Buena Vista Creek in dry weather. Sources of priority constituents in wet weather flows include erosion control issues which add to sediment loads in receiving water, channel bed and bank erosion, and “wash off” related to sources of bacteria.

**Baseline water quality data and previous scientific studies to support the problem definition**

Baseline data is available from the regional Copermittee NPDES Permit Monitoring Program that includes recent results from the 2010-2011 monitoring period and additional data from two previous sampling events that were summarized in the San Diego Copermittees 5-year Long Term Effectiveness Assessment (LTEA) (Ogawa, Weston & LWA; 2010). The assessment of the watershed during both ambient and wet weather conditions for the most current monitoring period of 2010-2011 is presented in an integrated manner that addresses each of the NPDES Permit Monitoring program core management questions. The integrated assessment incorporates both the ambient weather and wet weather assessments and provides a summary of the overall findings for the Buena Vista Creek HA. The integrated assessment also identifies which priority constituents overlap between receiving waters and urban runoff. It is anticipated that data from the MS4 Outfall and Source Identification Monitoring Programs will bolster the assessment process as more data become available in future years. Integrated watershed assessment results are presented by station in Table 7-1.

The results summarized on Table 7-1 indicate that nutrient, bacteria and total dissolved solids (TDS) are priority constituents in dry weather flows. TDS is identified as a high-priority constituent and total nitrogen is identified as a medium priority. TDS and total nitrogen were identified as high priorities in the 5-year assessment under the LTEA, which also identified *Enterococcus** as a medium priority. Total nitrogen, *Enterococcus* and TDS are common priority constituents in both MS4 outfall and receiving waters in ambient (dry weather) conditions. The LID measures that are proposed for this project will be designed to significantly reduce dry weather flows from over-irrigation and capture and infiltrate these flows from the project sites therefore significantly reducing the priority constituents that have been identified in these baseline studies.

Wet weather baseline data summarized in Table 7-1 indicates bacteria (fecal coliform), (synthetic pyrethroids) and TDS are priority constituents in wet weather flows. Bioassessment results indicate impairments of the benthic community. The 5- year LTEA also identified fecal coliform as a high priority. In addition, the LTEA identified bifenthrin*, TSS*, and turbidity* as high-priority constituents; and, permethrin* as a medium-priority. The proposed LID projects will reduce wet weather flows by capturing and either filtering or infiltrating storm flows thereby also reducing the loading of priority constituents into receiving waters. The LID projects will also reduce peak storm flows that can result in hydromodification and potential impact to receiving water benthic communities.

* rated low priority in most recent 2010-2011 assessment as shown on Table 7-1.

**Table 7-1. Buena Vista Creek TWAS-1 (El Salto) Drainage Area Assessment Findings for the 2010-2011 Monitoring Period**

| Buena Vista Creek TWAS-1 | | | |
|---|---|---|---|
| System Assessed | Dry Weather Priority Constituents[1] | Wet Weather Priority Constituents[1] | Core Management Question(s) Addressed |
| Receiving Water Monitoring | NPDES Program<br>• Chemistry – No priority constituents identified<br>• Toxicity – No toxicity observed<br>• Biology – Very Poor IBI*<br>• Bacteria – No priority constituents identified<br>• Nutrients – Total Nitrogen (Med)<br>• TDS – TDS<br><br>SMC Program (One Station, SMC00345)*<br>• Chemistry – Sulfate<br>• Toxicity – No toxicity observed<br>• Biology – Very Poor IBI<br>• Bacteria – Not analyzed<br>• Nutrients – Nitrate, Total Nitrogen<br>• TDS – TDS<br><br>Third-Party Data – (Coastkeeper)[2]<br>The following constituents did not meet Basin Plan benchmarks:<br>• Bacteria – *Enterococcus*, *E. coli* | NPDES Program<br>• Chemistry – Bifenthrin (Med)<br>• Toxicity – No toxicity observed<br>• Biology – Very Poor IBI[3]<br>• Bacteria – Fecal coliform<br>• Nutrients - No priority constituents<br>• TDS – TDS<br><br>Synthetic Pyrethroids in Sediment*<br>• Bifenthrin | 1, 2 |
| Urban Runoff Monitoring | MS4 Program<br>• Chemistry – TSS (Med)<br>• Bacteria – Fecal Coliform, *Enterococcus*<br>• Nutrients – Total Nitrogen, Total Phosphorus<br>• TDS– TDS | MS4 Program<br>• No samples collected upstream of BVC-TWAS-1 | 3, 4 |
| Lagoon/ Estuary/ Bay Monitoring | Not Applicable | Not Applicable | 1, 2 |

Note: Results included in this table reflect data collected above the receiving water station and below impoundment, if impoundment exists.
Priority constituents that are common to both the MS4 outfall monitoring and receiving water results are shown in blue.
[1] Priority constituents are determined using the WMA Assessment Methodology (SDCRC, 2010). High-priority and medium-priority constituents are defined for each monitoring program. When no priority constituents were identified for a constituent group, "no priority constituents identified" was stated to allow clear and consistent comparisons between assessment tables. In the case of toxicity "no observed toxicity" was stated.
[2] For third-party data, underlined constituents did not meet the Basin Plan water quality benchmark (WQB) for >50% of samples. Constituents that are not underlined did not meet the WQB for >25% to 50% of samples.
[3] One bioassessment sample is collected each year during ambient conditions and is used for both the dry and wet assessment.
*One sample used in analysis.

Med - medium priority constituent
TDS - total dissolved solids
IBI – Index of Biotic Integrity
NPDES - National Pollutant Discharge Elimination System
TWAS – temporary watershed assessment station
MS4 - municipal separate storm sewer system
SMC - Stormwater Monitoring Coalition

### Table 7-2: Constituents or parameters to be monitored, and frequency

| Project Element | Analyte to be Measured | | | | | | | Sample type |
|---|---|---|---|---|---|---|---|---|
| | Water Quality * | Flow | Metals | Bacteria | Sediment | Habitat | Wet/ Dry Flows Sampling | |
| Phase I LID Implementation – LID along street right of way, sidewalks and selected parking areas (porous pavement and filter strips) | Y | Y | Y | Y | Y | N | Wet and Dry Flow | LID BMP Effectiveness to be measured by collecting in-flow before entering BMP and outflow either through a sample port or downstream MS4 discharges point during storm events. Three storm events are planned. Multiple samples will be collected with flow measurements to obtain EMC. Dry weather flows are to be compared to current baseline from downstream MS4 with post-construction downstream dry weather flows and quality in the MS4. |
| Phase I LID Implementation – LID Bioretention Areas in Circles and Open Space Areas | Y | Y | Y | Y | Y | N | Wet and Dry Flow | Approach and sampling type similar to above LID BMPs |
| Education Outreach Efforts to Businesses on LID and Pollution Generating Activities | N | N | N | N | N | N | Visual Inspec-tions and Surveys | Behavioral assessments and surveys – A series of baseline and post-implementation inspections of targeted business to record pollutant generating activities observed to obtain frequency of occurrence and with water quality data obtained from above element the potential pollutant generating impact. Behavioral assessment surveys of targeted businesses will also be completed prior to and after outreach efforts ` |
| Education Outreach Efforts to Residences and Community on LID and Control of Pollutant Generating Activities | N | N | N | N | N | N | Visual Inspec-tions and Surveys | Behavioral assessments and surveys<br>Public surveys |

* pH, conductivity, temperature, dissolved oxygen etc.

### Table 7-3: Sampling locations, or a description of how sites will be selected

| Project Element | Selection Criteria | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | Health and safety | Ease of access | Upstream | Down stream | Within Project | Control Site | Number of sampling locations | |
| Phase I LID Implementation – LID along street right of way, sidewalks and selected parking areas (porous pavement and filter strips) | Y | Y | Y | Y | Y | N | 3* | *Number of sites will depend on final design and location of sampling ports for downstream sample collection. |
| Phase I LID Implementation – LID Bioretention Areas in Circles and Open Space Areas | Y | Y | Y | Y | Y | N | 3* | *Number of sites will depend on final design and location of sampling ports for downstream sample collection. |
| Education Outreach Efforts to Businesses on LID and Pollution Generating Activities | N | N | N | N | N | N | Each Targeted Business | Inspections and surveys will be conducted of targeted businesses before and after implementation. |
| Education Outreach Efforts to Residences and Community on LID and Control of Pollutant Generating Activities | N | N | N | N | N | N | Survey Respondent s | Surveys to be conducted before and after implementation within surrounding community |

**Table 7-4: Sampling Methods and Equipment**

| Project Element | Sample Method | | | | | |
|---|---|---|---|---|---|---|
| | Dry weather sampling | Wet weather sampling | Flow meters | Hand-held meters* | Grab samples | Other |
| Phase I LID Implementation – LID along street right of way, sidewalks and selected parking areas (porous pavement and filter strips) | Y | Y | Y | Y | * | * grab samples will be taken of dry weather flows. Sampling for wet weather events will be pollutograph and/or flow weighted composite to obtain event mean concentration (EMC) |
| Phase I LID Implementation – LID Bioretention Areas in Circles and Open Space Areas | Y | Y | Y | Y | * | * grab samples will be taken of dry weather flows. Sampling for wet weather events will be pollutograph and/or flow weighted composite to obtain event mean concentration (EMC |
| Education Outreach Efforts to Businesses on LID and Pollution Generating Activities | N | N | N | N | N | NA |
| Education Outreach Efforts to Residences and Community on LID and Control of Pollutant Generating Activities | N | N | N | N | N | NA |

* pH, conductivity, temperature, dissolved oxygen etc.

**Data Management, Analysis and Reporting**

The original data sheets, statistical worksheets, and reports produced during monitoring will be accumulated into project-specific files that are maintained in locked file cabinets.

Data sheets, field observations, and COC information will be detailed in a database based on nomenclature developed specifically for this project.

Any continuous data measurements collected during this project will be downloaded monthly. A QC of the data file will be performed prior to inclusion in the database.

The project manager will document and track the aspects of the sample collection process, including generating field logs at each site and COC forms for the samples collected. COC forms will accompany water samples to the appropriate laboratory for analysis.

The final EDD will be in a SWAMP-compatible format that matches requirements following the Surface Water Ambient Monitoring Program Information Management Plan (MPSL, 2005). The MPSL document details the format and structure of the data flow, verification, and validation processes.

After verification and final database establishment, the raw data files and databases will be copied to a separate database file for storage on site. The original data sheets, statistical worksheets, and reports produced are accumulated into project-specific files. Final report text and tables are also stored on disk. After data submissions, directories are archived on tape for storage off site. In-house copies of data files are made on CD when submitted. Records will be maintained for at least five years. The records and analyses pertaining to accreditation are kept for a minimum of five years.

## Project Performance Measurement Tables

The City of Vista Paseo Sante Fe Green Street Project has four Project Activity Categories established in the PAEP guidelines. The applicable categories include:

1) Planning, Research, and Assessment Category
    a) LID Effectiveness Assessment
    b) LID Retro-fit and Redevelopment Solutions Assessment
    c) Source Management Strategies and Assessment for Targeted Businesses in Project Area

2) Education, Outreach, and Capacity Building Category
    a) Education Outreach Efforts to Businesses on LID and Pollution Generating Activities at Targeted Businesses
    b) Education Outreach Efforts to Community on LID and Control of Pollutant Generating Activities for Residences

3) Pollutant Load Reduction Category
    a) Phase I LID Implementation – LID along street right of way, sidewalks and selected parking areas (porous pavement and filter strips)
    b) Phase I LID Implementation – LID Bio-retention Areas in Circles and Open Space Areas
    c) Source Control Measures and Outreach to Businesses

4) Water Conservation Category
    a) LID Runoff Reduction Components

Project Performance Measure Tables 7-5 through 7-8, respectively have been prepared for these categories.

**Table 7-5: Planning Research and Assessment Category**

| Project Goals | Desired Outcomes | Output Indicators | Outcome Indicators | Measurement Tools and Methods | Targets |
|---|---|---|---|---|---|
| LID Retro-fit and Redevelopment Solutions Assessment: Increase regional knowledge of LID solutions by demonstrating effectiveness of LID projects that are integrated into a redevelopment project to meet multi-benefits that include: achieve pollutant reduction ; create expanded greening of urbane landscapes; provide increased in attractiveness of commercial center; improve viability of commercial area surrounded by disadvantaged community; connect green areas to major transit hub; provide opportunities for public education of water quality issues; and, reduce impacts from hydromodification due to urbanization. | Through the effectiveness assessment of the LID BMPs, develop conclusions and recommendations in the Project Report that will be used by the City to disseminate through presentations and outreach materials (summary handout) on the effectiveness of the LID projects to meet the multiple goals that can be applied to other redevelopment projects. | • Phase I and II LID Design that details integration with the redevelopment project<br>• Project Report on the Assessment of the LID project to meet these multi-benefit goals<br>• Power Point Presentation and Project Summary Handout summarizing the findings and conclusions to regional watershed managers, redevelopment community, local community and posted on City and State Board site | • Successful completion of Phase I LID Solutions that are integrated into a redevelopment project to meet multi-benefits<br>• Completion of Project Report and Presentation/Hand out on Findings and Recommendations | • Assessment methods to determine success in meeting the multi-benefits are outlined under the outreach, pollutant reduction and water supply categories<br>• Delivery of Final Documents<br>• Increased knowledge of the LID Solutions based on participants in presentations on findings and recommendations | Development of Outreach Materials that include presentation and summary handout on the success of the LID project to meet the multiple goals that can be used by watershed managers, redevelopment community, local community and water quality professionals for redevelopment and retro-fit projects. |
| LID Effectiveness Assessment: Support regional and state-wide efforts to develop sound technical methods to assess the effectiveness of LID projects to meet pollutant load, storm volume and peak flow reduction goals through innovative sampling techniques integrated into LID designs | Through the development of the PAEP, QAPP, LID Design and effectiveness assessment results of the LID BMPs, develop conclusions and recommendations in the Project Report that will be used by the City to disseminate regionally and statewide through presentations on the effectiveness of the LID projects and the innovative measurement methods/techniques integrated into LID designs.to meet pollutant load, storm volume and peak flow reduction goals. | • PAEP and QAPP defining the methods for monitoring and evaluation of results to determine effectiveness of LID BMPs to meet reduction goals<br>• Phase I and II LID Design that provide details on innovative sampling ports and other built-in devices to measure effectiveness of LID<br>• Project Report on the Assessment of the LID project to meet the reduction goals<br>• Power Point Presentation summarizing the findings and conclusions to | • Successful completion of Phase I & II Design and Phase I LID implementation that meet pollutant load, storm volume and peak flow reduction goals<br>• Completion of Project Report and Presentation/Hand out on Findings and Recommendations on the effectiveness of the LID to meet the reduction goals and on the innovative monitoring techniques to determine | • Assessment methods to determine success in meeting the multi-benefits are outlined under the outreach, pollutant reduction and water supply categories<br>• Delivery of Final Documents<br>• Increased knowledge of the LID Solutions and innovative monitoring methods integrated into design based on participants in | Development of Outreach Materials that include presentation and summary handout on the success of the LID project to meet the reduction goals and on the monitoring techniques integrated into the LID Design that can be used by watershed managers and BMP designers on LID projects |

| Project Goals | Desired Outcomes | Output Indicators | Outcome Indicators | Measurement Tools and Methods | Targets |
|---|---|---|---|---|---|
| | | regional watershed managers and posted on City and State Board site | effectiveness. | presentations on findings and recommendations | |
| Source Management Strategies and Assessment for Targeted Businesses in Project Area: Support regional and state-wide efforts to develop sound technical methods to implement and assess the effectiveness of public-private partnerships in implementing source control and source management BMPs to significantly reduce pollutant generating activities at targeted businesses | Through the development of the business outreach and source management program and effectiveness assessment of the source control measures, develop conclusions and recommendations in the Project Report that will be used by the City to disseminate regionally and statewide through presentations on the effectiveness of the targeted business outreach and source control measure program. Based on the outcomes of the targeted business source control measures program develop recommendations and lessons learned on the effectiveness of partnering with businesses and integrating source control measures. | • Project Report on the Assessment of the LID project to meet the reduction goals | • Successful completion of Phase I & II Design and Phase I LID implementation that meet pollutant concentration and dry weather flow reduction goals<br>• Completion of Project Report and summary of findings and recommendations on the effectiveness of targeted business outreach and source control measures | • Assessment methods to determine success in meeting the multi-benefits are outlined under the outreach and pollutant reduction categories<br>• Delivery of Final Documents<br>• Increased knowledge of the source control measures at targeted businesses | Development of Outreach Materials that include summary handout on the success of the targeted business outreach and source management measure implementation that was integrated into the project to meet the reduction goals that can be used to support further business outreach in the City and region. |

**Table 7-6: Education, Outreach and Capacity Building Category**

| Project Goals | Desired Outcomes | Output Indicators | Outcome Indicators | Measurement Tools and Methods | Targets |
|---|---|---|---|---|---|
| Education Outreach Efforts to Businesses on LID and Pollution Generating Activities at Targeted Businesses: Implement successful Business Outreach Program to reduce pollutant generating activities | • High participation in business outreach activities like workshops and the source management program (see Table 7-7) that are part of this LID project.<br>• Decreased in the activities that generate pollutants by targeted businesses that impact water quality<br>• Increase in the awareness that lead to behavioral changes in the pollutant generating activities that can impact the water quality of Buena Vista Creek and Lagoon. | • Preparation and distribution of outreach materials that highlight the business practices that can lead to pollutant loading to runoff and receiving waters and the appropriate practices such as good house- keeping, containment and cover that can control pollutant generation and migration.<br>• Conduct outreach events<br>• Develop and implement targeted business inspection program that includes outreach and education on best management practices and incorporates source management measures that will be part of the LID project. | • Number and percentage of targeted businesses that participate in outreach events<br>• Percent of pollutant generating activities that are decreased by outreach effort<br>• Percent of targeted businesses that understand the impact of the pollutant generating activities on water quality in Buena Vista Creek and Lagoon. | • Compile list of targeted businesses within project area and track their participation in outreach efforts and source management program<br>• Conduct series of inspections that record the type, frequency of occurrence and potential level of pollutant loading of pollutant generating activities before implementation and at designated milestones during the project.<br>• Conduct surveys of targeted businesses that can be tabulated to determine level of understanding of the impact of activities on water quality before and at milestones in the project. | • Interaction with 80% of the targeted businesses in outreach events or source management program (see Table 7-7)<br>• 20 percent decrease in pollutant generating behavior by grant project completion<br>• 20 percent increase in business understanding of the impact to water quality from targeted pollutant generating activities |
| Education Outreach Efforts to Community on LID and Control of Pollutant Generating Activities for Residences: Implement successful Residential Outreach Program to reduce pollutant generating activities | • High participation in residential and community outreach<br>• Decrease in the activities that generate pollutants by targeted residences that impact water quality<br>• Increase in the awareness that lead to behavioral changes in the pollutant generating activities that can impact the water quality of Buena Vista Creek and Lagoon. | • Preparation and distribution of outreach materials that highlight practices that can lead to pollutant loading to water quality impacts and the appropriate practices that can control pollutant generation and migration.<br>• Conduct outreach events<br>• Develop and implement residential inspection program that includes outreach and education on best management practices and incorporates source management measures and LID approaches such as runoff reduction measures | • Percent of pollutant generating activities that are decreased by outreach effort<br>• Percent of targeted residences and participating public that understand the impact of the pollutant generating activities on water quality in Buena Vista Creek and Lagoon | • Conduct series of inspections that record the type, frequency of occurrence and potential level of pollutant loading of pollutant generating activities before implementation and at project milestones<br>• Conduct surveys that tabulate the level of understanding of the impact of activities on water quality before and at project milestones | • 10 percent decrease in pollutant generating behavior by grant project completion<br>• 10 percent increase in residential understanding of the impact to water quality from targeted pollutant generating activities |

**Table 7-7: Pollutant Load Reduction Category**

| Project Goals | Desired Outcomes | Output Indicators | Outcome Indicators | Measurement Tools and Methods | Targets |
|---|---|---|---|---|---|
| Phase I LID Implementation – LID along street right of way, sidewalks and selected parking areas (porous pavement and filter strips): Reduce storm water peak flows and volume to pre-development conditions and reduce pollutant loading to Buena Vista Creek and Lagoon of priority constituents in both wet and dry weather flows from project area. | • Reduction in storm flows to predevelopment conditions to reduce impact from hydromodification<br>• Reduction in pollutant loading from wet weather flows for 303d listed constituents in Buena Vista Creek and Lagoon<br>• Reduction in dry weather flows to address pollutant loading and constituent migration to receiving waters | • Completion of the Phase I and II LID Designs<br>• Implementation of LID features as part of Sante Fe Corridor Re-development - Construction of porous pavement and filter strips along the right of way, sidewalks and selected parking areas | • Percent reduction in storm flow volumes and peak flows from project area<br>• Percent reduction in constituent loading from storm flows from LID features<br>• Percent reduction in dry weather flows from LID approaches that include irrigation runoff reduction<br>• Percent reduction in dry weather flows constituent loading from project area | • Flow measurements and water quality sampling and analysis as outlined in Tables 7-2, 7-3 and 7-4.<br>• LID BMP Effectiveness to be measured by collecting in-flow before entering BMP and outflow either through a sample port or downstream MS4 discharges point during storm events. Three storm events are planned. Multiple samples will be collected with flow measurements to obtain EMC<br>• Dry weather flows are to be compared to current baseline from downstream MS4 with post-construction downstream dry weather flows and quality in the MS4. | • 90 percent peak flow reduction for a 2-year, 6-hour storm in Phase I & II Design and Phase I Implementation<br>• 20 percent peak flow reduction for a 5-year, 6 hour storm in Phase I & II Design and Phase I Implementation<br>• Reduction of bacteria, nutrient, and TSS loading by approximately 50-80 percent in storm flows (actual reduction will be determined in final design of Phases I and II LID projects)<br>• 30 percent reduction in dry weather flows and pollutant loading from Phase I implementation |
| Phase I LID Implementation – LID Bio-retention Areas in Circles and Open Space Areas: Reduce storm water peak flows and volume to pre-development conditions and reduce pollutant loading to Buena Vista Creek and Lagoon of priority constituents in both wet and dry weather flows from project area. | • Reduction in storm flows to predevelopment conditions to reduce impact from hydromodification<br>• Reduction in pollutant loading from wet weather flows for 303d listed constituents in Buena Vista Creek and Lagoon<br>• Reduction in dry weather flows to address pollutant loading and constituent migration to receiving waters | • Completion of the Phase I and II LID Designs<br>• Implementation of LID features as part of Sante Fe Corridor Re-development - Construction of LID bioretention areas in traffic circles and open space areas. | • Percent reduction in storm flow volumes and peak flows from project area<br>• Percent reduction in constituent loading from storm flows from LID features<br>• Percent reduction in dry weather flows from LID approaches that include irrigation runoff reduction<br>• Percent reduction in dry weather flows constituent loading from project area | • Flow measurements and water quality sampling and analysis as outlined in Tables 7-2, 7-3 and 7-4.<br>• LID BMP Effectiveness to be measured by collecting in-flow before entering BMP and outflow either through a sample port or downstream MS4 discharges point during storm events. Three storm events are planned. Multiple samples will be collected with flow measurements to obtain EMC<br>• Dry weather flows are to be compared to current baseline from downstream MS4 with post-construction downstream dry weather flows and quality in the MS4. | • 90 percent peak flow reduction for a 2-year, 6-hour storm in Phase I & II Design and Phase I Implementation<br>• 20 percent peak flow reduction for a 5-year, 6 hour storm in Phase I & II Design and Phase I Implementation<br>• Reduction of Existing Storm water volume to below the historical undeveloped condition in Phase I & II Design and Phase I Implementation<br>• Reduction of bacteria, nutrient, and TSS loading by approximately 50-80 percent in storm flows (actual reduction will be determined in final design of Phases I and II LID projects) |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | • 30 percent reduction in dry weather flows and pollutant loading from Phase I implementation |
| Source Control Measures and Outreach to Businesses: In combination with outreach efforts (see Table 7-6) reduce pollutant loading activities and dry weather flows from targeted business that are the sources of constituent impacts and exceedances of water quality benchmarks and objectives in the MS4 outfalls and receiving water | • High participation in business outreach activities (see Table 7-4) and the source management program that are part of this LID project.<br>• Decreased in the activities that generate pollutants by targeted businesses that impact water quality<br>• Increase in the awareness that lead to behavioral changes in the pollutant generating activities that can impact the water quality of Buena Vista Creek and Lagoon.<br>• Reduction in dry weather flows and constituent loadings from targeted businesses | • Preparation and distribution of outreach materials (see Table 7-4)<br>• Implementation as part of project non structural source control measures at targeted businesses that reduce dry weather flows and pollutant loading to runoff and receiving waters such as smart irrigation systems in landscaped areas, low water usage practices, and build-in good house- keeping features.<br>• Conduct outreach events<br>• Develop and implement targeted business inspection program that includes outreach and education on best management practices and incorporates source management measures | • Number and percentage of targeted businesses that participate in outreach events<br>• Number of source control measures implemented as part of LID Project that are incorporated into business operation<br>• Percent of pollutant generating activities that are decreased by outreach effort<br>• Percent of targeted businesses that understand the impact of the pollutant generating activities on water quality in Buena Vista Creek and Lagoon.<br>• Percent reduction in wet weather first flush constituent loading from targeted businesses<br>• Percent reduction in dry weather flows and pollutant loading from sources/ pollutant generating activities at targeted businesses | • Compile list of targeted businesses within project area and track their participation in outreach efforts and source management program<br>• Conduct series of inspections that record the type, frequency of occurrence and potential level of pollutant loading of pollutant generating activities before implementation and at designated milestones during the project.<br>• Conduct surveys of targeted businesses that can be tabulated to determine level of understanding of the impact on water quality before and at project milestones<br>• Dry weather observed before the implementation measured and sampled for comparison to any observed post-implementation dry weather flows from targeted businesses | • Interaction with 80% of the targeted businesses in outreach events or source control measures/ management program<br>• 20 percent decrease in pollutant generating behavior by grant project completion<br>• 20 percent increase in business understanding of the impact to water quality from targeted pollutant generating activities |

**Table 4: Water Conservation Category**

| Project Goals | Desired Outcomes | Output Indicators | Outcome Indicators | Measurement Tools and Methods | Targets |
|---|---|---|---|---|---|
| LID Runoff Reduction Components: Reduce urban runoff flows from over-irrigation in landscaped areas within the redevelopment project to MS4 and Buena Vista Creek | Decrease in urban runoff flows measured in the MS4 that discharge to Buena Vista Creek from the redevelopment Green Street project | • Number of Smart Timers installed<br>• Number of locations where irrigation improvements are made | • Percent reduction in dry-season flow from redevelopment Green Street project | • Flow monitoring equipment/measuring flow at key points in the MS4 that drain the site and discharge to Buena Vista Creek<br>• Water usage data from commercial land-uses and common areas | • 30-50 percent reduction in dry season flow after the installation of irrigation improvements, irrigation controllers, low water usage plantings and business outreach and source control measures |
| Runoff reduction: Reduce irrigation water waste and increased water conservation | • Reduction in over-irrigation<br>• Increase in water conserved | • Number of Smart Timers installed<br>• Number of locations where irrigation improvements are made<br>• Area of landscape areas that are converted or designed using low water usage irrigation systems and drought tolerant plantings | • Percent reduction in irrigation water use<br>• Levels of maintained plant health | • Water usage data from commercial land-uses and common areas | • 20 percent reduction in irrigation water use |