Applying the Triple Bottom Line to SFPUC Capital Planning

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SFPUC Implementing the SSIP

SYSTEM & SEISMIC RELIABILITY & REDUNDANCY

INNOVATIVE STORMWATER MANAGEMENT SOLUTIONS

PROTECTING OUR BAY & PACIFIC OCEAN

“No one deals with more crap than I do.”
— San Francisco Sewer System

Working for you 24/7
San Francisco Challenges

- Aging Infrastructure
- Seismic Reliability
- Combined Sewer Discharges
- Climate Change
  - Rising Sea Level
  - Storm Surge
- Flooding
- Odors, Noise & Visual
- Environmental Stewardship
Sewer System Improvement Goals

- Provide a Compliant, Reliable, Resilient, & Flexible System that can Respond to Catastrophic Events
- Integrate Green & Grey Infrastructure to Manage Stormwater
- Provide Benefits to Impacted Communities
- Modify the System to Adapt to Climate Change
- Achieve Economic & Environmental Sustainability
- Maintain Ratepayer Affordability
GREEN AND GREY TECHNOLOGIES

GREEN

- Creek Daylighting
- Constructed Wetlands
- Vegetated Roof
- Bioretention Planter
- Rainwater Harvesting
- Permeable Paving

GREY

- Pump Stations
- Outfall Retrofit/Replacement
- Tunnels
- Transport/Storage Structures
- Pipe Upsizing/Replacement
Triple Bottom Line Case Studies

Philadelphia Water Department (2009)
Sustainable return on investment (SROI) assessment of CSO control solutions

Portland Bureau of Environmental Services (2010)
Ecosystem service valuation

New York City Department of Environmental Protection (2010)
Benefit-cost assessment of green and grey infrastructure

Cincinnati Metropolitan Sewer District (Ongoing)
Sustainable watershed evaluation process (SWEP) for sewer improvement project

Melbourne Water (2007)
Guidelines for evaluating sustainability on a project, program, and strategic level
Triple Bottom Line Case Studies

Natural Channel Return on Investment

Probability of Not Exceeding

Return on Investment

-1  -50%  0%  50%  100%  150%  200%  250%  300%  400%

-1  -50%  0%  50%  100%  150%  200%  250%  300%  400%

Economic ROI
Environmental ROI
sROI
Social ROI
Envision™ Sustainable Infrastructure Rating System

Envision™ is the product of a joint collaboration between the Zofness Program for Sustainable Infrastructure at the Harvard University Graduate School of Design and the Institute for Sustainable Infrastructure.

Introduction

Envision™ provides a holistic framework for evaluating and rating the community, environmental, and economic benefits of all types and sizes of infrastructure projects. It evaluates, grades, and gives recognition to infrastructure projects that use transformational, collaborative approaches to assess the sustainability indicators over the course of the project’s life cycle.

Who Can Use Envision™

Envision™ can be used by infrastructure owners, design teams, community groups, environmental organizations, constructors, regulators, and policy makers to:

- Meet sustainability goals.
- Be publicly recognized for high levels of achievement in sustainability.
- Help communities and project teams to collaborate and discuss, “Are we doing the right project?” and, “Are we doing the project right?”.
- Make decisions about the investment of scarce resources.
Implementation Plan: Tools for Efficient Delivery


Triple Bottom Line Sample Output
The TBL Assessment Model is a module within the Citywide Sewer System Improvement Program (SSIP). The purpose of a TBL assessment is to provide a decision-support platform that facilitates the selection of SSIP projects and project alternatives that generate the highest value in terms of environmental improvement, social-benefit, and economic gain relative to criterion established. The determination of ‘value’ is carried out through a system of measurement that has two main aspects—the first is a set of Indicators that are designed to measure certain attributes of value, and second, is a Rating System that applies a consistent set of rules that can normalize, interpret, classify, aggregate and represent the measured indicator values in order to make them useful for decision-making. While indicators are primarily designed for measuring and monitoring performance of a system component, the Rating System is primarily designed to aid multi-criteria decision-making (MCDM) – a foundation of the TBL process.

The TBL is essentially an Indicator-based Rating System that incorporates multi-criteria decision making. The main components of a robust TBL module are:

- A comprehensive list of indicators
- A collection of indicator measurement models and processes that utilize available data
- A scoring and representation model (Rating System) that makes sense of all the indicators and facilitates decision-making

Characteristics of a good TBL Rating System:
- Simple (easily understood but logically sound)
- Comprehensive (by topic/criteria and indicators)
- Consistent (across indicator types, project types)
- Structurally Unbiased between indicators as a model (unless explicitly weighted)
- Computable/Measurable
- Scalable (expandable by number of indicators; can work at local, watershed, City scales)
- Aggregation capable (group indicators into indexes etc.)
- Visually Representable (in a compelling, easy to grasp way)

TBL follows a basic set of principles...
Infrastructure Feasibility:
SFPUC Triple Bottom Line Analysis Model
Sample Metrics / Outputs

- Acres Mitigated Flood Risk
- Feet Bike/Ped Enhancement
- Acres Green Space Added
- Labor Hours Generated
- Tons GHG Reduced
- Acres Urban Habitat
- Tons Criteria Pollutants Reduced
TBL Folsom & 17th Street Example

SURCHARGING MANHOLE: December 2, 2012 Flooding at 17th and Folsom in the Mission
17th and Folsom Street Alternative Analysis

**Mid Term Flood Control Proposed Concepts**

- **Proj. 1**: Comcast Parking Lot
- **Proj. 2**: PG&E Parking Lot
- **Proj. 4**: Mission Creek Stormwater Parkway

**Mission Creek Stormwater Parkway**
- **Cost**: $7.7 M
- **Volume Detained**: (1-yr, 3-hr storm): 0.5MG

**Property Acquisition**
- **Cost**: Approximately $300-400 per SF
  - 1417 15th St = $2,995,000
  - 2023 Folsom St = $1,900,000
  - 269-299 Alabama = $3,500,000-4,000,000

**Subsurface Storage**
- **Cost**: $60-85M
- **Volume Detained**: (1-yr, 3-hr storm): 0.5MG
- *Property acquisition not included

**Folsom St. 8” Diameter Sewer Main**
- **Cost**: $5M
- **Volume Detained**: (1-yr, 3-hr storm): 0.75MG
17th and Folsom Street Alternative Analysis

Project 1
17th and Folsom St (future park)

Project 2
Nearby Parking Lot Acquisition

Project 3
Right-of-Way Storage Box

Project 4
Stormwater Parkway

Note: Financial Criterion ratings are based on annualized costs NPV and select projects only.

* This criteria are not showing up in the pie charts but are in the legend because they are not applicable to any case.
Reduces flooding in high consequence area

Reduces odor in small area, only during flooding events

< 30% the cost performance of the mean of projects evaluated

Reduction in CSD Volume as a result of storage volume

Major boulevard disrupted during construction but not on arterial

Ratepayer cost >30% of projects evaluated

Improves a new park in conjunction with the storage investment but not in an area of acute need

Shortens construction schedule of 2 SF Public Works projects due to coordination
TBL Alternatives Evaluation (Scoring)

CUMULATIVE BENEFITS SUMMARY

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<td>Total CSD Events Remaining (events/Year)</td>
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<td>Total CSD Volume Reduced (MG/yr)</td>
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<td>Total LCA NPV ($K)</td>
<td>(36,982)</td>
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NORMALIZED EFFICIENCY METRICS

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<td>Stormwater Managed Per million $ Annual Investment</td>
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