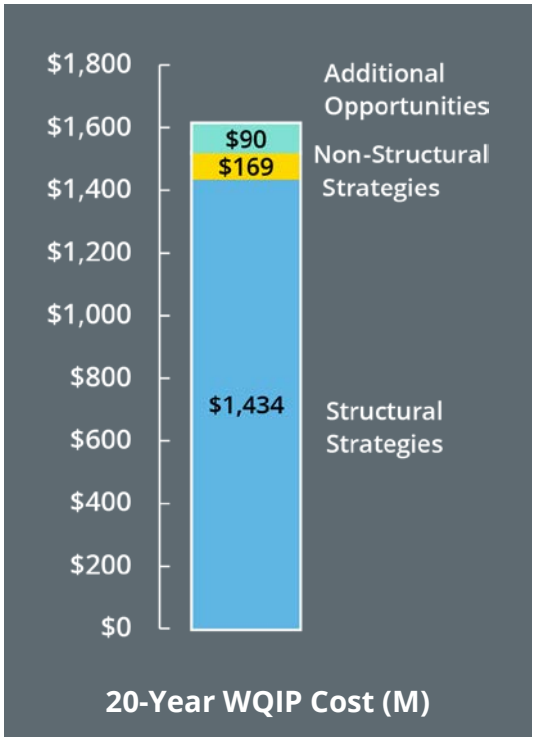
Transportation & Storm Water

WQIP Strategies Costing Tool

March 2017

Background

The City of San Diego (City) developed six Water Quality Improvement Plans (WQIPs) that show how the City will comply with the Municipal Separate Storm Sewer System Permit (Permit) and Total Maximum Daily Load (TMDL) regulations over the next 20 years. The WQIPs include non-structural and structural best management practices, or strategies, that are tailored to improve the water quality in the six watersheds in which the City has jurisdiction.



To estimate the funding need for implementing the WQIP-prescribed strategies, the City developed a robust costing tool (Excel database). The costing tool calculates and tabulates annual costs for each WQIP strategy, and the results were incorporated in the City's Watershed Asset Management Plan. The estimated 20-year WQIP funding need is $1.69 billion, including structural strategies, non-structural strategies, and additional opportunities such as lagoon and stream restoration projects. This estimate does not include the City's cost to provide flood risk management or support its day-to-day storm water pollution prevention activities. To see the City's full water quality compliance and flood risk management costs, visit https://www.sandiego.gov/sites/default/files/wamp2017costupdate.pdf.

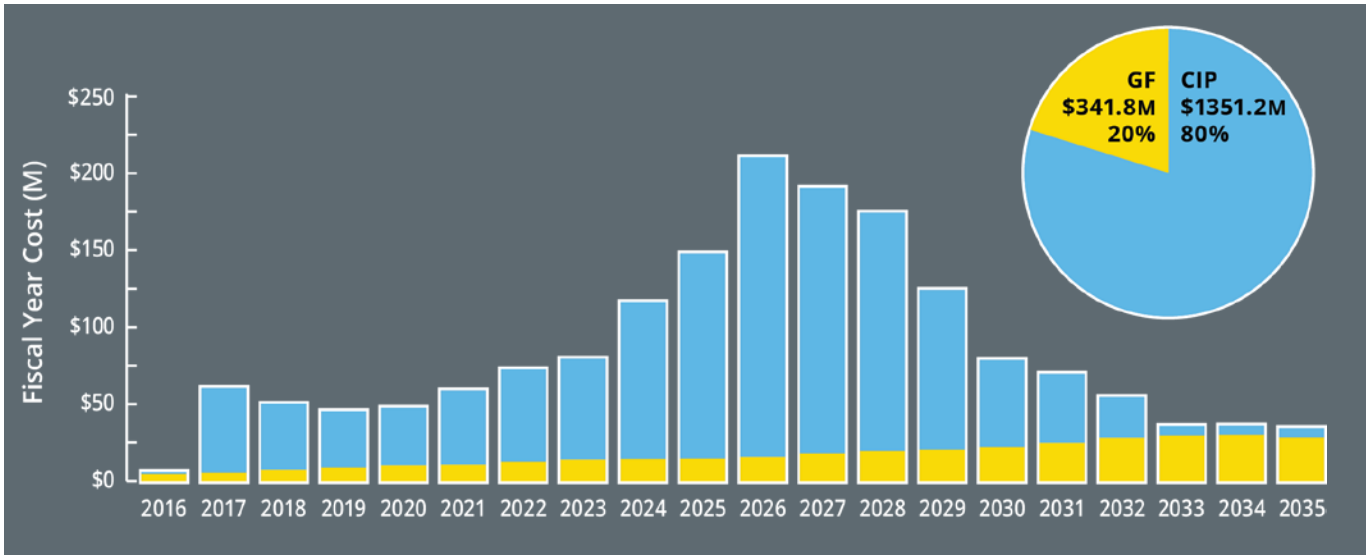
The costing tool is intended as a financial outlook forecasting tool, but it also provides information that supports current storm water operations and decision making processes. The purpose of this fact sheet is to briefly summarize the contents and assumptions of the costing tool.

Costing Tool Development

Development of the costing tool was a collaborative effort led by a multi-disciplinary team within the City's Storm Water Division. Contributions were made through internal workshops, staff interviews, literature reviews, actual cost and monitoring data from pilot studies (https://www.sandiego.gov/thinkblue/pilot-projects) and reviews of local vendor quotes and historical bid documents. To most accurately and comprehensively forecast the costs for each strategy, assumptions were developed "bottom-up" using the best available resources. For example, the number of personnel hours for each strategy were used to forecast how many full-time employees (considering specific salaries and fringe benefits) would be needed during each year of implementation. Personnel estimates were used to compute annual overhead costs associated with the new staff, including information technology fees, supplies, services, and additional supervisory staff. For structural strategies, the design, construction, and maintenance costs were also developed using this approach. Structural strategy cost estimates included full-time maintenance staff and supervisor costs, specific equipment rental fees, materials replacement costs, disposal fees, construction contracts, and design support costs.

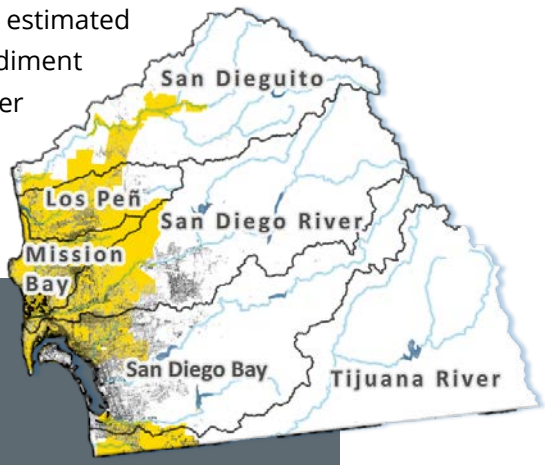
Funding Sources and Schedule

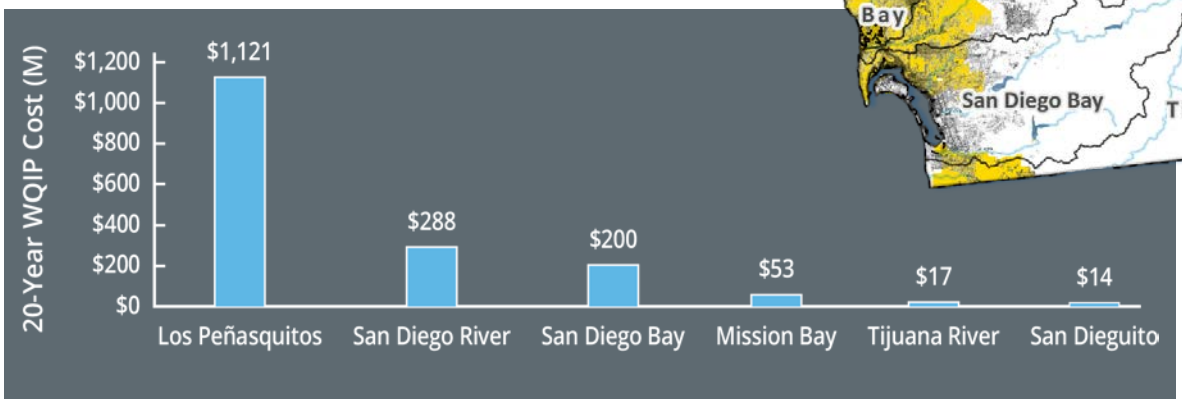
Costs were categorized depending on whether funding for the activity would be secured through the general fund (GF) or the capital improvement program (CIP) budget. Personnel costs, operations and maintenance activities (O&M) were categorized as GF, whereas new design and construction activities were categorized as CIP. The strategies were scheduled over time according to the regulatory compliance schedule, which is primarily driven by the need to meet TMDL compliance targets, as shown in the graphics below. At the end of the 20-year compliance period, annual costs are primarily driven by non-structural strategies and O&M of structural facilities. Additional CIP costs will be incurred beyond fiscal year 2035 as structural facilities begin to exceed their service life and are replaced.



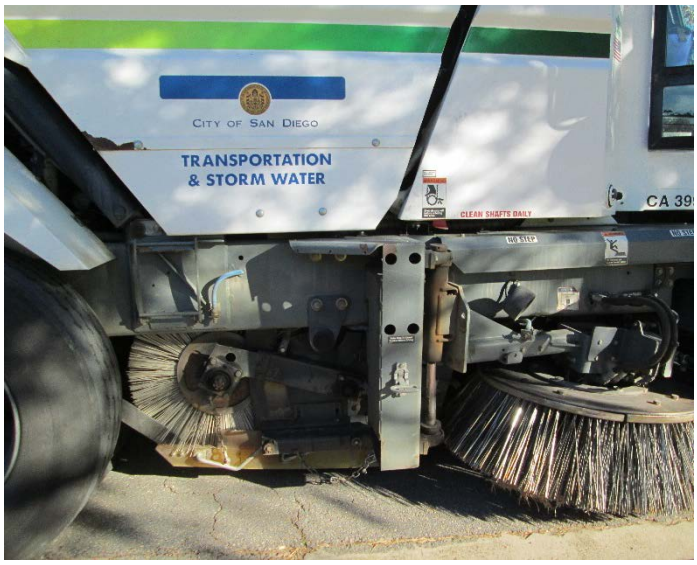
Costs by Watershed

Estimated costs vary by watershed depending on the water quality priorities and the extent of City's footprint. For example, the Los Peñasquitos Watershed has the highest estimated compliance cost because the water quality regulations for sediment demand a significant number of structural strategies be built over time to address this pollutant. Conversely, the San Dieguito River Watershed has the lowest cost because of the City's relatively small footprint in that watershed.





Non-Structural Strategies

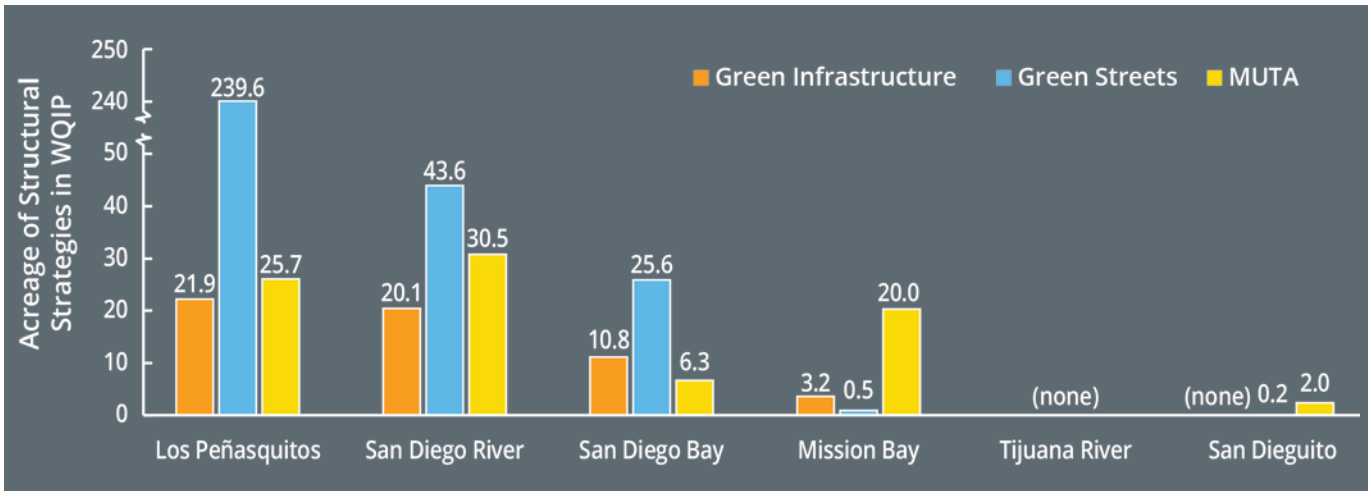


Maintenance and enhancement of non-structural and institutional programs are expected to provide significant water quality improvement. Non-structural strategies include activities such as enhanced catch basin inspection and cleaning, enhanced identification and enforcement of erosion and slope stabilization issues, enhanced street sweeping, and rebate programs for grass replacement, rain barrels, micro-irrigation, and downspout disconnection (among others). The storm water alternative compliance program will also augment City efforts by establishing a credit trading framework to leverage the most efficient projects (in lieu of building structural strategies on sites that are not well suited to water quality improvement).

Output from the costing tool suggests that non-structural programs will also be highly cost-effective because they focus on controlling the sources of pollution throughout the landscape before pollutants can be washed downstream by storm water runoff. For example, street sweeping in the San Diego Bay watershed costs approximately $10,000 to $20,000 per pound of heavy metals reduced each year; this is five- to ten-times more cost effective than structural strategies, with estimated efficiencies of approximately $100,000 per pound of metals reduced per year.

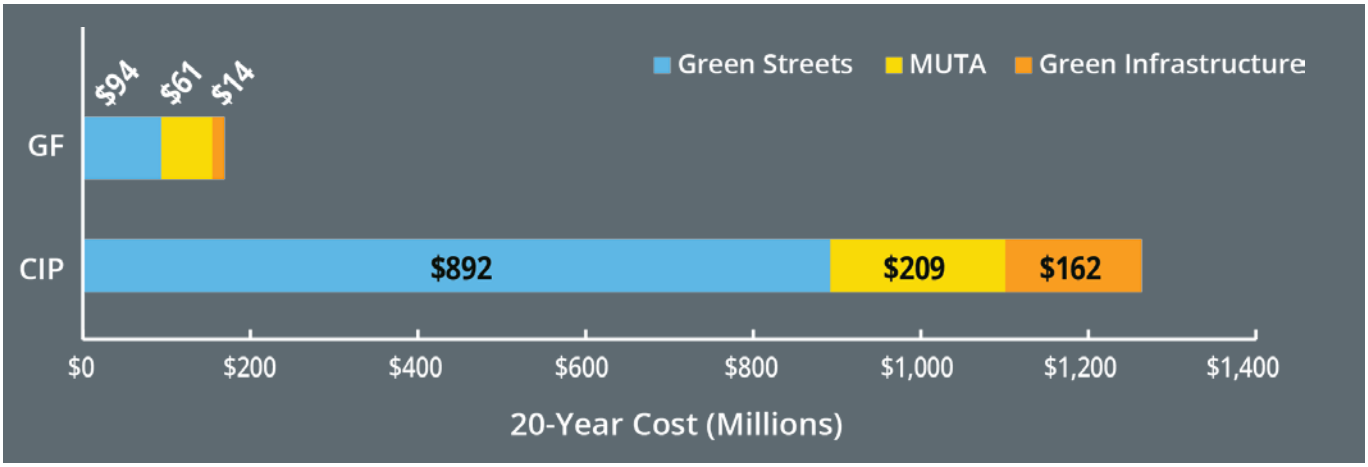
Structural Strategies

Structural strategies were classified and costed as one of three main categories: green infrastructure (small-scale infiltration on publically owned parcels such as rain gardens and permeable parking lots), green streets in the public right-of-way along transportation corridors, and multiuse treatment areas (MUTAs) designed to provide community co-benefits and efficiently collect and treat large drainage areas (usually 10 acres or more). The prescribed acreage of each structural strategy category is summarized below.



Distribution of Structural Costs

The costing tool estimates both capital (design and construction) and long-term O&M costs for all structural strategies over a 20-year period (from fiscal year 2016 through fiscal year 2035). Green street capital costs represent 55% of the total funding need. This estimate is expected to decrease as City continues to optimize its storm water programs using new, high-resolution data.



Unit Structural Costs

To better inform future project planning, the costs presented above can be normalized to a project area, and the table below presents the average unit costs for each structural strategy based on the assumptions in the costing tool. It is worth noting that the various strategies perform differently per unit based on their footprint (for example, a MUTA can typically capture more runoff and pollution per acre than a green street), so these assumptions are best used for planning-level cost estimating.

	Green Streets	MUTA	Green Infrastructure
Average CIP Cost per Square Foot Implemented	$66.14	$56.78	$66.53
Average Annual GF Cost per Square Foot Implemented*	$0.95	$1.30	$0.48

*Using Last 5 Years of Compliance Period (FY31-FY35)

Improvements and Limitations

Through adaptive management, the City of San Diego continues to improve its storm water project planning. Recent advances in watershed master planning have shown that water quality compliance costs can be significantly reduced using new, high resolution data. As the City learns more over time from implemented projects, the cost assumption will be refined to reflect more accurate methods and data. Until then, the costs presented in this fact sheet should be considered planning-level estimates based on the best data available during development of the WQIPs.