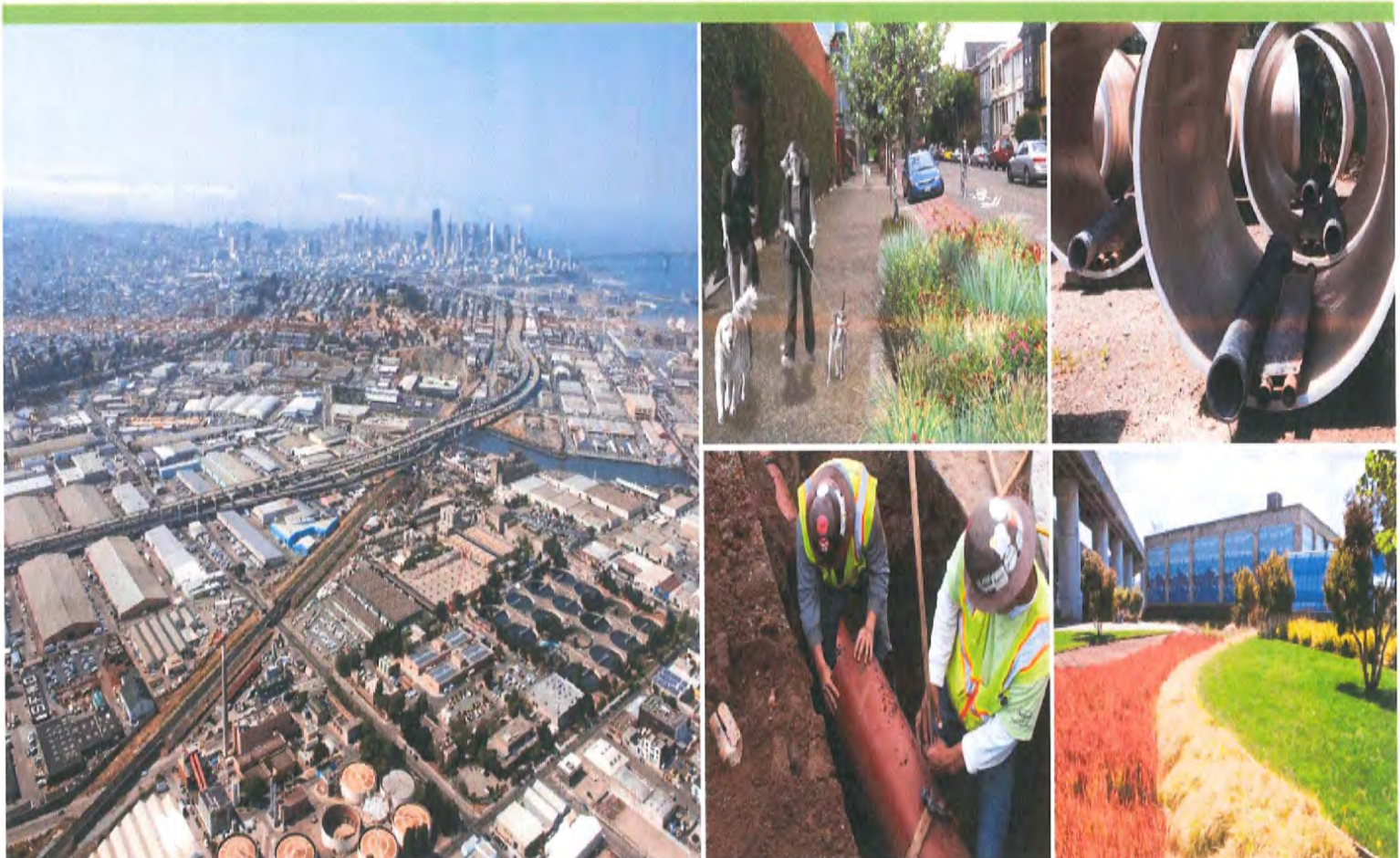


# CS – 363 Revenue Bond Oversight Committee (RBOC) Construction Management Services Lessons Learned

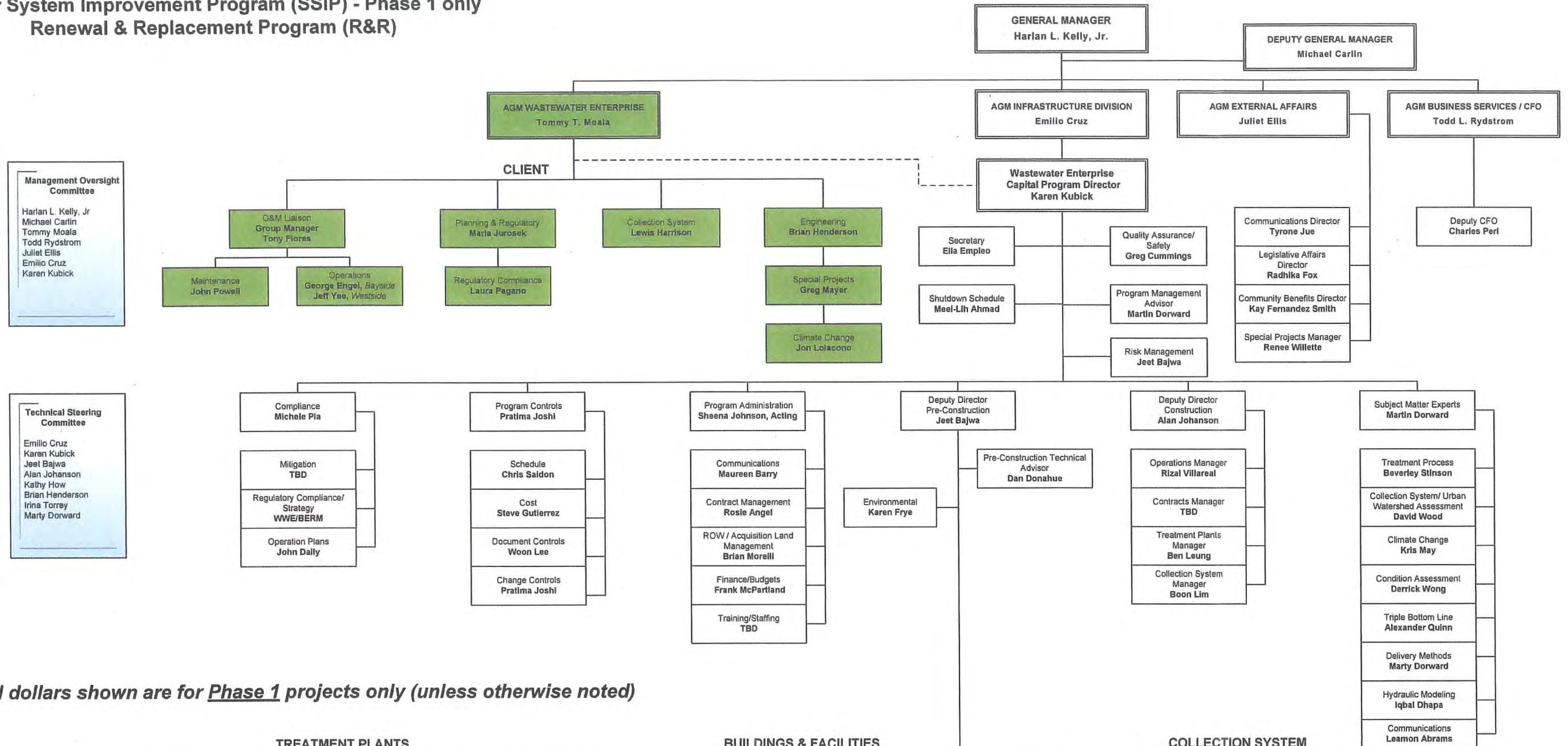
## Sewer System Improvement Program (SSIP) Projects and Procedures Information

April 1, 2014





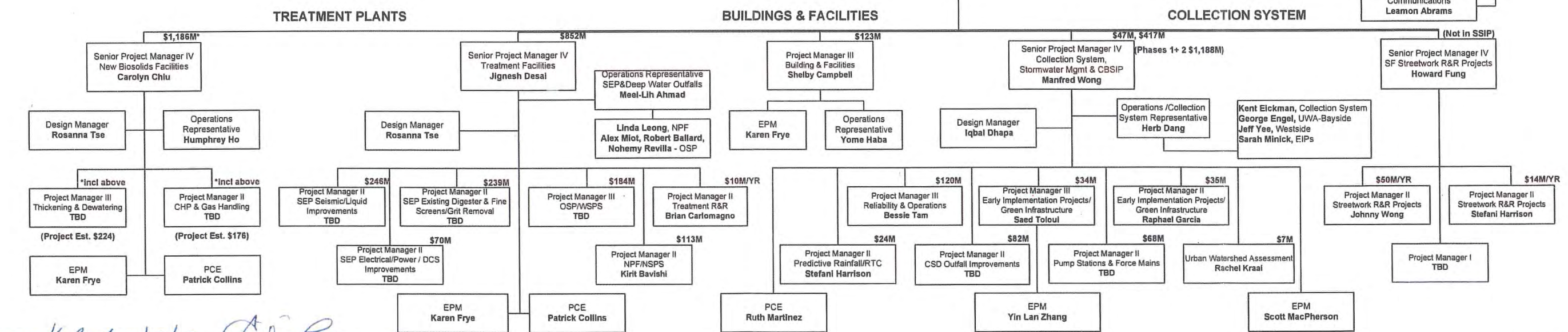
# Sewer System Improvement Program (SSIP) - Phase 1 only Renewal & Replacement Program (R&R)



**Management Oversight Committee**  
 Harlan L. Kelly, Jr.  
 Michael Carlin  
 Tommy Moala  
 Todd Rydstrom  
 Juliet Ellis  
 Emilio Cruz  
 Karen Kubick

**Technical Steering Committee**  
 Emilio Cruz  
 Karen Kubick  
 Jeet Bajwa  
 Alan Johanson  
 Kathy How  
 Brian Henderson  
 Irina Torrey  
 Marty Dorward

All dollars shown are for Phase 1 projects only (unless otherwise noted)



*Karen Kulak 11/13/13*  
 Sewer System Improvement Program Director

*Julio Cruz 13 NOV 13*  
 Assistant General Manager, Infrastructure





## **INFRASTRUCTURE DIVISION CIP PROCEDURES**

**September 27, 2013**

### **PROGRAM & PROJECT MANAGEMENT PROCEDURES**

(This page)

### **PROJECT DESIGN PROCEDURES**

(Next page)

### **CONSTRUCTION MANAGEMENT PROCEDURES**

(Last page)

### **PROGRAM & PROJECT MANAGEMENT PROCEDURES**

#### **SECTION 1: GENERAL**

[PM 1.15 Engineering Archives](#)

[PM 1.17 External Communications Approach and Coordination](#)

[PM 1.20 Arts Commission Project Funding And Civic Review Process](#)

#### **SECTION 2: PLANNING**

[PM 2.01 Project Development Process](#)

[PM 2.02 Project Management Plan](#)

[PM 2.03 Acronyms and Key Procedures](#)

#### **SECTION 3: CONTRACT MANAGEMENT**

[PM 3.05 As-Needed Consultants Contracts](#)

[PM 3.06 Pre-Bid Meeting](#)

[PM 3.08 Startup Testing and Training](#)

[PM 3.09 Startup Test Content](#)

[PM 3.12 LBE Participation for Construction](#)

[PM 3.14 Project Closeout](#)

[PM 3.16 Consultant Performance Evaluation](#)

#### **SECTION 4: FINANCIAL MANAGEMENT**

[PM 4.01 Right of Way Acquisition -- Administrative Settlements](#)

#### **SECTION 5: PROJECT CONTROLS**

[PM 5.02 WSIP Project Change Management](#)

[PM 5.03 Schedule Development and Control](#)

[PM 5.05 Monthly Statusing](#)

[PM 5.06 Construction Cost Estimate Review](#)

[PM 5.07 Monthly Progress Meetings](#)

#### **SECTION 6: QUALITY ASSURANCE**

[PM 6.01 Quality Assurance Program](#)

[PM 6.02 Quality Assurance Audits](#)

[PM 6.03 Lessons Learned](#)

[PM 6.05 Develop and Revise CIP Procedures](#)

#### **SECTION 7: ENVIRONMENTAL**

[PM 7.01 Environmental Review Implementation](#)

[PM 7.02 Environmental Permit Acquisition](#)



## **INFRASTRUCTURE DIVISION CIP PROCEDURES**

### **PROJECT DESIGN PROCEDURES**

#### **SECTION 1: GENERAL**

- [PD 1.01 Project Personnel Roles and other Definitions](#)
- [PD 1.02 P.E. Responsibilities](#)
- [PD 1.03 Meetings](#)
- [PD 1.04 Engineering Work Plans and Budgets for Planning and Design](#)
- [PD 1.05 Drafting Standards](#)
- [PD 1.06 Engineering Design Standards](#)
- [PD 1.08 Engineering & Operations Design Interface & Coordination](#)
- [PD 1.09 Equipment Identification and Numbering System](#)
- [PD 1.10 Construction Cost Estimating](#)
- [PD 1.11 Design Progress Reporting](#)
- [PD 1.12 City-Furnished Materials and Equipment](#)

#### **SECTION 2: PLANNING**

- [PD 2.01 Needs and Alternatives Identification](#)
- [PD 2.02 Alternatives Analysis and Evaluation](#)
- [PD 2.03 Conceptual Engineering Report](#)
- [PD 2.04 Design Criteria](#)
- [PD 2.05 Basic Engineering Design Data \(BEDD\) Sheets](#)

#### **SECTION 3: DESIGN**

- [PD 3.01 Engineering Calculations](#)
- [PD 3.02 Engineering Drawings](#)
- [PD 3.03 Project Specifications](#)
- [PD 3.05 Project Design Review Checklists](#)
- [PD 3.06 Security Coordination and Development](#)
- [PD 3.07 Corrosion Control](#)
- [PD 3.08 Safety in Design](#)
- [PD 3.09 SCADA Coordination and Development](#)

#### **SECTION 4: CONSTRUCTING/CONSTRUCTION**

- [PD 4.02 Addendum to Advertised Contract](#)
- [PD 4.03 Engineering Support During Bid Evaluation](#)
- [PD 4.04 Engineering Support During Construction](#)
- [PD 4.05 As-Built CAD Drawings](#)

#### **SECTION 5: QUALITY MANAGEMENT**

- [PD 5.01 Basics of Quality Control](#)
- [PD 5.03 Technical Advisory Panels \(TAPs\)](#)
- [PD 5.04 Value Engineering](#)
- [PD 5.05 Design Reviews](#)
- [PD 5.07 Formal Design Review Presentation](#)





## **INFRASTRUCTURE DIVISION CIP PROCEDURES**

### **CONSTRUCTION MANAGEMENT PROCEDURES**

#### **SECTION 1: PROJECT PLANNING**

[CM 1.01 Capital Project Budget Planning](#)

[CM 1.02 Escrow Account](#)

[CM 1.03 CM Budget Work Hours Planning](#)

#### **SECTION 2: PROJECT REVIEWS**

[CM 2.01 Constructability Review](#)

[CM 2.02 Construction Schedule Management](#)

[CM 2.03 Resident Engineer Report on Plans and Specifications](#)

[CM 2.04 Monthly Field Construction Status Report](#)

[CM 2.06 Pre-Construction Preparation](#)

#### **SECTION 3: CONSTRUCTION PROJECT ADMINISTRATION**

[CM 3.01 Project Photographs](#)

[CM 3.02 Change Order & Contract Modification](#)

[CM 3.03 Construction Contract Submittals](#)

[CM 3.04 Preconstruction Conference](#)

[CM 3.05 Resident Engineer and Inspector Construction Contract Field Reports](#)

[CM 3.06 Construction Engineering Division - Contract Files/Records](#)

[CM 3.08 Certified Payroll Reports](#)

[CM 3.09 Request for Information or Clarification](#)

[CM 3.10 Public Complaint Documentation](#)

[CM 3.11 Resident Engineer Administrative Close-out of Contract](#)

[CM 3.12 Automated Construction Contract Progress Payment](#)

[CM 3.13 Construction Contract Drawings Control](#)

[CM 3.15 Monitoring Status of Request for Clarification/Information](#)

[CM 3.16 Administration of Force Account](#)

[CM 3.18 Post-Construction Review Conference](#)

#### **SECTION 4: CONSTRUCTION PROJECT INSPECTION**

[CM 4.01 Construction Contract Punch List](#)

[CM 4.02 Pre- and Post-Construction Site Surveys](#)

[CM 4.03 Piles Inspection](#)

[CM 4.04 Notice of Contractor Non-Compliance](#)

[CM 4.05 Construction Risk Analysis](#)

#### **SECTION 5: TESTING (NOT USED)**

#### **SECTION 6: SAFETY**

[CM 6.01 Safety Training Program for Construction Engineering Division](#)

[CM 6.02 Construction Site Safety Reporting](#)

[CM 6.03 Construction Site Safety for Visitors](#)

**[WSIP CM Procedures \(link to page on SFPUC website\)](#)**

# Sewer System Improvement Program

Contract No. CS-165: Program Management Consultant Services

## CONSTRUCTION CHANGE CONTINGENCY AND PROGRAM/PROJECT DELIVERY COST ADVISORY WHITE PAPER for PROGRAM VALIDATION PHASE

Submitted by:

  
\_\_\_\_\_

Martin Dorward

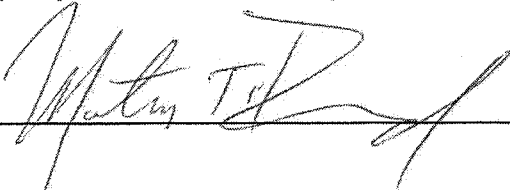
3/29/13  
Date

Prepared by:

Pratima Joshi, Hans Gaus and Tom Moe

Revision	Description	Issued Date
00	FINAL	March 29, 2013

Quality Assurance and Quality Control Review Complete:

  
\_\_\_\_\_

# Table of Contents

1. EXECUTIVE SUMMARY .....	3
2. INTRODUCTION .....	4
2A. PURPOSE OF PAPER.....	4
2B. DEFINITIONS.....	4
3. APPROACH .....	5
3A. COST BASIS AND ASSUMPTIONS FOR WATER SYSTEM IMPROVEMENTS PROGRAM (WSIP).....	6
3B. SAN FRANCISCO SEWER SYSTEM MASTER PLAN (SSIP 2010 BASELINE) .....	7
3C. ALLOWANCE PERCENTAGES FOR ORANGE COUNTY SANITATION DISTRICT (OCSD), CALIFORNIA .....	8
3D. ALLOWANCE PERCENTAGES FOR AUSTIN CLEAN WATER PROGRAM, TEXAS .....	9
4. PROJECT DELIVERY COST CATEGORIES .....	10
5. RECOMMENDATIONS .....	12
5A. CONSTRUCTION CHANGE CONTINGENCY ALLOWANCE PERCENTAGE .....	12
5B. GENERAL PROJECT DELIVERY COST MARKUP PERCENTAGES FOR SSIP PROJECTS .....	13
5C. PROGRAM MANAGEMENT COSTS .....	17
5D. TOTAL PROJECT DELIVERY COST MARKUPS FOR SSIP PROJECTS.....	17
5D1. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR GENERAL SSIP PROJECTS .....	18
5D2. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR BIOSOLIDS PROJECT .....	20
5D3. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR CBSIP .....	22
5E. SUMMARY OF RECOMMENDATIONS .....	24
REMARKS Dated March 20, 2013.....	25
APPENDIX A – DESCRIPTION OF TERMS .....	27
APPENDIX B – SUMMARY OF PROGRAM/PROJECT DELIVERY COSTS FOR SSIP PROJECTS (WITHOUT ESCALATION).....	31

## CONSTRUCTION CHANGE CONTINGENCY AND PROGRAM/PROJECT DELIVERY COST ADVISORY WHITE PAPER for PROGRAM VALIDATION PHASE

### 1. EXECUTIVE SUMMARY

The total program cost of implementing an infrastructure capital program includes much more than the construction cost of the individual projects alone. It typically includes costs for other activities associated with project implementation such as project management, program management, planning, design, environmental permitting and mitigation, communications and public outreach, as well as a contingency for unforeseen changes during construction. Collectively these associated costs are referred to as program/project delivery costs.

Appropriate allowances for each of these activities are added to the construction cost, as a percentage of the total construction cost estimate, to build the total project costs and the resulting total program costs. The appropriate allowances to be used for each of these activities to build the total project and program costs during the program validation phase, is the subject of this paper.

The paper includes recommendations for appropriate costs allowances for each individual activity associated with Sewer System Improvement Program (SSIP) program/project delivery costs as well as the methodology for calculating these allowances. These recommendations are summarized below in Table 1. Documentation supporting each percentage in the table can be found in the detailed tables presented later in the body of this paper.

**Table 1: Recommended SSIP Program/Project Delivery Cost Allowances**

	Description of Cost Component	Allowance	Un-escalated Cost
	Base Construction Cost Estimate*		<b>\$100.00</b>
A.	Construction Change Contingency	10%	<b>\$10.00</b>
	<b>Total Construction Cost</b>		<b>\$110.00</b>
B.	Project Delivery Cost **	48.15%	<b>\$52.97</b>
	<b>Total Project Cost</b>		<b>\$162.97</b>
C.	Program Management Cost	5.25%	

\*In accordance with general industry practice, the construction cost estimate at the Validation Phase includes a 30% Estimating Contingency.

\*\*Project Delivery Cost Allowance for general SSIP projects is 48.15% of Total Construction Cost

The assumption that the base construction estimate includes an estimating contingency of 30%, along with the method of calculation stated in the table above, indicates that there is an inherent 40% contingency amount included in the program/project delivery costs. This amount of contingency is recommended at the program validation phase and should be revisited as the scope of the program gets better defined. Furthermore, the program/delivery costs will be subject to the same escalation guidelines that have been recommended and implemented in the development of the program validation costs and summarized in the "Escalation Projection White Paper" dated February 11, 2013.



## 2. INTRODUCTION

### 2A. PURPOSE OF PAPER

The total scope of a project or program typically involves the three phases of planning, design, and construction. The costs of activities prior to and supporting construction are generally considered to include project delivery costs and program management costs. Experience with public infrastructure programs has shown that these costs are not a small percentage of the total cost and they must be accurately estimated to establish credible budgets and funding requirements.

The purpose of this paper is three-fold: first, to define categories which make up project delivery costs; second, to establish a percentage of construction cost associated with these activities; and third, to recommend how this cost should be applied to the projects currently defined in the program validation phase of the SSIP. In order to accomplish its purpose, this paper reviews historical information previously developed by the SFPUC as well as available information from wastewater programs in other parts of the country.

### 2B. DEFINITIONS

The total program cost typically includes a variety of factors and activities, each of which has an associated cost. In this paper, these added costs have been summarized into three (3) groups: Construction Change Contingency, Project Delivery Cost, and Program Management Cost, which will be further defined in this section.

#### i. Construction Change Contingency

Construction change contingency is an industry term for unforeseen site conditions and contractor change orders or claims that increase the final as-built price above the anticipated bid value for the project.

#### ii. Project Delivery Costs

Project delivery costs or "soft costs", is a construction industry term for expense items that are not considered direct construction costs. Soft costs differ from "hard costs" in that they are generally not considered to be exclusively related to physical construction. Soft costs capture those items that are necessary in developing and implementing a project such as but not limited to project management, planning, design, environmental review, permitting, public outreach and construction management.

#### iii. Program Management

Program Management costs vary depending on the size and complexity of a project or program. These fees are allocated to aid in successful program implementation by providing services for pre-planning, coordination between departments, support of personnel from the City's communications, legal and finance departments, program controls, reporting, estimating and scheduling at the program level.

#### Cost Escalation:

Cost escalation is defined as changes in the cost or price of specific goods, services and/or labor in a given economy over a defined period of time. The subject of escalation in the Sewer System Improvement Program (SSIP) is dealt with separately in the "Escalation Projection White Paper," which recommends that

a rate of escalation of 4.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate for each project to be implemented within the ten year period of 2013 to 2022. It further recommends that for the second ten year period from 2023 to 2032 and beyond, a rate of escalation of 5.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate. All program/project delivery costs stated in this paper will be escalated using the guidelines stated above and included in the "Escalation Projection White Paper" dated February 11, 2013.

Allowances for each of the cost groups discussed above will be applied to the Total Construction Cost Estimate, to build the total program cost.

### 3. APPROACH

This paper will review information previously developed by the SFPUC as well as available information from wastewater programs in other parts of the country, and compare these values with the recommendations for the SSIP.

The available SFPUC information includes the following documents:

- Water System Improvement Program (WSIP)
  - Cost and Schedule Basis and Assumptions, March 2005
  - Annual Fiscal Year Cost Breakdown, June 2011
- San Francisco Sewer System Master Plan (SSIP 2010 Baseline)
  - Alternatives Summary and Estimated Costs, November 2010 (Carollo Engineers)

The WSIP and SSIP 2010 costs were carefully considered in the development of the SSIP (2012) soft costs presented herein.

Wastewater programs in other parts of the country were also used for comparison, including: Orange County Sanitation District (OCSD), California, and Austin Clean Water Program (Austin), Texas. When comparing these other programs it is noted that costs in San Francisco will typically be higher for a number of reasons including:

- A dense urban setting which makes construction challenging;
- An elaborate political and multi-layered decision making system which adds time to the pre-construction phase of the project;
- Strong union influence and local hire programs which include required training components;
- Extensive and extended environmental review to allow community input, provide transparency and avoid potential litigation;
- Provision for benefits for communities impacted by the construction or the ongoing operation of the SFPUC facility; and
- Extensive contracting requirements and processes requiring a long bid and award period.

These qualifiers were taken into account when performing the comparative analyses later in this paper.



### 3A. COST BASIS AND ASSUMPTIONS FOR WATER SYSTEM IMPROVEMENTS PROGRAM (WSIP)

In March 2005, the SFPUC developed the *Cost and Schedule Basis and Assumptions* manual to provide a basis for WSIP cost and schedule projections. This manual described guidelines for estimating the base bid construction budget, construction change contingency, and total program delivery costs for WSIP. In conjunction with these guidelines, WSIP has prepared an annual fiscal year cost breakdown for all projects in the program. The most recent cost breakdown was developed in June 2011, a summary of which is presented in Table 2, showing the following allowances:

- Construction Change Contingency            9.77% of the Estimated Construction Cost/Bid
- Program/Project Delivery Costs            55.17% of the Estimated Construction Cost/Bid

Details of these markups and their potential applicability to the current SSIP will be discussed later in this paper.

**Table 2: Summary of WSIP June 2011 Soft Cost Analysis**

WSIP Cost Breakdown as of June 2011		WSIP Project/Program Cost	% of WSIP Estimated Construction Cost/Bid	% of WSIP Total Program Cost
Construction Cost	Estimated Construction Cost/Bid	\$2,396,262,291		60.63%
	Construction Change Contingency	\$234,070,272	9.77%	5.92%
	<b>Total Construction Cost (A)</b>	<b>\$2,630,332,563</b>		<b>66.55%</b>
PM Cost	Program Management	\$78,105,513	3.26%	1.98%
	Project Management	\$155,199,808	6.48%	3.93%
	Subtotal Program Management	\$233,305,321	9.74%	5.90%
Pre-Design & Planning	NAR, AAR, CER	\$80,804,727	3.37%	2.04%
Environmental Cost	Review & Permitting	\$105,443,373	4.40%	2.67%
	Construction Compliance	\$56,789,244	2.37%	1.44%
	Subtotal Environmental	\$162,232,617	6.77%	4.10%
Engineering Cost	Detailed Design	\$292,211,238	12.19%	7.39%
Construction Management Cost	Construction Management	\$314,842,212	13.14%	7.97%
	Engineering Support	\$85,220,589	3.56%	2.16%
Other SFPUC & City Departments	Legal & ROW	\$8,271,047	0.35%	0.21%
	Legal Project Support	\$13,284,200	0.55%	0.34%
	Operations Support	\$24,915,705	1.04%	0.63%
Other Costs	Environmental Avoidance & Mitigation Cost	\$61,802,844	2.58%	1.56%
	Art Commission Fee	\$5,382,654	0.22%	0.14%
	Security Upgrade Cost	\$3,412,090	0.14%	0.09%
	Real Estate Costs	\$36,407,358	1.52%	0.92%
<b>Program/Project Delivery Costs (B)</b>		<b>\$1,322,092,602</b>	<b>55.17%</b>	<b>33.45%</b>
<b>TOTAL WSIP PROGRAM COST (A) + (B)</b>		<b>\$3,952,425,165</b>	<b>164.94%</b>	<b>100.00%</b>

## Construction Change Contingency and Program/Project Delivery Cost Advisory White Paper

**3B. SAN FRANCISCO SEWER SYSTEM MASTER PLAN (SSIP 2010 BASELINE)**

In preparation for the June 2012 Program Validation, construction change contingency and program/project delivery costs for the SSIP 2010 baseline were analyzed for the larger components of the program. This effort was undertaken by breaking down the SSIP November 2010 estimate to define its procedures and assumptions. A summary of the 2010 baseline SSIP soft costs by activity is presented in Table 3 showing the following markups:

- Construction Change Contingency                    9.75% of Construction Cost Escalated
- Program/Project Delivery Costs                    44.37% of Construction Cost Escalated

Details of these markups and their potential applicability to the current SSIP will be discussed later in this paper.

**Table 3: Summary of SSIP 2010 Baseline Soft Cost Analysis**

<b>SSIP Overall Program Baseline Estimate(2010) - Without Treasure Island Treatment Plant</b>			
<b>Description</b>	<b>SSIP Baseline</b>	<b>% of Total (B)</b>	<b>% of Total Cost (D)</b>
Base Construction Cost Estimate (A)	\$2,280,052,557		37.58%
Estimate Contingency Cost	0	0.00%	0.00%
Compounded Cost Escalation *	\$1,656,702,000		27.31%
<b>Construction Cost Escalated (B)</b>	<b>\$3,936,754,557</b>		<b>64.88%</b>
<b>Construction Change Contingency</b>	\$383,687,000	9.75%	6.32%
<b>Subtotal Construction Cost (C)</b>	<b>\$4,320,441,557</b>		<b>71.21%</b>
Environmental Mitigation Costs	\$46,425,957	1.18%	0.77%
Art Commission Fee Costs	\$4,220,542	0.11%	0.07%
Public Outreach	\$35,000,000	0.89%	0.58%
<b>Subtotal</b>	<b>\$85,646,499</b>	<b>2.18%</b>	<b>1.41%</b>
Project Management	\$213,197,078	5.42%	3.51%
Planning/Pre-Design	\$77,902,402	1.98%	1.28%
Environmental Planning & Review	\$71,126,005	1.81%	1.17%
Engineering Design	\$351,314,699	8.92%	5.79%
<b>Subtotal Planning and Design</b>	<b>\$713,540,184</b>	<b>18.13%</b>	<b>11.76%</b>
Bid and Award	\$8,441,083	0.21%	0.14%
Construction Management & Admin.	\$422,054,156	10.72%	6.96%
Closeout	\$4,220,542	0.11%	0.07%
<b>Subtotal Construction Management</b>	<b>\$434,715,781</b>	<b>11.04%</b>	<b>7.16%</b>
<b>Department/Agency Fees</b>	<b>\$127,666,247</b>	<b>3.24%</b>	<b>2.10%</b>
<b>Security, Land, ROW Costs</b>	<b>\$129,878,854</b>	<b>3.30%</b>	<b>2.14%</b>
Program Management Consultant	\$157,502,327	4.00%	2.60%
City Program Management	\$97,973,144	2.49%	1.61%
<b>Subtotal Program Management</b>	<b>\$255,475,471</b>	<b>6.49%</b>	<b>4.21%</b>
<b>Program/Project Delivery Costs</b>	<b>\$1,746,927,914</b>	<b>44.37%</b>	<b>28.79%</b>
<b>SSIP 2010 BASELINE TOTAL (D)</b>	<b>\$6,067,369,471</b>		<b>100.00%</b>

\* Compounded Cost Escalation is 72.66% of the Base Construction Cost Estimate



**3C. ALLOWANCE PERCENTAGES FOR ORANGE COUNTY SANITATION DISTRICT (OCSD), CALIFORNIA**

The Orange County Sanitation District (OCSD), located southeast of Los Angeles in Southern California, recently completed a large wastewater program upgrade similar to SSIP. OCSD has a history of using past project soft cost data to determine a percentage of construction costs by project phase, so its data should present a representative example for SSIP. OCSD's available data indicate a range of 26% to 55% for soft costs with a median of 46%. Table 4 below shows this percentage broken down between OCSD staff and outside (consultant) services for each project phase. OCSD also applies a construction change contingency of 10% to its base bid construction budgets (not shown in Table 4).

**Table 4: OCSD Non-Construction (Soft) Costs as a Percent of Construction Costs**

<b>OCSD Non-Construction Costs as a Percentage of Construction Costs</b>			
<b>Project Phase</b>	<b>OCSD Staff</b>	<b>Outside (Consultant) Services</b>	<b>Total</b>
Project Development	4.50%	0.00%	4.50%
Preliminary Design	2.50%	1.00%	3.50%
Environmental Planning	0.00%	2.50%	2.50%
Detailed Design	4.50%	10.50%	15.0%
Bid and Award	0.25%	0.25%	0.50%
Construction Management	9.50%	5.50%	15.00%
Environmental Mitigation	1.25%	1.25%	2.50%
Commissioning & Support	1.00%	1.00%	2.00%
Closeout	0.25%	0.25%	0.50%
<b>Total</b>	<b>23.75%</b>	<b>22.25%</b>	<b>46.00%</b>

**3D. ALLOWANCE PERCENTAGES FOR AUSTIN CLEAN WATER PROGRAM, TEXAS**

The City of Austin, Texas, recently completed a significant wastewater program called the Austin Clean Water Program. The City tracked soft costs in the eleven (11) categories shown in Table 5 below. The soft costs represent 43% of the construction cost. The City also applied a construction change contingency of 10% to its base bid construction budgets (not shown in Table 5).

**Table 5: Austin CWP Non-Construction (Soft) Costs as a Percent of Construction Costs**

<b>Austin Non-Construction Costs as a Percent of Construction Costs</b>			
<b>Project Phase</b>	<b>Actual Cost</b>	<b>Percent of Construction</b>	<b>Percent of Total</b>
Construction	\$260,000,000	---	69.93%
Planning and Pre-design	\$5,100,000	1.96%	1.37%
Environmental Planning and Review	\$2,800,000	1.08%	0.75%
Design Project Management	\$20,100,000	7.73%	5.41%
Design Engineering	\$31,500,000	12.11%	8.47%
Environmental Mitigation	\$8,000,000	3.08%	2.15%
Public Outreach	\$3,400,000	1.31%	0.91%
Land Acquisition	\$18,700,000	7.19%	5.03%
Permitting	\$3,000,000	1.15%	0.81%
Bid and Award	\$2,000,000	0.77%	0.54%
Construction Administration	\$16,700,000	6.42%	4.49%
Closeout	\$500,000	0.19%	0.13%
<b>Total Soft Costs</b>	<b>\$111,800,000</b>	<b>43.00%</b>	<b>30.07%</b>
<b>Total Program Costs</b>	<b>\$371,800,000</b>	<b>---</b>	<b>100.00%</b>



#### 4. PROJECT DELIVERY COST CATEGORIES

The SSIP is fortunate that WSIP previously developed the *Cost and Schedule Basis and Assumptions* manual that provides significantly similar program/project delivery cost information. This manual identified and described the following ten (10) categories of project delivery cost:

- Environmental Mitigation
- Arts Commission Fees
- City Project Management
- Planning and Pre-design
- Environmental Planning and Review
- Engineering Design
- Construction Management
- Department and Agency Fees ( Legal Project Support, Operations Support and Right-of-way Support)
- Security Upgrades, Land and ROW Acquisition
- Program Management

Since the release of this manual in 2005, SFPUC staff deemed it prudent to consider the addition of the following four (4) program/project delivery cost categories to the above list:

- Communication
- Public Outreach
- Bid and Award
- Closeout

SFPUC staff determined that the first two of these additional categories, namely communication and public outreach, are needed to account for the anticipated degree of public and community involvement that will be required to implement the SSIP. SFPUC staff also determined that the last two of these additional categories, namely bid and award and closeout, are needed to accurately allocate costs for the program's post-design services.

Thus, this paper recommends that a total of 15 (fifteen) categories be used to further define the Total Program/Project Delivery Cost:

- A construction change contingency,
- Thirteen (13) categories to estimate the total project delivery costs, and
- A separate Program Management Cost applied uniformly over the entire SSIP.

A brief definition of these categories is presented below. A more detailed description is included in Appendix 1.

- i. **Construction Change Contingency:** costs to handle unforeseen site conditions and contractor change orders and potential claims.
- ii. **Environmental Mitigation/Construction Compliance:** costs of mitigating for environmental impacts that may be identified during the environmental review of each project.

- iii. **Communication:** costs associated with the distribution of information to program stakeholders in addition to the costs for a formal public outreach program.
- iv. **Arts Commission Fees:** costs provided for design, production, and installation of artwork or art enrichment at all above grade structures constructed in the program.
- v. **Public Outreach:** costs of providing a structured program for public information and project involvement.
- vi. **City Project Management:** costs associated with City oversight and management for each specific project in the program.
- vii. **Planning and Pre-design:** costs to provide initial scope studies, develop viable alternatives, and produce an alternatives analysis, engineering assessment and recommendation prior to the engineering design phase. These costs also include the production of necessary planning/pre-design reports.
- viii. **Environmental Planning and Review:** costs for preparing project environmental documentation in compliance with the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), and other permitting requirements, and costs associated with coordinating the document review and permitting process.
- ix. **Engineering Design and Engineering Support During Construction (ESDC):** costs required to produce the appropriate designs (including calculations, drawings, and specifications for a contract bid package) that will meet operational requirements and measurable delivery goals, and provide engineering support during the Bid and Award phase as well as the project construction phase.
- x. **Bid and Award:** costs needed to advertise a contract bid package, prepare and distribute addenda, review contractor submittals, provide requests for information (RFI's) and to award a construction contract.
- xi. **Construction Management:** costs provided for the construction oversight team including construction manager, resident engineers and inspectors, and administrative staff that will provide design support during construction.
- xii. **Closeout:** costs needed to document and store hard copy and electronic project files and to file final project completion paperwork.
- xiii. **Department/Agency Fees:** fees paid for services from other Divisions in the SFPUC, or other City departments that provide support to the program including but not limited to ROW support, legal support, and operations support.
- xiv. **Security Upgrades, Land, and ROW:** additional costs for projects that will have off-site components requiring additional land and/or ROW acquisition as well as upgrades to normal site security.
- xv. **Program management:** costs provided for City and consultant staff to manage development and implementation of the program (discussed separately in section 5C).



**5. RECOMMENDATIONS**

**5A. CONSTRUCTION CHANGE CONTINGENCY ALLOWANCE PERCENTAGE**

When estimating the total construction cost of a project, there is always uncertainty as to the precise content of all items in the Base Construction Cost Estimate, how the work will be performed, and what work conditions will be like when the project is executed. The estimated cost of the known-unknowns during construction is referred to by cost estimators as construction change contingency.

The Association for the Advancement of Cost Engineering (AACE International), has defined contingency as an amount added to a construction estimate:

“to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in the aggregate, in additional costs.”

The WSIP *Cost and Schedule Basis and Assumptions* manual includes construction change contingency within the total construction cost estimate to reflect this potential growth in the contract value during construction. The manual recognized that industry practice generally utilizes 10% of the budgeted construction value for construction change contingency. The 10% allowance for change during construction has also been a standard used by SFPUC. Review of the actual cost data from the WSIP, SSIP 2010, OCSD and Austin revealed these percentages for construction change contingency:

- WSIP cost performance through 2011 = 9.77%
- SSIP 2010 overall program baseline = 9.75%
- Orange County Sanitation District, California = 10%
- Austin Clean Water Program, Texas = 10%

Based on this data, a contingency of 10% for changes during construction is recommended for SSIP cost estimates. The total estimated construction cost is, therefore, the sum of the base construction cost estimate plus a 10% markup for construction change contingency. A representative cost breakdown is shown below:

No.	Category	Allowance	Cost
	Base Construction Cost Estimate*		\$100.00
A.	Construction Change Contingency Cost	10%	\$10.00
	<b>Total Construction Cost</b>		<b>\$110.00</b>

\*Base Construction Cost Estimate includes a 30% Estimating Contingency at the Validation Phase.

**5B. GENERAL PROJECT DELIVERY COST MARKUP PERCENTAGES FOR SSIP PROJECTS**

This section of the paper recommends a percentage allowance for the project delivery cost categories identified in Section 4 and discusses the rationale for each recommendation. The sum of these items equals the project delivery cost markup of **48.15%** for SSIP projects.

**i. Environmental Mitigation/Construction Compliance:** Includes costs of mitigating for environmental impacts that may be identified during the environmental review of each project. Analysis of the actual cost data from the previously identified sources revealed these percentages for environmental mitigation:

- WSIP cost performance through 2011 = 2.37%
- SSIP 2010 overall program baseline = 1.18%
- Orange County Sanitation District, California = 2.50%
- Austin Clean Water Program, Texas = 3.08%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated environmental mitigation costs. Based on the WSIP data, a slightly higher markup of **2.50%** for environmental mitigation is recommended for SSIP cost estimates. This recommended markup is also consistent with OCSD's similar wastewater program.

**ii. Communication:** Includes costs for disseminating information to program stakeholders in addition to the costs for a formal public outreach program. Analysis of the actual cost data from the previously identified sources revealed these percentages for communication:

- WSIP cost performance through 2011 = not identified separately
- SSIP 2010 overall program baseline = not identified separately
- Orange County Sanitation District, California = not identified separately
- Austin Clean Water Program, Texas = not identified separately

Although none of the above sources provides a guideline for cost of communication, it seems prudent to include this category, particularly when considering the number of meetings and volume of printed material that will be needed during the life of the SSIP. Therefore, a markup of **0.50%** for communication is recommended for SSIP cost estimates.

**iii. Arts Commission Fees:** Includes costs for design, production, and installation of artwork or art enrichment at all above grade structures constructed in the program. Analysis of the actual cost data from the previously identified sources revealed these percentages for arts commission fees:

- WSIP cost performance through 2011 = 0.22%
- SSIP 2010 overall program baseline = 0.11%
- Orange County Sanitation District, California = not identified separately
- Austin Clean Water Program, Texas = not identified separately

The WSIP cost performance through 2011 provides a reasonable starting point for estimating SSIP's Arts Commission fees. However, since the initiation of WSIP, the Arts Commission requirements have become more rigorous. In addition, although much of SSIP's sewer and pump station construction will be underground, there will be a large amount of above ground construction particularly at the Southeast

---

Construction Change Contingency and Program/Project Delivery Cost Advisory White Paper

Plant. Therefore, a higher markup of **0.50%** for Arts Commission fees is recommended for SSIP cost estimates.

**iv. Public Outreach:** Includes costs of providing a structured program for public information and project involvement. Analysis of the actual cost data from the previously identified sources revealed these percentages for public outreach:

- WSIP cost performance through 2011 = not identified separately
- SSIP 2010 overall program baseline = 0.89%
- Orange County Sanitation District, California = not identified separately
- Austin Clean Water Program, Texas = 1.31%

Based on this data, a markup of **0.50%** for public outreach is recommended for SSIP cost estimates, allowing for the 0.50% that has already been included for Item 2 (communication) as described above. This brings the total markup for communication and public outreach to 1.00%.

**v. City Project Management:** Includes costs associated with City oversight and management for each specific project in the program. Analysis of the actual cost data from the previously identified sources revealed these percentages for City project management:

- WSIP cost performance through 2011 = 6.48%
- SSIP 2010 overall program baseline = 5.42%
- Orange County Sanitation District, California = 4.50%
- Austin Clean Water Program, Texas = 7.73%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated City project management costs. Based on the WSIP data, a markup of **6.50%** for City project management is recommended for SSIP cost estimates. This percentage also places it within the envelope of the other programs included in the analysis.

**vi. Planning and Pre-design:** Includes costs for producing conceptual designs and reports (e.g., Conceptual Engineering Reports) needed prior to engineering design. Analysis of the actual cost data from the previously identified sources revealed these percentages for planning and pre-design:

- WSIP cost performance through 2011 = 3.37%
- SSIP 2010 overall program baseline = 1.98%
- Orange County Sanitation District, California = 3.50%
- Austin Clean Water Program, Texas = 1.96%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated planning and pre-design costs. Based on the WSIP data, a markup of **3.50%** for planning and pre-design is recommended for SSIP cost estimates. This recommended markup is also consistent with Orange County Sanitation District's similar wastewater program.

**vii. Environmental Planning and Review:** Includes costs for preparing project environmental documentation and coordinating the document review and permitting process. Analysis of the actual cost data from the previously identified sources revealed these percentages for environmental planning and review:

- WSIP cost performance through 2011 = 4.40%
- SSIP 2010 overall program baseline = 1.81%
- Orange County Sanitation District, California = 2.50%
- Austin Clean Water Program, Texas = 1.08%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated environmental planning and review costs. Based on the WSIP data, a markup of **4.40%** for environmental planning and review is recommended for SSIP cost estimates. San Francisco is also judged to have a more rigorous environmental planning and review process than both OCSD and Austin.

**viii. Engineering Design and Engineering Support During Construction:** Includes costs required to produce the appropriate designs including calculations, drawings, and specifications for a contract bid package. Refinement of the design and the appropriate design documents will be made at design review cycles (35%, 65%, 95%) before reaching the 100% design completion. This also includes costs to provide engineering support during the Bid and Award phase, as well as the construction phase, to review contractor submittals, requests for information (RFI's), change orders, testing, startup, commissioning, and as-built document review/development. Analysis of the actual cost data from the previously identified sources revealed these percentages for engineering design:

- WSIP cost performance through 2011 = 12.19%
- SSIP 2010 overall program baseline = 8.92%
- Orange County Sanitation District, California = 15.00%
- Austin Clean Water Program, Texas = 12.11%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated engineering design costs. It is important to note that the percentage shown for WSIP is based on current data, and **not** on the original baseline estimate for WSIP developed in 2005. It is also important to note that projects in both WSIP and SSIP vary on size and scope of work. The current design costs in WSIP for large treatment plants is approx. 8% to 9% of the total project cost and design costs for pipelines, tunnels and other "linear" projects is 5% to 6% of the total project cost. For SSIP projects, a markup of **12.00%** will be used for both engineering design and engineering support during construction. This markup makes design costs for SSIP projects consistent with the typical WSIP design costs for large treatment plants, and adds an additional 3% for engineering support during construction. As discussed, the cost split for this category is as follows:

- 9% for Engineering Design
- 3% for Engineering Support During Construction

**ix. Bid and Award:** Includes costs needed to advertise a contract bid package, prepare and distribute addenda, and award a construction contract. Analysis of the actual cost data from the previously identified sources revealed these percentages for bid and award:



---

Construction Change Contingency and Program/Project Delivery Cost Advisory White Paper

---

- WSIP cost performance through 2011 = not identified separately
- SSIP 2010 overall program baseline = 0.21%
- Orange County Sanitation District, California = 0.50%
- Austin Clean Water Program, Texas = 0.77%

Based on this data, a markup of **0.50%** for bid and award is recommended for SSIP cost estimates. This recommended markup is consistent with OCSD's similar wastewater program and also places it within the envelope of the other programs included in the analysis.

**x. Construction Management:** Includes costs provided for the construction oversight team including the construction manager, resident engineers and inspectors, and administrative staff. Analysis of the actual cost data from the previously identified sources revealed these percentages for construction management:

- WSIP cost performance through 2011 = 13.14%
- SSIP 2010 overall program baseline = 10.72%
- Orange County Sanitation District, California = 15.00%
- Austin Clean Water Program, Texas = 6.42%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated construction management costs. It should be noted, however, that WSIP's markup of 13.14% included bid and award and closeout as these components were not broken out separately. Based on this data, a markup of **12.00%** for construction management is recommended for SSIP cost estimates, allowing for segregated bid and award and closeout costs. This percentage also places it within the envelope of the other programs included in the analysis.

**xi. Closeout:** Includes costs needed to document and store hard copy and electronic project files and to file final project completion paperwork. Analysis of the actual cost data from the previously identified sources revealed these percentages for closeout:

- WSIP cost performance through 2011 = not identified separately
- SSIP 2010 overall program baseline = 0.11%
- Orange County Sanitation District, California = 0.50%
- Austin Clean Water Program, Texas = 0.19%

Based on this data, a markup of **0.50%** for closeout is recommended for SSIP cost estimates. This recommended markup is consistent with OCSD's similar wastewater program.

**xii. Department/Agency Fees:** Includes fees paid for services from other City departments that provide support to the program including ROW support, legal support, and operations support. Analysis of the actual cost data from the previously identified sources revealed these percentages for department/agency fees:

- WSIP cost performance through 2011 = 1.94%
- SSIP 2010 overall program baseline = 3.24%
- Orange County Sanitation District, California = 1.50%
- Austin Clean Water Program, Texas = 1.15%

The WSIP cost performance through 2011 provides a good indicator of SSIP's anticipated bureau/department/agency fees. A markup of **1.45%** for department/agency fees is recommended for SSIP cost estimates, placing it within the envelope of the other programs included in the analysis. The specific breakdown of this category is as follows:

- Legal Project Support = 0.55%
- Operations Support = 0.65%
- Legal and Right-of-way Support = 0.25%

**xiii. Security Upgrades, Land and Right-of-way (ROW):** Includes additional costs for projects that will require additional land and/or ROW plus upgrades to normal site security including fencing, gates and surveillance. Analysis of the actual cost data from the previously identified sources revealed these percentages for security upgrades, land, and ROW:

- WSIP cost performance through 2011 = 1.66%
- SSIP 2010 overall program baseline = 3.30%
- Orange County Sanitation District, California = 0.50%
- Austin Clean Water Program, Texas = 7.19%

The SSIP 2010 overall program baseline provides a good indicator of SSIP's anticipated program security upgrades, land, and ROW costs. These baseline percentages consider that land costs in an urban environment (as is the case for SSIP projects) are expected to be higher than those for WSIP projects, which were in primarily rural environments. Therefore a markup of **3.30%** for security, land, and ROW costs is recommended for SSIP cost estimates. It should also be noted that very large land acquisition costs for new facilities were needed in Austin's Clean Water Program, leading to a much higher markup and, therefore, this program was not felt to be representative in this category.

#### **5C. PROGRAM MANAGEMENT COSTS**

SFPUC staff decided that costs for program management should be separated entirely from the soft cost analysis and instead applied at a uniform percentage on top of the other project delivery costs. A program management markup of **5.25%** was derived by spreading the total program management cost of \$320 million over 20 years, including escalation.

#### **5D. TOTAL PROJECT DELIVERY COST MARKUPS FOR SSIP PROJECTS**

The recommended approach for the remainder of this paper will be to first recommend project delivery cost markups for the general SSIP projects, make adjustments as necessary for the New Biosolids Digester Facilities Project (Biosolids Project) and the Central Bayside System Improvement Project (CBSIP) (discussed in sections 5D2 and 5D3), and then apply a uniform program management markup of 5.25% for the entire program.

**5D1. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR GENERAL SSIP PROJECTS**

Table 6 on the following page presents the recommended cost markups for SSIP projects other than the Biosolids Project and the CBSIP. This table shows the grouping of cost categories within the nine (9) project phases of the SFPUC Work Breakdown Structure (WBS). A summary of the table is stated below:

- Construction Change Contingency (A2) = 10.00% of (A1) {This amount does NOT include adjustments for escalation}
- Project Delivery Cost (C) = 48.15% of Total Construction Cost (B)
- Program Management (D) = 5.25%

**Table 6: Recommended Soft Cost Allowances for SSIP Projects other than Biosolids Project and CBSIP, per Phase of Project**

<b>Construction Contingency and Project Delivery Costs for SSIP Projects other than Biosolids Project and CBSIP</b>			
<b>WBS Phase No.</b>	<b>Cost Description</b>	<b>% of Constr. Cost (B)</b>	<b>Phase of Project</b>
	Base Bid Construction Budget Including Estimating Contingency (A1)	100.00%	Construction
	<b>Construction Change Contingency (A2)</b>	<b>10.00%</b>	Construction
<b>(1)</b>	<b>Total Construction Cost (B) = A1 + A2</b>	<b>110.00%</b>	<b>Construction</b>
	Environmental Mitigation/Construction Compliance	2.50%	Distributed over Construction
	Security Upgrades, Land, and ROW	3.30%	Distributed over Construction
	<b>Subtotal</b>	<b>5.80%</b>	
	Communication	0.50%	Project Management
	Arts Commission Fees	0.50%	Project Management
	Public Outreach	0.50%	Project Management
	City Project Management	6.50%	Project Management
	Legal Project Support	0.55%	Project Management
	Operations Support	0.65%	Project Management
	Community Benefits		
<b>(2)</b>	<b>Subtotal Project Management</b>	<b>9.20%</b>	
<b>(3)</b>	Planning and Pre-design	3.50%	Planning
<b>(4)</b>	Environmental Planning and Review	4.40%	Environmental
<b>(5)</b>	Legal & ROW Support	0.25%	Land Acquisition Support
<b>(6)</b>	Engineering Design and Engineering Support During Construction	12.00%	Design
<b>(7)</b>	Bid and Award	0.50%	Bid and Award
<b>(8)</b>	Construction Management	12.00%	Construction Mgmt.
<b>(9)</b>	Closeout	0.50%	Closeout
	<b>Subtotal</b>	<b>33.15%</b>	
	<b>Subtotal Project Delivery Cost (C)</b>	<b>48.15%</b>	
	<b>Program Management Cost (City and Consultant) (D)</b>	<b>5.25%</b>	
	<b>Total Construction Change Contingency + Project Delivery Cost + Program Management Cost (B + C + D)</b>	<b>163.40%</b>	



**5D2. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR BIOSOLIDS PROJECT**

In considering the suitability of a uniform project delivery cost markup for all projects in the program, SFPUC staff decided that two large projects, the Biosolids Project and the Central Bayside System Improvements Project (CBSIP), should be segregated from the total list of SSIP projects. The development of these two projects is generally much farther along than the other projects in the SSIP and much more is known about their scope and cost and their appropriate project delivery cost markups.

The Biosolids Project will provide a new digester and solids handling facility, replacing the existing aged and failing facility at the Southeast Water Pollution Control Plant (SEP). The new facility would include state-of-the-art treatment processes producing Class A (EPA 40 CFR 503) biosolids that can be reused for beneficial purposes. Biosolids treatment processes would include solids thickening, anaerobic digestion, gas handling, energy generation/reuse, dewatering, odor control and side stream treatment. Possible siting alternatives for the new facility are being evaluated, either on-site at or near the existing digester area, or off-site with the addition of available adjacent property.

Based on discussions with SFPUC management and staff, recommended project delivery cost adjustments (to the previous percentages discussed in Table 6) for the Biosolids Project are as follows:

- Increase the percentage for Public Outreach by 0.5%, from 0.5% to 1.0%.
- Include an additional category for Community Benefits at 10%.

Table 7 on the following page presents the recommended cost markups for the Biosolids Project, which are summarized below:

- Construction Change Contingency (A2) = 10.00% of (A1) {This amount does NOT include adjustments for escalation}
- Project Delivery Cost (C) = 58.65% of Total Construction Cost (B)
- Program Management Cost (D) = 5.25%

**Table 7: Recommended Cost Allowances for the Biosolids Project per Phase of Project**

<b>Construction Contingency and Project Delivery Costs for Biosolids Project</b>			
<b>WBS Phase No.</b>	<b>Cost Description</b>	<b>% of Constr. Cost (B)</b>	<b>Phase of Project</b>
	Base Bid Construction Budget Including Estimating Contingency (A1)	100.00%	Construction
	<b>Construction Change Contingency (A2)</b>	<b>10.00%</b>	Construction
(1)	<b>Total Construction Cost (B) = A1 + A2</b>	<b>110.00%</b>	<b>Construction</b>
	Environmental Mitigation/Construction Compliance	2.50%	Distributed over Construction
	Security Upgrades, Land, and ROW	3.30%	Distributed over Construction
	<b>Subtotal</b>	<b>5.80%</b>	
	Communication	0.50%	Project Management
	Arts Commission Fees	0.50%	Project Management
	Public Outreach	1.00%	Project Management
	City Project Management	6.50%	Project Management
	Legal Project Support	0.55%	Project Management
	Operations Support	0.65%	Project Management
	Community Benefits	10.0%	Project Management
(2)	<b>Subtotal Project Management</b>	<b>19.70%</b>	
(3)	Planning and Pre-design	3.50%	Planning
(4)	Environmental Planning and Review	4.40%	Environmental
(5)	Legal & ROW Support	0.25%	Land Acquisition Support
(6)	Engineering Design and Engineering Support During Construction	12.00%	Design
(7)	Bid and Award	0.50%	Bid and Award
(8)	Construction Management	12.00%	Construction Mgmt.
(9)	Closeout	0.50%	Closeout
	<b>Subtotal</b>	<b>33.15%</b>	
	<b>Subtotal Project Delivery Cost (C)</b>	<b>58.65%</b>	
	<b>Program Management Cost (City and Consultant) (D)</b>	<b>5.25%</b>	
	<b>Total Construction Change Contingency + Project Delivery Cost + Program Management Cost (B + C + D)</b>	<b>173.90%</b>	

**5D3. PROJECT DELIVERY COST MARKUP PERCENTAGES FOR CBSIP**

As mentioned previously, SFPUC staff decided that two large projects, the Biosolids Project and the Central Bayside System Improvements Project (CBSIP), should be segregated from the total list of SSIP projects in the calculation of project delivery costs because of their level of development in comparison with other projects in the SSIP.

The Central Bayside System Improvements Project (CBSIP) will provide collection system enhancement to the Channel Drainage Basin, including needed redundancy for the existing 66-inch Channel Force Main, hydraulic improvements to sewers/pump stations, and improvements to stormwater management through elements of both grey and green infrastructure. An analysis will be conducted to quantify the current and future anticipated stormwater flows and run-off that must be managed. Major components of the project consist of a tunnel to transport, via gravity, dry and wet-weather flows from the Channel and North Shore Drainage Basins to the Southeast Water Pollution Control Plant (SEP) and a large all-weather pump station to lift the flows into the plant.

Based on discussions with SFPUC management and staff related to project complexity, scope and other historical data related to tunneling projects executed previously by SFPUC, the recommended project delivery cost adjustments (to the previous percentages discussed in Table 6) for the CBSIP are as follows:

- Reduce the percentage for Environmental Mitigation by 1.24%, from 2.5% to 1.26%.
- Increase the percentage for Public Outreach by 0.5%, from 0.50% to 1.0%.
- Reduce the percentage for City Project Management by 3.0%, from 6.5% to 3.5%.
- Reduce the percentage for Environmental Planning and Review by 2.9%, from 4.4% to 1.5%.
- Reduce the percentage for Engineering Design by 5.0%, from 12.0% to 7.0%.
- Reduce the percentage for Construction Management by 2.0%, from 12.0% to 10.0%.

Table 8 on the following page presents the recommended cost markups for the CBSIP:

- Construction Change Contingency (A2) = 10.00% of (A1) {This amount does NOT include adjustments for escalation}
- Project Delivery Cost (C) = 34.51% of Total Construction Cost (B)
- Program Management Cost (D) = 5.25%

**Table 8: Recommended Cost Markups for Central Bayside System Improvements Project (CBSIP)**

<b>Construction Contingency and Project Delivery Costs for CBSIP</b>			
<b>WBS Phase No.</b>	<b>Cost Description</b>	<b>% of Constr. Cost (B)</b>	<b>Phase of Project</b>
	Base Bid Construction Budget Including Estimating Contingency (A1)	100.00%	Construction
	<b>Construction Change Contingency (A2)</b>	<b>10.00%</b>	Construction
<b>(1)</b>	<b>Total Construction Cost (B) = A1 + A2</b>	<b>110.00%</b>	<b>Construction</b>
	Environmental Mitigation/Construction Compliance	1.26%	Distributed over Construction
	Security Upgrades, Land, and ROW	3.30%	Distributed over Construction
	<b>Subtotal</b>	<b>4.56%</b>	
	Communication	0.50%	Project Management
	Arts Commission Fees	0.50%	Project Management
	Public Outreach	1.00%	Project Management
	City Project Management	3.50%	Project Management
	Legal Project Support	0.55%	Project Management
	Operations Support	0.65%	Project Management
	Community Benefits		
<b>(2)</b>	<b>Subtotal Project Management</b>	<b>6.70%</b>	
<b>(3)</b>	Planning and Pre-design	3.50%	Planning
<b>(4)</b>	Environmental Planning and Review	1.50%	Environmental
<b>(5)</b>	Legal & ROW Support	0.25%	Land Acquisition Support
<b>(6)</b>	Engineering Design and Engineering Support During Construction	7.00%	Design
<b>(7)</b>	Bid and Award	0.50%	Bid and Award
<b>(8)</b>	Construction Management	10.00%	Construction Mgmt.
<b>(9)</b>	Closeout	0.50%	Closeout
	<b>Subtotal</b>	<b>23.25%</b>	
	<b>Subtotal Project Delivery Cost (C)</b>	<b>34.51%</b>	
	<b>Program Management Cost (City and Consultant) (D)</b>	<b>5.25%</b>	
	<b>Total Construction Change Contingency + Project Delivery Cost + Program Management Cost (B + C +D)</b>	<b>149.76%</b>	



## Construction Change Contingency and Program/Project Delivery Cost Advisory White Paper

**5E. SUMMARY OF RECOMMENDATIONS**

Table 9 below summarizes the recommended cost markup percentages for general SSIP projects, the Biosolids Project and the CBSIP.

**Table 9: Recommended Cost Markup Percentages for all SSIP Projects**

Project Category	Construction Change Contingency	Total Project Delivery Cost	Subtotal	Program Management
General SSIP Projects	10.00%	48.15%	58.15%	5.25%
Biosolids Project	10.00%	58.65%	68.65%	5.25%
CBSIP	10.00%	34.51%	44.51%	5.25%

Furthermore, once the project/delivery costs and associated cashflow has been calculated, the costs are to be escalated based on guidelines stated in the "Escalation Projection White Paper" that were discussed in June 2012 and approved on February 11, 2013.

An example of the calculations for project delivery costs without the Program Management cost for the general SSIP projects, is shown below, in Table 10:

**Table 10: Sample Calculations for Project Delivery Costs without Program Management Costs**

Proj. No.	Base Construction Cost without escalation	Const. Change Contingency	Total Const. Cost	Project Delivery Cost	Total Project Cost without Escalation	Escalation	Total Project Costs with Escalation
	A1 (in millions)	A2 = 0.1*A1 (in millions)	B = A1 + A2 (in millions)	C = 0.4815*B (in millions)	D = B + C (in millions)	E (in millions)	D + E (in millions)
NPF-001	\$24.900	\$2.490	\$27.390	\$13.200	\$40.590	\$14.370	\$54.960

Additional supporting tables are included in Appendix B.

**REMARKS Dated March 20, 2013**

The project and program cost estimates based on recommendations and methodology of calculations stated in this paper, were discussed at Program Validation Workshop #5: Preliminary Project Sequencing held on May 30, 2012. Customization of the soft costs for the Biosolids Project and the Central Bayside System Improvement Project was based on further discussions with SFPUC Executive Management and Senior Project Managers on June 12, 2012 and June 25, 2012. The results of those discussions are reflected in this paper.

The final program/project delivery cost estimates for all three phases of the program, based on these recommendations, were calculated and presented to the SFPUC Commission during the Program Validation Workshops, on July 10, July 24 and August 28, 2012.

The costs estimates presented at the Program Validation workshops stated above, were further reviewed by SFPUC staff, including Senior Project Managers, in preparation for the development of the Baseline Implementation Cost and Schedule for projects in SSIP Phase 1. Soft costs were revised and customized per project, based on the experience and prior knowledge of these types of projects, by the SFPUC Project Managers. These revisions were conducted during October and November 2012 and have been documented and summarized in emails and formal transmittals dated November 1, 2012 and November 15, 2012. These revisions have also been reflected in the DRAFT Program Baseline Implementation Schedule and Cost report for SSIP Phase 1 Projects, dated November 2012.

Major changes from the costs associated with the Program Validation Phase that have been included in the November 2012 DRAFT Program Baseline Implementation report are stated below:

- Environmental Mitigation/Construction Compliance added to Project Management
- Security Upgrades, Land and ROW added to Project Management
- Allowances for few other categories were reviewed and reduced and the amount added to Project Management.

The impact of these changes to the percentages of the various project delivery cost categories, averaged over the SSIP general projects, is summarized on the following page in Table 11.

**Table 11: Escalated Program/Project Delivery Costs for SSIP Projects as of November 2012**

<b>WBS Phase</b>	<b>Description of Cost Category</b>	<b>SSIP - General Projects (Average)</b>
	Base Bid Construction Estimate (with escalation)	100.00%
	Construction Change Contingency	10.00%
(1)	<b>Total Construction Cost ( with escalation)</b>	<b>110.00%</b>
(2)	Project Management	22.57%
(3)	Planning and Pre-design	4.89%
(4)	Environmental Planning and Review	5.03%
(5)	Legal & ROW Support	0.56%
(6)	Engineering Design and Engineering Support During Construction	11.15%
(7)	Bid and Award	0.52%
(8)	Construction Management	13.07%
(9)	Closeout	0.56%
	<b>Total Project Delivery Cost (with escalation)</b>	<b>58.35%</b>
	<b>Program Management (City and Consultant)</b>	<b>5.25%</b>
	<b>Total Project Delivery + Program Mgmt. Cost (with escalation)</b>	<b>173.60%</b>

**Notes:**

1. Base Bid Construction Estimate includes 30% of Estimating Contingency
2. Program Management (City and Consultant) are not added at the project level.
3. Cost escalation rates have been applied to construction as well as Project Delivery costs.

## APPENDIX A – DESCRIPTION OF TERMS

### CONSTRUCTION COST AND CONSTRUCTION CHANGE CONTINGENCY

#### BASE CONSTRUCTION COST ESTIMATE

In accordance with general industry practice, the Base Construction Cost Estimate typically includes an estimating contingency of 30% which accounts for uncertainty in construction definition early in the life of a project. Initial cost estimates at the start of a project are based upon costs gleaned from other projects of similar size, type, and complexity, as specific project data is generally not available at the time of inception. As the planning and design process moves forward on each project, more precise information becomes available, and the estimates are augmented and refined. Acquisition of new data that differs from initial assumptions, changes in government codes, additional requirements from affected communities, or other unanticipated circumstances may cause changes to the design of system components and construction methods. A cost estimate allowance is applied when establishing the base construction cost estimate and is based on the phase of the project during which the estimate is being prepared. The estimate accuracy allowance is higher at project initiation and declines to zero at the time of bid, when all conditions ought to be known and the engineer's estimate should reflect the actual contract value.

#### CONSTRUCTION CHANGE CONTINGENCY

The construction cost is based on the anticipated bid value for the project. Experience shows that unforeseen site conditions or contractor claims increase the final, as built, price above that of the bid. An identified construction change contingency is included within the construction estimate to reflect this potential growth in the contract value during construction. Industry practice generally uses a value of 10% of the budgeted construction contract value for construction change contingency.

#### TOTAL CONSTRUCTION COST

The total construction cost is the sum of the base construction cost estimate and the construction change contingency.



## **PROJECT DELIVERY COSTS**

### ENVIRONMENTAL MITIGATION/CONSTRUCTION COMPLIANCE COSTS

Environmental mitigation costs are costs of mitigating environmental impacts that may be identified during the environmental review of each SSIP project. Potential specific environmental impacts and associated mitigations of the individual SSIP projects cannot yet be identified. Therefore, these estimated mitigation costs are intended to provide budgeted funding for eventual mitigation work. The estimates are based on professional knowledge and judgment of what is known at this early stage about the individual SSIP projects.

### COMMUNICATION AND PUBLIC OUTREACH COSTS

These costs include costs for communication efforts for the effective implementation of the SSIP and disseminating information to internal (within the SSIP) and external stakeholders. A large part of this effort will be to ensure consistency and standardization of all publications and presentations produced by the SSIP, as well as education efforts tailored to specific audiences throughout the course of the Program, thereby creating a structured program for public information and project involvement.

### ART COMMISSION FEES

The Art Commission costs provide for design, production, and installation of artwork or art enrichment of all above grade structures constructed in the program. Based on City legislation the amount required is approximately 2 percent of the value of the above ground improvements. (Reference: City and County of San Francisco, Administrative Code Section 3.19, Appropriation for Art Enrichment of Proposed Public Buildings, Above Ground Structures, Parks and Transportation Improvement Projects).

### CITY PROJECT MANAGEMENT COSTS

Project specific costs associated with oversight and management of a specific project are provided in this category. These include project specific controls, cost estimating, scheduling, quality assurance/ quality control, and total project oversight for all phases of the project from beginning to end.

### PLANNING AND PRE-DESIGN COSTS

These costs provide for the planning and pre-design phase of the projects. The Planning and Pre-design phase will produce a Needs Assessment Report (NAR), an Alternatives Analysis Report (AAR), and a Conceptual Engineering Report (CER) to provide initial scope studies and identify potential alternatives, conduct an alternatives analysis of best value solutions, and provide the initial engineering assessments to embark upon a designated design for each project.

### ENVIRONMENTAL PLANNING AND REVIEW COSTS

The estimated costs for environmental review and permitting of the proposed program and projects are based on the anticipated review and documentation that will be required to meet relevant local, state, and federal laws, rules, and regulations for a given project's scope and location. In addition to various application and processing fees, these costs include services from the following:

- PUC staff,
- dedicated staff of the San Francisco Planning Department,
- dedicated staff of various federal and state agencies in a central permitting office, and
- Consultants performing environmental support services.

Work performed under this category includes evaluation and planning for environmental considerations from the engineering planning phases through the design and construction of a project. Environmental review costs are estimated based on the administrative requirements for anticipated environmental documents submitted under the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA) if applicable, and other permitting requirements.

#### ENGINEERING DESIGN AND ENGINEERING SUPPORT DURING CONSTRUCTION COSTS

Costs associated with engineering design are those necessary to produce the appropriate designs (including calculations), drawings, and specifications (or a contract bid package), to meet the operational requirements and measurable delivery goals of the program. Engineering costs are based on the effort required to produce a credible design that can be carried forward to construction. In order to refine information and provide value engineering to the project, engineering design efforts and their associated fees extend from the conceptual planning phase through the construction phase of the project. Project-specific engineering cost percentages (based on the total construction cost) vary according to the extent of work, the pre-existing condition of facilities, and the complexity of the design.

During the design phase, design review cycles will occur at 35%, 65%, and 95% design to review design status and results before reaching 100% design completion. Refinement to the design and appropriate design documents and technical specifications will be completed at the close of each review cycle and submitted for review. Each project's engineering design team will work with other PUC departments during the various stages of the project life to ensure consistent and integrative designs are produced in cooperation with operational strategies, environmental review, constructability review, and mitigation of environmental impacts. This also includes engineering support during the Bid and Award phase, as well as the construction phase, to review contractor submittals, requests for information (RFI's), change orders, testing, startup, commissioning, and as-builts document review/development.

#### CONSTRUCTION MANAGEMENT COSTS

Construction management costs are associated with the construction oversight team. These costs cover not only the resident engineers and inspectors (civil, mechanical and other specialists as required) but also construction manager(s) and support staff that are all involved with ensuring that construction is progressing as scheduled. Important components of the construction oversight team include administrative support, scheduling, cost estimating, claims analysis, quality assurance/quality control, safety, and closeout specialists. Estimates for all of these support positions are covered under this category. These costs also provide for laboratory and field-testing of materials, such as HAZMAT and in-situ compaction testing, and state mandated special inspections and testing such as welding and concrete. Partial cost for permit compliance monitoring is also budgeted in this category.

#### DEPARTMENTAL AND AGENCY COSTS

Department and agency costs account for services from other City departments that provide support to the SFPUC in efforts to implement the SSIP and projects in the program and to direct PUC Operations Site Surveys and the associated labor costs. City departments included in this category are Legal, Real Estate and Operations, Engineering and Maintenance.

#### SECURITY UPGRADES, LAND AND RIGHT-OF-WAY (ROW) ACQUISITION COSTS

This category includes additional costs associated with upgrades to site security including fencing, gates and surveillance where existing measures are inadequate. Also includes costs for easements, surveys, appraisals and negotiations. While many SSIP projects will not have land and ROW costs (most projects are upgrades or

modifications of existing facilities), there are instances where acquisition of additional land/easements for contractor laydown areas may be necessary.

### **PROGRAM MANAGEMENT COSTS**

Program management fees are based upon costs associated with program development and implementation. Direct program management costs provide for planning, coordination between departments, support of personnel from the City's communications, legal and finance departments, program controls, reporting, estimating and scheduling at the program level. Additionally, these monies also cover all program contracts and modifications, funding authorizations, program consulting services and associated administrative costs, Commission and Board approvals, audits, change order negotiations, and closeout approvals. The program management costs also provide for document control services, quality/control quality assurance within the organization, and community outreach programs.

### **CONSTRUCTION COST ESCALATION**

Cost escalation is defined as a change in the cost or price of specific commodities or goods, services and/or labor in a given economy over a defined period of time. The subject of escalation in the Sewer System Improvement Program (SSIP) is addressed separately in the "Escalation Projection White Paper", which recommends that an annual escalation rate of 4.0% per year compounded annually be applied to the first 10 years of the SSIP program (between 2012-2022) and a rate of 5.0% per year compounded annually be used for the second 10 years of the SSIP and beyond.

## APPENDIX B – SUMMARY OF PROGRAM/PROJECT DELIVERY COSTS FOR SSIP PROJECTS (WITHOUT ESCALATION)

**Table B-1: Recommended Allowances for SSIP Projects other than Biosolids Project and CBSIP  
(Not organized per SFPUC Work Breakdown Structure)**

Cost Description	% of Constr. Cost (B)	% of Total Project + Program Mgmt. Cost	* Amount in WSIP as of June 2011
Base Bid Construction Budget Including Estimating Contingency (A1)	100.00%	61.20%	
<b>Construction Change Contingency (A2)</b>	<b>10.00%</b>	6.12%	9.77%
<b>Total Construction Cost (B) = A1 + A2</b>	<b>110.00%</b>	<b>67.32%</b>	
Environmental Mitigation/Construction Compliance	2.50%	1.53%	2.37% + 2.58%
Communication	0.50%	0.31%	N/A
Arts Commission Fees	0.50%	0.31%	0.22%
Public Outreach	0.50%	0.31%	N/A
<b>Subtotal</b>	<b>4.00%</b>	<b>2.46%</b>	<b>5.17%</b>
City Project Management	6.50%	3.98%	6.48%
Planning and Pre-design	3.50%	2.14%	3.37%
Environmental Planning and Review	4.40%	2.69%	4.4%
Engineering Design and Engineering Support During Construction	12.00%	7.34%	12.19% + 3.56%
<b>Subtotal Design Phase</b>	<b>26.40%</b>	<b>16.15%</b>	<b>30%</b>
Bid and Award	0.50%	0.31%	N/A
Construction Management	12.00%	7.34%	13.14%
Closeout	0.50%	0.31%	N/A
<b>Subtotal Construction Phase</b>	<b>13.00%</b>	<b>7.96%</b>	<b>13.14%</b>
Legal & ROW Support	0.25%	0.15%	0.35%
Legal Project Support	0.55%	0.34%	0.55%
Operations Support	0.65%	0.40%	1.04%
<b>Subtotal Department/Agency Fees</b>	<b>1.45%</b>	<b>0.89%</b>	<b>1.94%</b>
<b>Security Upgrades, Land, and ROW</b>	<b>3.30%</b>	<b>2.02%</b>	<b>1.52% + 0.14%</b>
<b>Total Project Delivery Cost (C)</b>	<b>48.15%</b>	<b>29.47%</b>	
<b>Program Management Cost (City and Consultant) (D)</b>	<b>5.25%</b>	<b>3.21%</b>	<b>3.26%</b>
<b>Total Construction Change Contingency + Project Delivery Cost + Program Management Cost</b>	<b>163.40%</b>	<b>100.00%</b>	

\* WSIP allowances for project delivery costs discussed on Page 6 shown here for reference.

## Construction Change Contingency and Program/Project Delivery Cost Advisory White Paper

**Table B-2: Comparison of SSIP and WSIP Program/Project Delivery Costs (without escalation)**

Description of Cost Category	SSIP - General Projects  A	SSIP - New Biosolids Digester Project  B	SSIP - CBSIP  C	WSIP (as of June 2011)  D	Variance  E = A - D
Base Bid Construction Estimate (without escalation)	100.00%	100.00%	100.00%	100.00%	
Construction Change Contingency	10.00%	10.00%	10.00%	9.77%	
<b>Total Construction Cost (without escalation)</b>	<b>110.00%</b>	<b>110.00%</b>	<b>110.00%</b>	<b>109.77%</b>	<b>0.23%</b>
<b>Project Management</b>					
Environmental Mitigation/Const. Compliance	2.50%	2.50%	1.26%	4.95%	-2.45%
Security Upgrades, Land, and ROW	3.30%	3.30%	3.30%	1.66%	1.64%
Communication	0.50%	0.50%	0.50%	Not separated	
Arts Commission Fees	0.50%	0.50%	0.50%	0.22%	0.28%
Public Outreach	0.50%	1.00%	1.00%	Not separated	
City Project Management	6.50%	6.50%	3.50%	6.48%	0.02%
Legal Project Support	0.55%	0.55%	0.55%	0.55%	0.00%
Operations Support	0.65%	0.65%	0.65%	1.04%	-0.39%
Community Benefits	0.00%	10.00%	0.00%	Not separated	
<b>Subtotal Project Management</b>	<b>15.00%</b>	<b>25.50%</b>	<b>11.26%</b>	<b>14.90%</b>	<b>0.10%</b>
<b>Planning and Pre-design</b>	<b>3.50%</b>	<b>3.50%</b>	<b>3.50%</b>	<b>3.37%</b>	<b>0.13%</b>
<b>Environmental Planning and Review</b>	<b>4.40%</b>	<b>4.40%</b>	<b>1.50%</b>	<b>4.40%</b>	<b>0.00%</b>
<b>Legal &amp; ROW Support</b>	<b>0.25%</b>	<b>0.25%</b>	<b>0.25%</b>	<b>0.35%</b>	<b>-0.10%</b>
<b>Engineering Design and Engineering Support During Construction</b>	<b>12.00%</b>	<b>12.00%</b>	<b>7.00%</b>	<b>15.75%</b>	<b>-3.75%</b>
<b>Bid and Award</b>	<b>0.50%</b>	<b>0.50%</b>	<b>0.50%</b>	<b>0.00%</b>	<b>0.50%</b>
<b>Construction Management</b>	<b>12.00%</b>	<b>12.00%</b>	<b>10.00%</b>	<b>13.14%</b>	<b>-1.14%</b>
<b>Closeout</b>	<b>0.50%</b>	<b>0.50%</b>	<b>0.50%</b>	<b>0.00%</b>	<b>0.50%</b>
<b>Total Project Delivery Cost (without escalation)</b>	<b>48.15%</b>	<b>58.65%</b>	<b>34.51%</b>	<b>51.91%</b>	<b>-3.76%</b>
<b>Program Management (City and Consultant)</b>	<b>5.25%</b>	<b>5.25%</b>	<b>5.25%</b>	<b>3.26%</b>	<b>1.99%</b>
<b>Total Project Delivery + Program Mgmt. Cost (without escalation)</b>	<b>163.40%</b>	<b>173.90%</b>	<b>149.76%</b>	<b>164.94%</b>	<b>-1.54%</b>

Notes for SSIP Projects:

1. Base Bid Construction Estimate includes 30% of Estimating Contingency
2. Project Delivery Costs are calculated as a % of Total Construction Cost  
e.g. Project Management = 15% x Total Construction Cost
3. Program Management (City and Consultant) are not added at the project level.
4. Cost escalation rates to be applied to construction as well as Project Delivery costs.

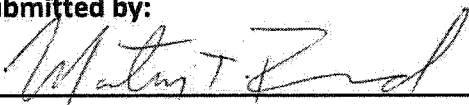


# Sewer System Improvement Program

Contract No. CS-165: Program Management Consultant Services

## ESCALATION PROJECTION WHITE PAPER

Submitted by:

  
\_\_\_\_\_  
Martin Dorward 2/11/13  
Date

Prepared by:

Pratima Joshi, Hans Gaus and Tom Moe  
\_\_\_\_\_  
Date

Revision	Description	Issued Date
00	FINAL	February 11, 2013

# Table of Contents

1. EXECUTIVE SUMMARY ..... 3

    Table 1: Rate of Escalation values from 2013 to 2022 ..... 3

    Table 2: Rate of Escalation values from 2023 to 2032 ..... 3

2. INTRODUCTION ..... 3

3. BACKGROUND INFORMATION ..... 4

    3A. HISTORIC ESCALATION INDICES ..... 4

        Figure 1: ENR CCI Index with 10- and 30-Year Averages ..... 4

        Figure 2: ENR CCI San Francisco Index ..... 5

        Table 3: ENR CCI-SF Escalation Table ..... 5

        Figure 3: ENR CCI – San Francisco Index – Year-to-Year Escalation ..... 6

    3B. WATER SYSTEM IMPROVEMENT PROGRAM POLICY ..... 6

    3C. NEAR-TERM (RECENT) IMPACT AND ECONOMIC FACTORS ..... 6

4. ECONOMIC FACTORS THAT AFFECT ESCALATION ..... 7

    4A. COMMODITIES (MATERIALS) ..... 7

    4B. LABOR ..... 8

    4C. CONSTRUCTION SPENDING TRENDS ..... 8

5. ESCALATION PROJECTIONS ..... 9

    Table 4: IHS Global Insight CPI Prediction ..... 9

    Table 5: IHS Global Insight Material Increase Prediction ..... 10

    Table 6: AGC 2013 to 2017 Predictions ..... 11

    5A. INDEXING COST ESCALATION ..... 11

    5B. SELLING PRICE (CONTRACTOR MARGINS) ..... 11

6. CONCLUSIONS AND RECOMMENDATIONS ..... 12

    Table 7: Escalation Prediction Comparisons ..... 12

    Table 8: Cost Escalation Predictions ..... 13

REMARKS dated January 22, 2013 ..... 14

**SAN FRANCISCO PUBLIC UTILITIES COMMISSION (SFPUC)  
SEWER SYSTEM IMPROVEMENT PROGRAM (SSIP)**

**ESCALATION PROJECTION WHITE PAPER**

Advisory White Paper for Forward Construction Cost Escalation  
for the Sewer System Improvement Program (SSIP)

**1. EXECUTIVE SUMMARY**

In preparation for the program validation process and the establishment of the program cost estimate for the Sewer System Improvement Program (SSIP), the previous assumptions historically used by the San Francisco Public Utilities Commission (SFPUC) and other industry standard practices for construction cost escalation were analyzed and compared to current and relevant cost information. From the information gathered, this advisory White Paper is offered to the SFPUC as a basis for the most probable annual construction and corresponding project cost escalation for projects within the SSIP.

It is recommended that a rate of escalation of 4.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate for each project to be implemented within the ten year period of 2013 to 2022 as shown in Table 1 below.

**Table 1: Rate of Escalation values from 2013 to 2022**

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Rate of Escalation per Year	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Escalation Multiplier	104.00%	108.16%	112.49%	116.99%	121.67%	126.53%	131.59%	136.86%	142.33%	148.02%

Based on the assumption that the economy will have recovered, it is further recommended that for the second ten year period from 2023 to 2032 and beyond, a rate of escalation of 5.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate for each project as shown in Table 2 below.

**Table 2: Rate of Escalation values from 2023 to 2032**

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Rate of Escalation per Year	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Escalation Multiplier	155.43%	163.20%	171.36%	179.92%	188.92%	198.37%	208.29%	218.70%	229.63%	241.12%

**2. INTRODUCTION**

This White Paper reviews historic escalation trends and economic factors to develop a realistic picture of the long-term escalation of the 2012 SSIP construction costs developed during the program validation phase of the SSIP. This paper also compares past cost estimating practices with recent cost data and projections. After a discussion of the background information used for this study, the economic factors that affect escalation, and escalation projections, the conclusions and recommendations for the most probable annual project cost escalation for projects within the SSIP will be presented for consideration by the SFPUC.

### 3. BACKGROUND INFORMATION

The background information for this White Paper is organized into the following subsections:

- A. Historic escalation indices
- B. Water System Improvement Program Policy
- C. Near-term (recent) Impact and Economic Factors

#### 3A. HISTORIC ESCALATION INDICES

The industry standard Engineering News Record (ENR) 20-City National Average Construction Cost Index (CCI) is illustrated in Figure 1. The average CCI index value is shown on the vertical axis and the years across the horizontal axis. ENR calculates CCI using the following construction cost components: 200 hours of common labor, multiplied by the 20-city average rate for wages and fringe benefits, plus cost of 25 hundredweight (cwt) of fabricated standard structural steel at the 20-city average price, plus cost of 1.128 tons of bulk portland cement priced locally, plus cost of 1,088 board-feet of 2"x4" lumber priced locally. The index measures how much it costs to purchase this hypothetical package of goods compared to what it would have cost in the base year.

The data in Figure 1 shows a relatively steady increase in construction cost from December 1981 to December 2011.

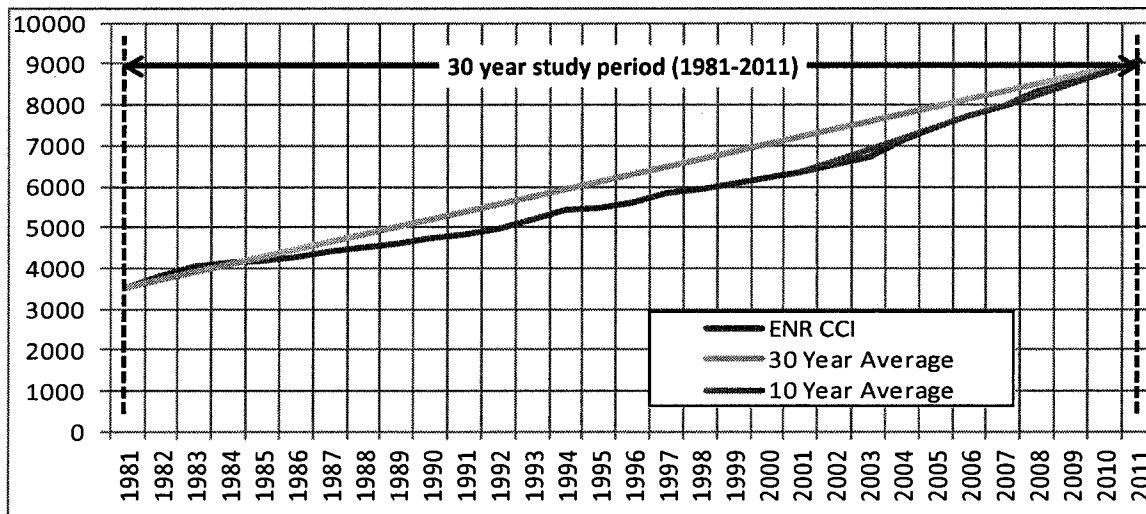


Figure 1: ENR CCI Index with 10- and 30-Year Averages

A more relevant index for the SSIP is shown in Figure 2, the industry standard ENR CCI for San Francisco (ENR CCI-SF), based specifically on the San Francisco construction market. The average CCI index value for San Francisco is shown on the vertical axis and the years across the horizontal axis.

Escalation Projection White Paper

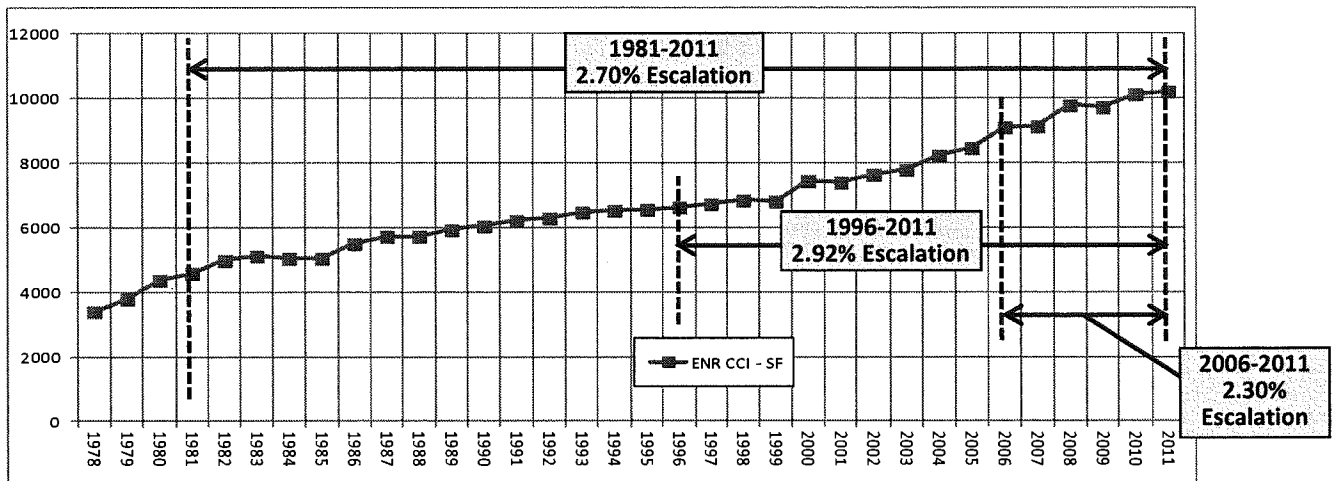


Figure 2: ENR CCI San Francisco Index

Figure 2 also illustrates a steady increase in the construction cost in San Francisco between 1978 and 2011. The increase between 1978 and 1992 was not dramatic, but between 1992 and 2011 the ENR CCI for San Francisco nearly doubled. Also shown in Figure 2 are representative average escalation values resulting from CCI trends for 3 specific ranges of time. A more complete picture of escalation rate behavior can be found in Table 3.

Table 3 below shows historic average construction cost escalation values specific to the San Francisco market, compounded annually for December to December periods in 5-year increments. The highest average escalation rate (3.27 percent) occurred during the 10-year period from 2001 to 2011.

Table 3: ENR CCI-SF Escalation Table

Term	Range	Average Escalation %
5 Years	2006 to 2011	2.30%
10 Years	2001 to 2011	3.27%
15 Years	1996 to 2011	2.92%
20 Years	1991 to 2011	2.40%
25 Years	1986 to 2011	2.50%
30 Years	1981 to 2011	2.70%

Over the 30 year period between 1981 and 2011, the ENR CCI for San Francisco averaged roughly 0.50 percent less than the national annual compounded increase of 3.191%. As a comparison, in that same 30 year period, the Consumer Price Index (CPI) averaged a compounded annual increase of 2.87%.

Figure 3 presented on the following page illustrates the pronounced vacillation in average escalation values from year to year between 1978 and 2011. From 1981-2011 (the specific thirty year period we are examining), the index starts out at about 4.3% in 1981, peaks in 1986 at about 8.3% and peaks again in 2000 at roughly 9%. By 2011, the index declines again to just over 1%. Of special interest is the period



Escalation Projection White Paper

between 2001 and 2006, which indicates an average rate of increase of 4.30%. This was the last five year increment before the financial crisis of 2008.

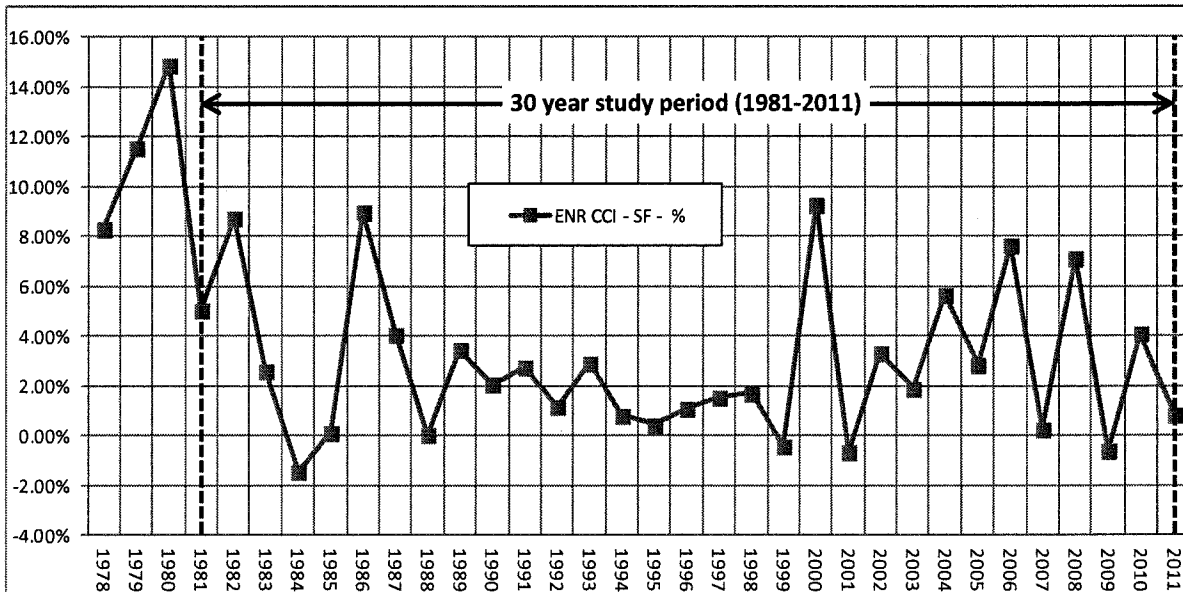


Figure 3: ENR CCI – San Francisco Index – Year-to-Year Escalation

**3B. WATER SYSTEM IMPROVEMENT PROGRAM POLICY**

The policy adopted and used on the WSIP program starting in 2009 included a cost escalation of 3.5% per year, non-compounded, from January 2010 to the mid-point of construction for each project. This policy is still in effect for the WSIP program. None of the WSIP projects bid over the program management estimate, unless there were scope changes or only one bidder. All projects bid within a tolerable margin of the estimate. The mid-point of construction for WSIP projects was relatively close to the estimated dates, on average within two (2) years. The WSIP cost estimation policy has apparently proven to be effective for this period of time.

**3C. NEAR-TERM (RECENT) IMPACT AND ECONOMIC FACTORS**

The 20-year duration of the SSIP program requires an escalation policy sensitive to the uncertainty of construction and commodities markets over a longer span of time, rather than an over-sensitivity to large market vacillations from year to year. Most economists predict construction cost increases will be low to very low over the next two years. For the purposes of this White Paper we are relying on three main-stream sources: Engineering News Record (ENR); Turner Construction and IHS Global Insight.

The economics editors at ENR forecasted in 2012 (*Appendix A1*) that there would be little to no construction market growth in 2012. In a subsequent article, the ENR economic editors predicted an increase in the CCI of only 2.1% following the 2011 increase of 2.5% (*Appendix A2*). They further predicted that recovery in the construction market may not come until 2013 or 2014.

ENR quoted Karl Almstead of Turner Construction, who compiles the Turner building cost index, that the construction market will not pick up until the end of 2013, at which point Almstead expects a 2.0% to 2.5% escalation for the subsequent two years (2014-2015).

Another major source in construction cost indexing and projection information is a firm known as IHS Global Insight (Global Insight). The IHS.com website currently shows their Top 10 Economic Predictions for 2012 (*Appendix A3*). Global Insight predicts that commodity prices will (mostly) move sideways. Commodity prices will be pulled down by weak global demand but in some cases pushed up by limited excess capacity and robust growth in key economies such as China and India. The biggest downside risk to commodity prices is a possible decline of growth in China and India.

Global Insight maintains that inflation will decline in almost every region of the world in 2012 because world growth is softening and commodity prices are off their peaks. Based on this forecast, inflation and construction cost escalation values in 2012 will likely flatten at 2.5% or lower.

#### **4. ECONOMIC FACTORS THAT AFFECT ESCALATION**

The previous section discussed what appears to be moderate escalation for the foreseeable future. In balance, given the 20-year duration of the SSIP, we must study and examine those factors that could lead to higher escalation in the long term. These factors include commodity (material), labor and contractor margins and construction spending trends.

##### **4A. COMMODITIES (MATERIALS)**

Many commodities affect the escalation of construction costs. Some of the most influential are oil, steel, copper, cement and lumber. Lumber is not a large component of wastewater treatment work, except in forming concrete, and is therefore not discussed in this paper.

Global Insight's *Global Executive Summary* warns that oil prices could spike higher at times in coming years (*Appendix A3*) as any geo-political event in oil producing regions could temporarily increase oil prices. In the long term, however, Global Insight anticipates stability in oil prices as a result of the increase in domestic oil production infrastructure and new technology that will make oil extraction feasible from many sources (see further discussion below).

There seems to be little upward pressure on steel pricing for the near future. In its latest forecast, SteelOnTheNet sees only a moderate increase in the next 12 months (*Appendix A4*). This source predicts little upside pressure in the short-term, even with optimism for slow global growth in 2012 along with slower, but still high, growth in emerging markets in other parts of the world.

Gilbane Building Company's December 2011 *Market Conditions in Construction* report provides comparable information on the factors affecting steel pricing (*Appendix A5*). The construction industry represents the largest consumer of steel products worldwide. With steel production up, excess production capacity available, and construction spending (demand) down, market conditions will lead both to excess capacity and excess supply. Little upward pressure is projected for steel prices in the immediate future.

Currently ENR is reporting that year-to-year steel and rebar prices are up 4.5% and 10.5%, respectively. While there seems to be little concern that steel prices will increase significantly in 2012, the trend after

that is not so clear. Steel prices will most likely rise in parallel with other Producer Price Inputs (PPI) for construction-related materials.

With regard to **copper pricing**, we draw again from Gilbane's December 2011 *Market Conditions in Construction* report. Copper is a leading economic indicator that has rarely, if ever, failed to indicate the direction of world economies (*Appendix A6*). Copper prices have been very volatile, hitting an all-time high of \$4.60/lb in February 2011, a 25% increase from October 2010. In September 2011, the price was back to \$3.10/lb and currently hovers around \$3.90/lb. Copper is not usually a speculative commodity, and prices are driven by supply and demand alone. Gilbane's analysts predict that copper will average \$4.00/lb in 2012, increasing only with an increase in demand.

Although **cement** started in 2012 at 3.7% above the January 2011 level, the demand for cement is far from taxing current capacity and there seems to be little risk of an immediate price increase. However, the cost of producing and transporting cement and cement products is very sensitive to energy costs. An increase in oil and other energy costs has the potential to drive up the cost of cement and cement-based products. Global demand is also an important factor.

The price of cement is difficult to forecast far into the future. Increased cement and concrete demand will increase prices from the currently low levels.

#### **4B. LABOR**

Construction employment has reached a low point, falling 29% below the peak reached in April 2006. As can be gleaned from Gilbane's December 2011 *Market Conditions in Construction* report (*Appendix A7*), in April 2006, construction labor peaked at 7,726,000 employed in the United States. Since that time, the construction industry has lost 2,248,000 construction jobs (or 29%). In the meantime, the construction unemployment rate has declined from 22.5% in January 2011 to 13.5% in August 2011. During that period the construction industry gained 48,000 jobs or 0.6% of peak employment.

When the unemployment rate declines without a corresponding rise in the number of jobs, it can only mean that the number of people in the workforce has gone down. The reduction in the workforce is not currently a problem because the construction work load has declined at a similar rate. When the volume of construction work increases however, the construction industry will be plagued by a lack of available skilled workers. It is predicted to take six years at previous expansion rates to recover to pre-recession levels of construction employment. What might this mean to the SSIP? There could be a significant shortage of skilled San Francisco craft workers to meet the 50% requirement for local hire and professional management at the time SSIP projects are scheduled to begin, potentially leading to higher costs, poor workmanship and difficulty staffing projects.

#### **4C. CONSTRUCTION SPENDING TRENDS**

IHS Global Insight provided materials from "The World Economic Outlook," a presentation conducted on January 19, 2012. With a focus on North America and the United States, further construction spending is expected to decline in 2012 (down 1.1%), with an upward trend in construction spending starting in 2013. The 2006 level of construction spending, which was the highest level of spending over the period examined, is expected to be attained by 2020. Just as residential construction led to the downturn in construction spending, it will likely also lead to the construction spending recovery. Global Insight is predicting close to \$500-billion in residential construction in 2016, compared to nearly \$600-billion in

---

2006. This will be a considerable increase from the low levels of spending in 2011 and 2012 (\$225 billion). While this has no direct impact on SSIP, increased construction activity may increase material prices.

Uncertainties in the United States' economy have led to lower investment in and funding of infrastructure construction. This in turn has lowered overall construction spending. While infrastructure spending in the United States will be down in both 2012 and 2013, infrastructure spending will begin to increase between 2014 and 2016. Likewise, the bulk of annual expenditures for the current SSIP budget fall between 2016 and 2024.

## 5. ESCALATION PROJECTIONS

There are few prognosticators willing to develop or agree on a long-term construction cost escalation policy. One firm that has already produced a prediction of the long-term Consumer Price Inflation (CPI) is IHS Global Insight. In their December 2011 *Global Executive Summary*, they predict the CPI will increase as shown in Table 4.

**Table 4: IHS Global Insight  
CPI Prediction**

2012	1.5%
2013	1.7%
2014	2.1%
2015	2.2%
2016	1.9%
2017 to 2021	1.8%
2022 to 2026	1.9%

While the CPI and construction indices do not always move in concert, there is a correlation so that when construction indices rise, we can expect an increase in the CPI. John Mothersole, also of IHS Global Insight, relayed his prediction for the escalation of construction-related **material** costs on January 13, 2012, as shown in Table 5.

**Table 5: IHS Global Insight  
Material Increase  
Prediction**

2012	<2.0%
2013	<2.8%
2014	2.8%
2015	3.8%
2016	2.7%
2017	1.9%
2018	1.7%
2019	1.5%
2020	1.7%
2021	2.3%

Part of the reason for this relatively flat projection is that IHS Global Insight expects the increase in material costs to be tempered by relatively flat increases in the price of oil and energy. When the oil and gas prices spiked in early 2012, Mr. Mothersole was again consulted on February 22, 2012 about his early projection that oil and energy would be relatively flat. He maintained that the oil and gas price spike is largely geo-political and that the long term trend is not toward severe upward movement. He does not believe the current high level is sustainable, stating that oil is a volatile commodity. He further believes new technology allowing for increased domestic oil recovery will lead to an increase in oil production globally, driving down long-term prices.

The escalation prediction illustrated in Table 5 may capture the increase in material cost but miss the resurgence in construction activity. This would increase the margins that suppliers, subcontractors and contractors are anxious to recapture. Increased margins are addressed in the recommendation section below.

One of the few other sources in the discussion of long-term escalation is Ken Simonson, Chief Economist of the Associated General Contractors of America (AGC). In a recent webinar (*Appendix A8*), he offered the following trends for 2013 to 2017 as shown in Table 6. AGC predicts over the five year period from 2013 to 2017 that both materials and labor costs for the United States will go up and construction spending and bid prices will increase, but not at the same levels.

**Table 6: AGC 2013 to 2017 Predictions**

Construction Spending	+6% to 10% per year (from 2013-2017)
Material Costs	+2% to +4% per year (from 2013-2017)
Labor Costs	+2% to +4% per year (from 2013-2017)
Bid Prices	+2% to +5% per year (from 2013-2017)

Construction inflation is also discussed in the *Current Construction Inflation Forecast* section of Gilbane's December 2011 *Market Conditions in Construction* report (*Appendix A9*). Gilbane concluded that, until construction spending returns to normal, we should expect construction costs passed on to owners to be somewhat subdued, perhaps no more than a nominal 3% per year. Aggressive bidding (resulting from a reduced level of investment in construction) will be the predominant factor in the subdued finish project prices. It would take an extremely isolated economic micro-climate to break out of this scenario. Recent trends indicate, however, that the Bay Area appears to be leading California out of the recession and may prove to be just such an economic micro-climate.

#### **5A. INDEXING COST ESCALATION**

Project costs can be indexed from any historical point to the current time using competent indices. Applying anticipated inflation factors on today's cost estimates moves project costs out to some point in the future.

When escalation was increasing at moderate and predictable rates, this was a competent approach. Escalation rates, however, are no longer predictable.

While there are several monthly declines in the ENR index from late 2008 through early 2010, the annual average has gone up every year for the past 70 years. More importantly, from 2Q 2008 to today (during the only recent period of true deflation), the ENR-BCI would indicate an 11% cost increase. The actual final cost of construction during this period, documented by several reliable measures including the Turner Building Cost Index (*Appendix B*), decreased by anywhere from 8% to 12%. Since then, while the ENR Index has increased 3.2%, cost of construction has increased about 2.5%.

However, even well researched and highly respected indices like ENR's BCI fail to reflect the recent volatility in the selling price for construction projects. The failure is that the small data set of construction commodities and labor reflected in the construction cost escalation index fails to take into account selling prices affected by a decrease in contractor margins.

The downturn in the construction industry in the United States means that there are fewer buyers for construction commodities and labor which reduces the data for developing an index.

#### **5B. SELLING PRICE (CONTRACTOR MARGINS)**

Few inflation or material/labor cost predictors address the issue of bidders lowering margins to win work and thereby lowering what is known as the selling price. The cost of construction still lags normal labor and material inflation cost indices, which should continue for some time to come.



## Escalation Projection White Paper

Despite substantial increases in the cost of construction materials and labor, selling prices for construction remain virtually unchanged. Most indicators are still showing declining construction volume through 2012, not expected to recover until 2013.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The flow of projects coming to bid in the coming months and years will strongly influence the cost movement of bids and the corresponding construction costs. Competition for few projects will keep construction costs low in 2012, but construction costs may begin to rise slightly before the end of 2013.

Standard escalation index tables and practices may not address the inflection points in this unusual time period. This will be a period of conceptual project budget preparation unlike any we have ever experienced. The critical issue is the consideration of the project time period being used as the baseline for a future projection. Any baseline project or project costs from either inflated or depressed margin pricing periods will need special attention to reflect an accurate prediction of that project into future costs.

Since the bulk of the annual SSIP expenditures appear to be between 2016 and 2024, the long-term escalation recommendation and calculation is very important to the program. While it is challenging to predict this far out, we must, as a team, determine an escalation strategy for the SSIP, subject to frequent monitoring and updates. The sources cited within this paper and the future construction cost escalation values they have predicted are summarized in Table 7.

**Table 7: Escalation Prediction Comparisons**

Year	ENR	Turner Building Company	Gilbane Building Company	IHS Global Insight (Materials Only)	AGC
2011	2.5%	N/A	N/A	N/A	N/A
2012	2.1%	2.5%	4.0%	2.0%	2.0%
2013	N/A	2.5%	5.0%	2.8%	2.0-5.0%
2014	N/A	N/A	7.0%	2.8%	2.0-5.0%
2015	N/A	N/A	N/A	3.8%	2.0-5.0%
2016	N/A	N/A	N/A	2.7%	2.0-5.0%
2017	N/A	N/A	N/A	1.9%	2.0-5.0%
2018	N/A	N/A	N/A	1.7%	N/A
2019	N/A	N/A	N/A	1.5%	N/A
2020	N/A	N/A	N/A	1.7%	N/A
2021	N/A	N/A	N/A	2.3%	N/A

Only IHS Global Insight and AGC are predicting into the years in which the SSIP will have significant construction investments. AGC has provided a constant (compounded) range of escalation while IHS Global Insight's escalation is for materials only.

## Escalation Projection White Paper

In escalating current costs into the future, the escalation factor must include the anticipated increased cost of material, labor and margins. The typical components of project construction costs are listed below:

- Labor represents approximately 40% of the total construction costs
- Materials represent approximately 50% of the total construction costs. Projects with heavy mechanical and electrical equipment may represent a higher percentage
- General conditions and other costs represent approximately 10% of the total construction costs
- Margins are applied to each of the components of the construction budget

Correspondingly, when we assimilate all researched construction cost escalation predictions we can anticipate the following trends:

**Labor** costs to increase by 2% to 3% per year. Since the labor ratio is 40% of total construction costs, escalation would be 0.8% to 1.2% of project costs.

**Material** costs to increase by 2.5% to 6%. Since the material ratio is 50% of total construction costs, escalation would be 1.25% to 3.0% of project costs.

IHS Global Insight's John Mothersole provided the longest reaching material prediction into 2021. We recommend using these material cost predictions coupled with a 1.0% increase in labor.

It is assumed that the market will remain competitive for the next 5 years and hence the increase in margins from 2013 to 2017 is expected to be 0 percent. As the market recovers, the margins are expected to increase at a rate of 1.5 percent each year for the period 2018 to 2021.

This approach would result in the escalation rates shown in Table 8.

**Table 8: Cost Escalation Predictions**

Year	Mat.	Labor	Margins	Total
2013	2.8%	1.0%	0.0%	3.8%
2014	2.8%	1.0%	0.0%	3.8%
2015	3.8%	1.0%	0.0%	4.8%
2016	2.7%	1.0%	0.0%	3.7%
2017	1.9%	1.0%	0.0%	2.9%
2018	1.7%	1.0%	1.5%	4.2%
2019	1.5%	1.0%	1.5%	4.0%
2020	1.7%	1.0%	1.5%	4.2%
2021	2.3%	1.0%	1.5%	4.8%
<b>Avg.</b>	<b>2.4%</b>	<b>1.0%</b>	<b>0.7%</b>	<b>4.0%</b>

---

Escalation Projection White Paper

This approach was discussed and reviewed with SFPUC staff in early June 2012. Additional discussions were held with City of San Francisco staff which indicated that the City is applying the following percentages for future cost estimates:

- 3% compounded annually for the next two-years (2013 and 2014)
- 5% compounded annually from 2015 onwards

Based on the analysis of data from the various companies mentioned previously, and discussions with SFPUC staff and City of San Francisco staff, the following recommendations are being presented in this paper:

- A rate of escalation of 4.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate for each project to be implemented within the ten year period of 2013 to 2022.
- Based on the assumption that the economy will have recovered, a rate of escalation of 5.0% per year be applied to the forecasted annual cashflow of the 2012 cost estimate for each project to be implemented within the ten year period of 2023 to 2023 and beyond.

Although this White Paper reflects the opinions of respected construction economists, it can in no way be warranted as an absolute prediction of inflation or escalation. There are many variables that can and will affect the cost of construction commodities, construction labor, contractor margins, and construction market conditions. It is recommended that the assumptions made in this paper be analyzed annually and adjusted as necessary.

### **REMARKS DATED JANUARY 22, 2013**

The recommendations stated here were discussed with Program Management Consultant team members and SFPUC staff and utilized in the calculation of project costs for the SSIP during Program Validation. The project cost estimates based on these assumptions were discussed prior to Workshop #5: Preliminary Project Sequencing, held on May 30, 2012. Detailed methodology of applying these recommendations to project costs estimates, was presented in subsequent meetings with SFPUC staff in June 2012.

Further discussions were held with SFPUC staff and the following project cost estimates were compared for two major projects, the New Biosolids Digester Project and the Central Bayside System Improvement Project:

- Project cost estimates based on recommendations in this paper
- Project cost estimates based on escalation to the mid-point of construction

The difference between the two cost estimates was less than 2%, and it was decided to continue with the recommendations stated in this paper for the development of project cost estimates for projects within the SSIP.

The project cost estimates for all three phases of the program, based on recommendations stated in this paper, were presented to the SFPUC Commission during the Program Validation Workshops, on July 10, July 24 and August 28, 2012.

# SSIP PMC (CS-165)

SSIP White Paper / Technical Memorandum Routing Slip			
Routing No.:	White Paper / Technical Memorandum Title		Project Manager
	Escalation Projection White Paper		Jeet Bajwa
To:	Karen Kubick	From:	Martin Dorward
<p><b>This White Paper / Technical Memorandum is sent to you for your review and comment.</b></p> <p><b>This Document is concurrently being reviewed by :</b> _____</p> <p>_____</p> <p><b>Review Comment Due date:</b> _____</p> <p style="text-align: right;">Transmittal #: _____</p> <p style="text-align: right;">Date Transmitted: _____</p> <p style="text-align: right;">Transmitted by: _____</p> <p style="text-align: right;">Title of Document: _____</p> <p style="text-align: right;">Document Revision #: _____</p> <p style="text-align: right;">Date Document Prepared or Revised: _____</p> <p style="text-align: right;">Document Prepared By: _____</p>			
Martin Dorward Review by PMA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MTD 1/31/13 Initials Date
James Chia Review for Format	<input type="checkbox"/>	<input checked="" type="checkbox"/>	JC 1/30/13 Initials Date
Jeet Bajwa Review by PM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	JB 1/30/13 Initials Date
Martin Dorward PMA Approval Submit for Final Approval	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MTD 1/31/13 Initials Date
Karen Kubick Approved by SSIP Program Director	<input type="checkbox"/>	<input checked="" type="checkbox"/>	K3 2/11/13 Initials Date
Return to Lisa Chavarri for Distribution Distribute White Paper \ Technical Memorandum to : Preparer, James Chia, Project Manager, Karen Kubick.			
<b>Comments:</b> _____ _____			



SEWER SYSTEM IMPROVEMENT PROGRAM | Grey. Green. Clean.

# GOVERNANCE



San Francisco  
Water Power Sewer

Services of the San Francisco Public Utilities Commission



# Governance Process Overview

This SSIP governance framework was developed to provide a transparent, consistent and efficient approach to issues management and decision-making in the implementation of the Sewer System Improvement Program (SSIP). SSIP governance addresses:

- ① mechanisms that provide independent oversight and advice,
- ② open and transparent policy decision-making at the program level, and
- ③ open and transparent decision-making at the project level to advance implementation.

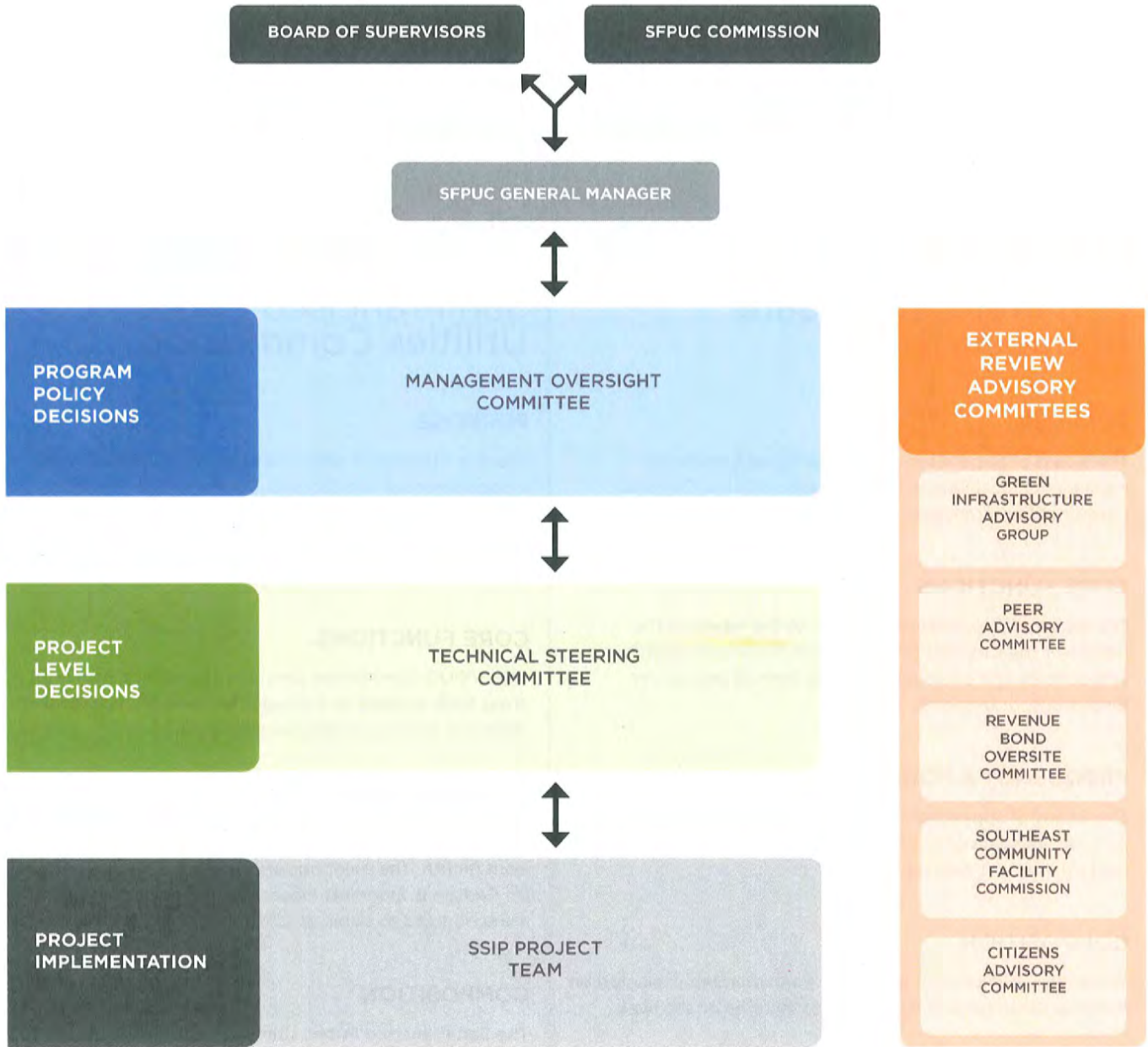
As a department of the City and County of San Francisco, SFPUC policy and budget guidance are provided by the Mayor, legislative branch - the San Francisco Board of Supervisors, and the San Francisco Public Utilities Commission.





# Governance Decision-Making Process

The following graphic illustrates the decision-making Process of the governance groups and the communication protocol between them. This is followed by a description of each group including the purpose, core functions, frequency and format and composition.



↔ Two-way Communication

# LEGISLATIVE DECISIONS



## San Francisco Board of Supervisors

### PURPOSE

The Board of Supervisors is the legislative branch and implements local laws and public policy for the City and County of San Francisco.

### CORE FUNCTIONS

The Board of Supervisors responds to the needs of the people of the City and County of San Francisco, establishes city policies, and takes action in the form of ordinances, resolutions, or motions.

### FREQUENCY & FORMAT

The Board of Supervisors' regular meetings are held at 2:00 p.m., on Tuesdays of each week. Special meetings may be held on different dates and times.

### COMPOSITION

The Board consists of 11 members. Each member is elected on a non-partisan basis from a district where he or she lives.

### SFPUC POINT OF CONTACT

Radhika Fox, rfox@sfgwater.org, (415) 554-1830

## San Francisco Public Utilities Commission

### PURPOSE

The San Francisco Public Utilities Commission (SFPUC) is a department of the City and County of San Francisco that provides retail drinking water services, wholesale water to three Bay Area counties, wastewater services and green hydroelectric and solar power to SF municipal departments.

### CORE FUNCTIONS

The SFPUC Commission provides operational oversight in areas such as rates and charges for services, approval of contracts and organizational policy.

### FREQUENCY & FORMAT

The Commission meets on the second and fourth Tuesdays of each month. The meetings are held in City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, CA 94102. They are scheduled to begin at 1:30 p.m. unless otherwise noticed.

### COMPOSITION

The San Francisco Public Utilities Commission consists of five members, nominated by the Mayor and approved by the Board of Supervisors.

### SFPUC POINT OF CONTACT

Radhika Fox, rfox@sfgwater.org, (415) 554-1830



# PROGRAM POLICY DECISIONS



## Management Oversight Committee

### PURPOSE

The Management Oversight Committee (MOC) is the forum for SFPUC senior management to execute high-level policy decision-making to guide SSIP implementation. The purpose of the committee is to consider recommendations for projects from a policy perspective and to facilitate necessary approvals.

### CORE FUNCTIONS

Provides policy guidance on particular focus areas including but not limited to:

- Integrated and coordinated long-term strategic planning
- Staff resource coordination
- Alignment of project needs to LOS
- Triple Bottom Line Alternative Analysis
- Regulatory planning and compliance

### FREQUENCY & FORMAT

Meetings will occur as-need when policy decisions are required to move the program forward.

Meeting duration will typically be one hour and consist of a project team presentation with time for questions and answers.

### COMPOSITION

The committee is chaired by the SFPUC AGM of Infrastructure. Members are from the executive leadership team of the SFPUC and include:

1. Harlan L. Kelly Jr., General Manager
2. Michael Carlin, Deputy General Manager
3. Tommy Moala, AGM, Wastewater Enterprise
4. Todd Rydstrom, AGM & CFO, Business Services
5. Juliet Ellis, AGM, External Affairs
6. Karen Kubick, Wastewater Enterprise Capital Program Director (Staff)

### SFPUC POINT OF CONTACT

Emilio Cruz,  
ecruz@sfwater.org,  
(415) 554-3409



# PROJECT LEVEL DECISIONS



## Technical Steering Committee

### PURPOSE

The Technical Steering Committee (TSC) is a decision-making body of SFPUC and PMC technical personnel to provide review of SSIP and other WWT projects, consider technical findings and recommendations, and to facilitate necessary approvals at each project phase. The TSC also reviews and provides oversight in order to expeditiously move SSIP projects forward.

### CORE FUNCTIONS

Integrate capital and operations decision-making

Provide reviews and approvals to advance project delivery and execution at key project milestones:

AAR to CER

At 35% design to effectuate a design freeze

As-needed to respond to significant design or construction changes

### FREQUENCY & FORMAT

Meetings will occur as-needed and as requested by the Project Managers or the Program Director to move projects forward at the AAR and 35% Design phase.

Meeting duration will typically be one hour and consist of a project team presentation with time for questions and answers.

Budget, scope, schedule, and critical issues will be presented.

### COMPOSITION

The committee is chaired by the AGM of Infrastructure. Members are technical leaders from the SFPUC and the PMC and include:

1. Emilio Cruz (Chair)
2. Karen Kubick
3. Jeet Bajwa
4. Brian Henderson
5. Alan Johanson
6. Kathy How
7. Irina Torrey
8. Marty Dorward

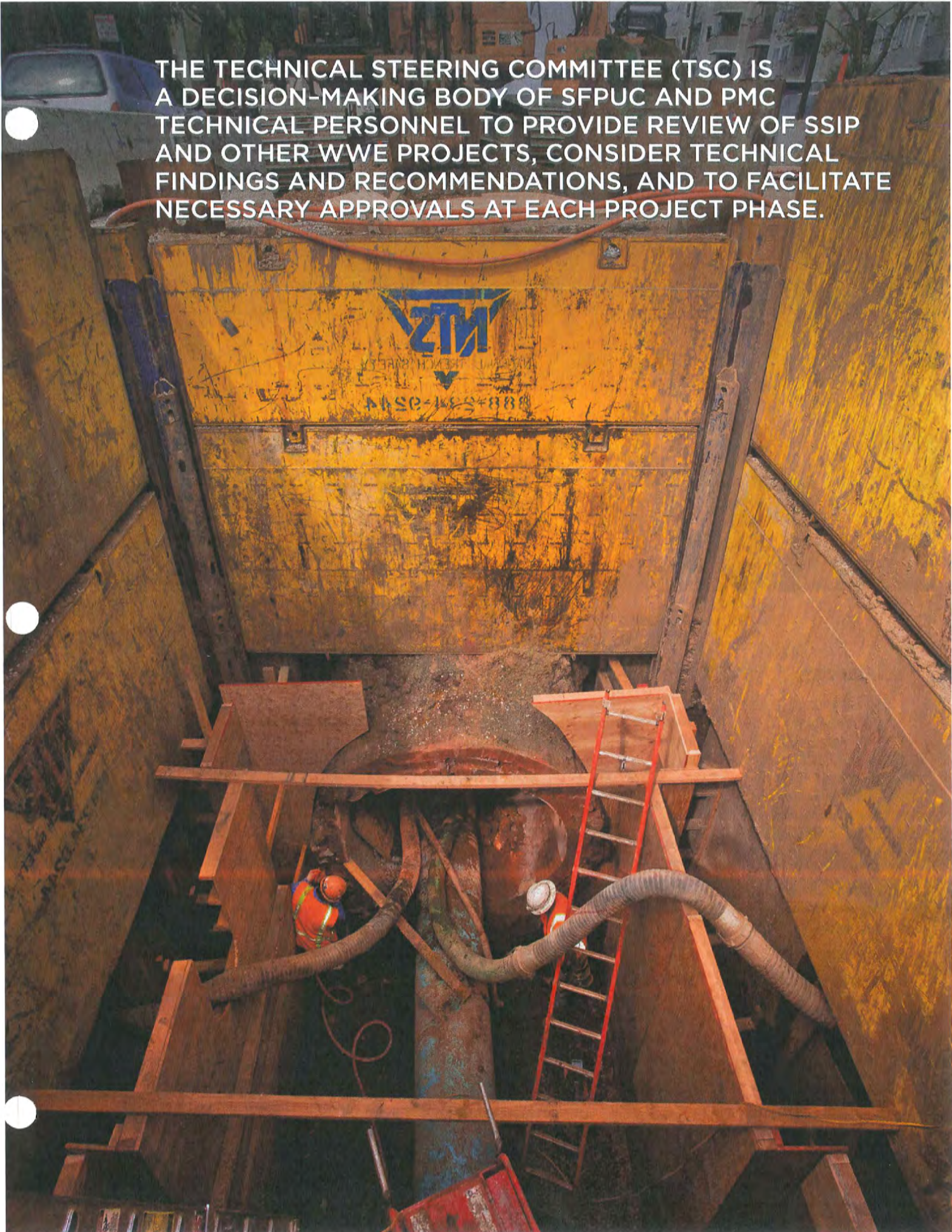
Project Team Members: Project Manager (PM) with up to 3 team members (staff or consultant) to assist with the presentation.

### SFPUC POINT OF CONTACT

Emilio Cruz,  
ecruz@sflower.org,  
(415) 554-3409



THE TECHNICAL STEERING COMMITTEE (TSC) IS A DECISION-MAKING BODY OF SFPUC AND PMC TECHNICAL PERSONNEL TO PROVIDE REVIEW OF SSIP AND OTHER WWE PROJECTS, CONSIDER TECHNICAL FINDINGS AND RECOMMENDATIONS, AND TO FACILITATE NECESSARY APPROVALS AT EACH PROJECT PHASE.





# EXTERNAL REVIEW ADVISORY COMMITTEES



## Green Infrastructure Advisory Group

### PURPOSE

The Green Infrastructure Advisory Group (GIAG) is composed of thought-leaders and technical experts to support successful implementation of performance-based green infrastructure projects, programs, policies and public education.

### CORE FUNCTIONS

Provide high-level advice on:

- Implementation of the Early Implementation Projects (EIPs), Urban Watershed Assessment (UWA), and related projects
- New or expanded policies and programs that would support management of stormwater with green infrastructure
- Opportunities for public education and building public support.

### FREQUENCY & FORMAT

The committee will meet bi-monthly and work collaboratively with the SFPUC to provide constructive feedback on green infrastructure and stormwater management related issues within the SSIP. The group may write memos summarizing issues discussed and decisions made, some of which may be formalized and distributed more broadly to the SFPUC or the SPUR Board. The group may generate or provide advisory input related to future opportunities for green infrastructure policy.


### COMPOSITION

The committee consists of national and local experts with experience in infrastructure development and planning in areas including stormwater management, green infrastructure, landscape design, policy development, project delivery, combined sewer system function and operation, hydrology, urban planning and stakeholder engagement.

### SFPUC POINT OF CONTACT

Renee Willette,  
rwillette@sfgwater.org,  
(415) 554-3476





**THE GREEN INFRASTRUCTURE ADVISORY GROUP (GIAG) IS COMPOSED OF THOUGHT-LEADERS AND TECHNICAL EXPERTS TO SUPPORT SUCCESSFUL IMPLEMENTATION OF PERFORMANCE-BASED GREEN INFRASTRUCTURE PROJECTS, PROGRAMS, POLICIES AND PUBLIC EDUCATION.**



## Peer Advisory Committee

### PURPOSE

The Peer Advisory Committee (PAC) is an advisory body of outside utility management experts that provides independent review to ensure efforts are being made to incorporate, and widely apply, industry best practices and standards in program implementation, regulatory compliance, engineering, design, construction and stakeholder communications.

### CORE FUNCTIONS

- Provide informed guidance on the application of industry standards, best practices, and policies.
- Provide broad reviews of the project development and work implementation process, standards, and related elements of project development, delivery and execution.
- Assess implications of SSIP projects on stakeholders and recommend strategies for communicating those implications.

### FREQUENCY & FORMAT

- Meetings will occur bi-annually or as needed in San Francisco at critical phases of the program's implementation.
- Conference calls may also be used. On-site meetings will typically be full day and include presentations from key program personnel and site visits, if applicable.
- Work products will be meeting minutes defining observations, recommendations, and action items.

### COMPOSITION

The committee is chaired by the AGM of infrastructure. Members are senior utility executives with extensive history and experience in managing wastewater CSO-related utility capital improvement programs. The proposed members are:

1. Virgin Adderly, Program Manager, City of Portland
2. Al Lopez, Principal, ARL Associates (past Dep. Commissioner of Capital Projects, NYCDEP)
3. Leonard Benson, Chief Engineer, DC Water
4. Mike Holbrook, COO, MWRA
5. Rick Merolla, Retired, past Utilities Director and Deputy Mayor, City of Akron
6. Adel Hagekhali, Assistant Director, City of Los Angeles.
7. Wally Bishop, PE and Utility CEO

### SFPUC POINT OF CONTACT

Emilio Cruz, [ecruz@sfgwater.org](mailto:ecruz@sfgwater.org), (415) 554-3409

## Revenue Bond Oversight Committee

### PURPOSE

On November 5, 2002, the voters of San Francisco adopted Proposition P, an ordinance that established the Public Utilities Revenue Bond Oversight Committee (RBOC) to oversee the SFPUC's use of revenue bonds on the repair, replacement and expansion of the City's water, power and wastewater facilities.

### CORE FUNCTIONS

- Oversee the City's use of utility revenue-bond funds
- Evaluate whether bond funds are being used for authorized purposes
- Assess long-range financial planning
- Provide input and report to the Mayor, Board of Supervisors and Public Utilities Commission

### FREQUENCY & FORMAT

The RBOC meets once a month on Mondays from 9:00 a.m. to 11:30 a.m. All meetings are open to the public. RBOC can:

- Hold public hearings
- Review the expenditure of utility revenue-bond funds
- Review capital improvement plans, proposals and other financial records
- Inspect utility facilities
- Hire independent auditors, inspectors and other experts
- If found that bond funds were being used for unauthorized purposes, the committee could halt the sale of any remaining bonds.

### COMPOSITION

The members are appointed by the Mayor and Board of Supervisors. Members are:

1. Kevin Cheng, Chair (Mayor)
2. John Ummel, Vice Chair (BAWSCA)
3. Chris Godwin (Budget and Legislative Analyst's Office)
4. Holly Kaufman (Mayor)
5. Marina Pelosi (Board of Supervisors)
6. Eric Sandler (Controller)
7. Vacant (Board of Supervisors)

### SFPUC POINT OF CONTACT

Surinderjeet Bajwa, [sbajwa@sfgwater.org](mailto:sbajwa@sfgwater.org), (415) 551-4514

# Southeast Community Facility Commission

## PURPOSE

The Southeast Commission Facility Commission (SECF) reviews and provides guidance regarding the operations of the SECF and other facilities under its jurisdiction, to promote and advocate special services for the improvement of the general economy, health, safety and welfare of residents in the southeastern sector of the City. The SECF was established as a mitigation measure in return for the Bayview Hunters Point (BVHP) community's acceptance of the Southeast Water Pollution Control Treatment Plant in their neighborhood.

## CORE FUNCTIONS

- Provide guidance necessary for the establishment, retention and enhancement of business activities of the greenhouse, educational and job skills centers, child care and senior activities centers.
- Review and provide guidance on budgetary matters related to the operation and maintenance expenses at the Southeast Community Facility

## FREQUENCY & FORMAT

SECF Commission meetings are held twice monthly:

Second (2nd) Thursday and fourth (4th) Wednesday (unless otherwise posted at least 72 hours prior to meeting). Meetings are held in the evenings (6 pm) at 1800 Oakdale Avenue, Alex L. Pitcher, Jr. Community Room. All meetings are open to the public.

## COMPOSITION

The members of the Commission are appointed and serve under the leadership of the Mayor. Members are:

1. Karen A. Chung, Commissioner, Chairperson
2. LaVaughn King, Vice-Chairperson, Commissioner
3. Bobbrie Brown, Commissioner
4. Janine Greer, Commissioner
5. Brigette R. LeBlanc, Commissioner
6. Eddy Zheng, Commissioner
7. Vacant

## SFPUC POINT OF CONTACT

Renee Willette, [rwillette@sfgwater.org](mailto:rwillette@sfgwater.org), (415) 554-3476

# Wastewater Citizens Advisory Subcommittee

## PURPOSE

The purpose of the Wastewater Citizens' Advisory Subcommittee (WCAS) is to support the creation and implementation of good public policy through an inclusive process of citizen oversight and comment addressing the achievement of the SFPUC's wastewater-related goals and objectives for long-term strategic, financial, and capital improvement plans and policies.

## CORE FUNCTIONS

Publicly discuss and make recommendations to the General Manager, the Public Utilities Commission and the Board of Supervisors through actions including:

- Gathering information from and being open to the concerned public.
- Providing timely and clear reports, in writing, to the General Manager, Commission and Board of Supervisors.
- Providing any special reporting it determines advisable.

## FREQUENCY & FORMAT

Meetings of the WCAS will be held at times and a place jointly designated by the General Manager and the Subcommittee. The Subcommittee shall meet no less than nine times in a twelve-month period, unless the Chair and the Subcommittee agree to a different frequency of meetings. Meeting schedules will maximize, to the extent feasible, the opportunity for public attendance and participation in the meeting. All subcommittee meetings shall be open to the public. Minutes shall be taken.

## COMPOSITION

There shall be four members of the WCAS, each appointed in the manner provided by Administrative Code section 5.141(a). The Chair of the Subcommittee is appointed by the Chair of the Citizens Advisory Committee (CAC). Membership is comprised of individuals who demonstrate one or more of the following qualifications: representing a community, business, environmental or environmental justice organization, or with demonstrated knowledge, skill or experience in a field related to public utilities, environmental justice or environmental science.

1. Javieree Pruthill, Subcommittee Chair (D8)
2. David Pilpel (D4)
3. Tracy Zhu (B-EJ)
4. Art Taylor (D9)
5. Wendy Aragon, CAC Chair (D2)

## SFPUC POINT OF CONTACT

Jessica Buendia, [jbuendia@sfgwater.org](mailto:jbuendia@sfgwater.org), (415) 554-3473



SEWER SYSTEM IMPROVEMENT PROGRAM | Grey. Green. Clean.

