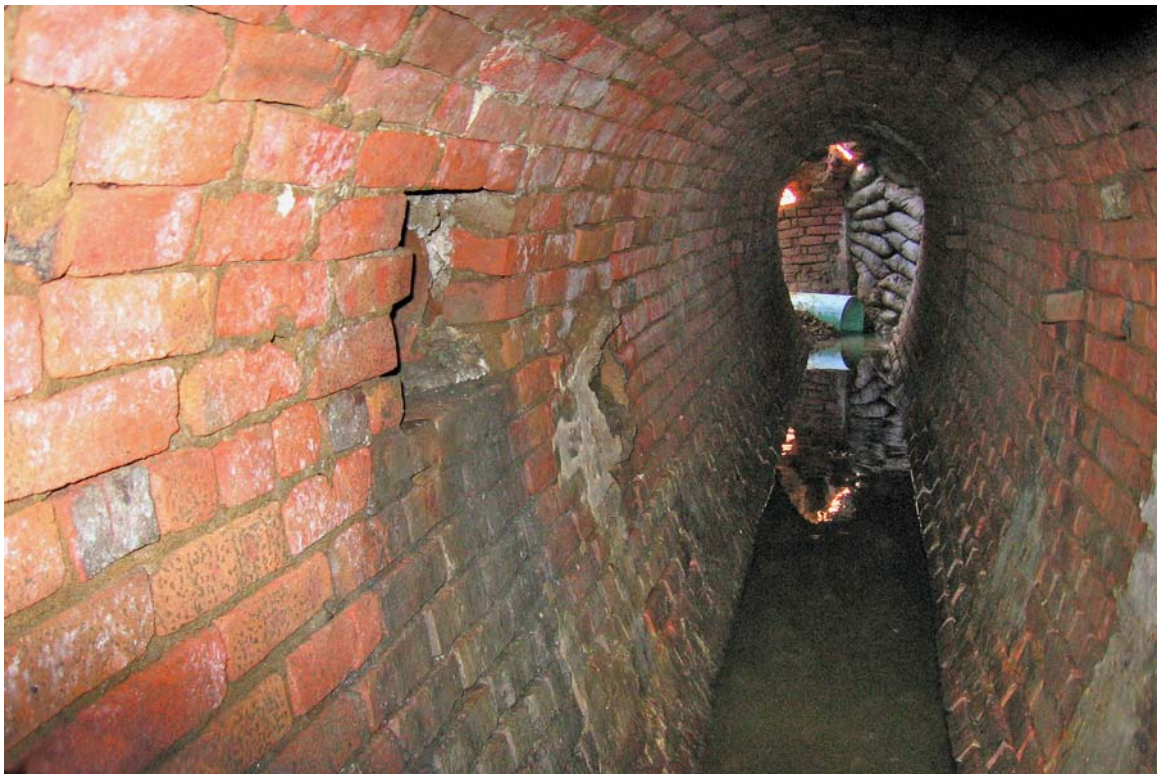
Summary Report
Fifth Meeting of the
Technical Advisory Committee for the
City of San Francisco Sewer System Master Plan

October 15, 2007



Prepared by

Technical Advisory Committee
San Francisco, California

SFPUC Wastewater Master Plan
SUMMARY OF FIFTH TECHNICAL ADVISORY COMMITTEE MEETING
City of San Francisco, California

October 15, 2007

Mr. Jon Loiacono
SFPUC
1145 Market St. 5th floor
San Francisco, CA 94103

RE: *Summary Report of the Fifth Meeting of the Technical Advisory Committee for the City of San Francisco* ***Sewer System Master Plan***

Dear Mr. Loiacono:

Please find enclosed the summary report for the fifth meeting of the Technical Advisory Committee (TAC) for the *City of San Francisco* ***Sewer System Master Plan.*** The fifth TAC meeting was held on July 16, 2007 in San Francisco at the PUC offices. This summary report has been prepared, reviewed, and approved by all of the undersigned TAC members.

Very truly yours,

George Tchobanoglous, Chair	Robert Gearheart
Darla Inglis	David Jenkins
Michael Josselyn	Larry Kolb Absent from fifth meeting
Cecil Lue-Hing	E. Joe Middlebrooks

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The City of San Francisco, CA is currently in the process of developing a ***Sewer System Master Plan* (SSMP)*.*** To ensure that the planning process is comprehensive and consistent with the needs of the City, an independent Technical Advisory Committee (TAC) was formed. Several TAC meetings were scheduled prior to the completion off the Master Plan by the end of 2007. Key findings from the fifth meeting of the TAC held on July 16, 2007 are presented in this Executive Summary. The agenda for the July 16, 2007 meeting is included in Appendix A. More detailed meeting minutes are also included in this report in Appendices B through E. The minutes of the first four TAC meetings, held on March 5 and 6, 2006, June 1 and 2, 2006, September 6, 2006, and November 6, 2006, respectively are on file at the SFPUC. Brief summaries of the first four meetings are included in this report, for easy reference.

Subsequent to the fifth meeting, the TAC developed a consensus statements on (1) the Master Plan dealing with the goals and objectives of the SSMP and (2) the soundness of the Integrated Urban Watershed Planning approach. The full text of the two consensus statements is presented following this executive summary.

MEETING OBJECTIVES

The principal objectives of the fifth TAC meeting were to:

1. Review the Sewer System Master Plan (SSMP) Alternatives, the selected alternative and proposed project phasing;
2. Review biosolids management options and siting issues; and
3. Review collection system projects and implementation options

INTEGRATED URBAN WATERSHED MANAGEMENT

Before presenting the details of the SSMP alternatives, the concept of Integrated Watershed Management (IWM) was reviewed.

Planning Approach/Vision

Integrated Watershed Management was presented as an approach/vision for addressing the many different issues that need to be resolved in the Master Plan. A number of Low Impact Development (LID) approaches including water reduction or desynchronization, rainwater harvesting, and opportunistic water reclamation (i.e., treating wastewater for reuse within the watershed) were emphasized as key elements in this approach.

TAC Comments

The TAC noted that LID needs to be more integrated in the discussions of the alternatives. The SFPUC should commit to evaluating potential LID concepts, even those which may be experimental, in the alternative analysis and not necessarily commit to LID as an alternative. It was emphasized, by TAC members, that LID is a technique or "tool kit," and not a stand-alone alternative. LID concepts should not be a box in a flow chart, but should be incorporated into all elements of the project alternatives. Further, it was noted that while the implementation of LID approaches may not represent the lowest cost, they could result in the highest value to the customer.

PRESENTATION OF THE SSMP ALTERNATIVES

The four alternatives, developed by the city staff and their consultants, the recommended alternative, and the proposed project phasing were presented. Details on each alternative, identified below and the recommended alternative, may be found in the summary of the fifth meeting presented in this document and in the project reports on file at the SFPUC.

The Four SSMP Alternatives

The major difference between the alternatives is in the location where the treatment, reuse, and disposal of the treated wastewater will occur. It should be noted that the improvements to make existing infrastructure more reliable are common to each of the alternatives.

Recommended Alternative

The SFPUC staff and consultants conducted a master planning design charrette, and based on the findings, identified the recommended master planning alternative and common elements. The recommended alternative includes collection system improvements, low impact developments, water reclamation, and improvements at all the existing wastewater treatment and disposal facilities. The recommended project is described in greater detail in the TAC consensus statement and in the summary of the fifth meeting. A key feature of the recommended alternative is that it maintains the flexibility to implement any of the alternative locations for liquid treatment in the future.

Project Phasing

To keep project costs manageable, implementation of the Master Plan will be accomplished in three phases each 10 years in duration. In Phase 1, the two primary elements are the replacement of the digesters at SEP and collection system improvements. Collection system improvements also need to be undertaken as part of Phase 1. In Phase 2, the emphasis is on improvements to the wastewater management system as a whole and specific measures to improve reliability. Phase 3 involves system maintenance and upgrades to existing facilities with new technologies.

TAC Comments on the SSMP Presentation

The TAC was pleased the City had adopted the key elements of the plan proposed by the TAC at the fourth meeting. It was suggested that more emphasis be placed on the collection system repairs in the SSMP presentations and outreach material, as the needed repairs to the collection system represent the majority of the cost of the SSMP. Also, it will be important to discuss how the Bayview community concerns will be addressed in each of the three phases. The TAC raised some concerns with Phase 1, in particular, can the proposed new digester project be completed in 10 years. For better clarity, the TAC suggested that in future presentations, the recommended alternative(s) be presented first followed by back-up information for the other alternatives. The

TAC also recommended that the urgency to replace the digesters should also be stressed in any presentation.

BIOSOLIDS MANAGEMENT

The next presentation dealt with an updated presentation on the Biosolids Management Plan. The management of the biosolids is of critical importance as the City has a zero waste goal by year 2020

Long-Term Planning

A major theme of the presentation was the fact that land disposal of treated biosolids is being challenged throughout California and alternative biosolids management options must be investigated.

Codigestion of Food Wastes and Wastewater Biosolids

The SFPUC is working with Norcal and evaluating how to best treat/recycle organic waste streams (e.g., fats, oils, and grease and food waste). Separate composting system for treatment plant sludge and food wastes has been proposed and is being investigated.

New Bayside Biosolids Center (BBC)

The need for a new or refurbished solids handling facility was identified. The Existing SEP digesters, which have been in operation for 55 years, are not in conformance with current seismicity standards and have significant maintenance requirements. A number of potential sites have been identified.

TAC Comments

The TAC found that the recommendation to keep sludge digestion is sound from a treatment and technological standpoint. Most of the future sludge processing technologies begin with digestion and hence, the SFPUC will not lose by investing in sludge digestion. The TAC suggested investigating the use of biosolids in pelletized form in cement kilns as fuel. Regardless of the sludge management techniques employed, odor management is a major issue that must be addressed positively. Though difficult to accomplish, centralization of the solids handling facilities would result in economies of scale in energy recovery and in the production of a useful byproduct. The various architectural designs

(renderings) for the biosolids handling facility were viewed positively by the TAC. The range of options available for the visual screening of the digesters, and other possible beneficial uses was impressive.

COLLECTION SYSTEM PROJECTS

The next presentation dealt with an overview of the challenges facing the collection system infrastructure.

Repair and Rehabilitation Program

Because of the increasing age of the sewer pipes in the collection system, including the old brick sewers (see Cover), the number of sewer pipe failures is expected to increase over the next 30 years. The impact of the rising sea levels in San Francisco Bay was also discussed. With regard to the repair and rehabilitation of these sewers there are two schools of thought on how to proceed. One approach is ramping up quickly on expenditures (with the risk of spending in advance of failures), versus going slower in ramping up expenditures (with the risk of incurring increased pipe failures).

TAC Comments

The TAC noted that selection of the best approach for sewer repair and rehabilitation is dependent on how well the existing condition of sewers is known. It is also dependent on determining what is an acceptable rate of (predicted) failure. The TAC suggested budgeting for more emergency repairs under the delayed expenditure approach and to consider that seawater intrusion (from rising sea levels) would increase sulfides into the sewer and treatment plants.

PUBLIC COMMENTS

A number of comments were offered by the public on different aspect of the SSMP. The principal issues raised by the public are presented below. Additional issues are presented in the summary of the fifth meeting.

1. Land should be secured near Mission Bay so that pumping could be reduced. Land in Mission Bay is potentially available now; but may not be in future.
2. Need to deal with environmental justice issues in the Master Plan

3. More discussion of sustainability as a general theme and guiding principal for the alternatives
4. Regulatory issues on CSO discharges at Islais and Mission “creeks” should be included as drivers in the selection of alternatives
5. Opportunities for stormwater treatment in Brisbane and Hunters Point should be examined.
6. Eventually look at each of the subdrainage areas in the City to implement the idea of integrated watershed management.

Following the fifth TAC meeting, consensus statements were developed for two major issues related to the SSMP. The issues and the corresponding consensus statements are presented below.

ISSUE 1:

The City of San Francisco Sewer System Master Plan (SSMP) developed four distinct alternative programs to meet the Wastewater Enterprise mission of protecting public health and the environment by providing safe, reliable, cost-effective and efficient facilities for the collection, treatment, reuse, and disposal of wastewater and stormwater from the City of San Francisco.

The goals of the SSMP are to:

1. Provide a unifying vision and a long-range (30-year) plan consisting of sustainable policies, programs, and projects that cost-effectively manage the City of San Francisco's wastewater and stormwater systems; and
2. Provide a recommended financial analysis.
3. Maintain an open, fair and objective public planning process.

The *overall objectives* of the SSMP are to:

1. Identify system improvements that:
    - Provide high quality wastewater collection, treatment and disposal that ensure compliance with current and foreseeable local, state and federal regulations and that accommodate planned population growth and provide the flexibility of accommodating unanticipated increases in population and/or wastewater volume.
    - Increase the reliability of the wastewater management system in collecting, treating and disposing of wastewater and wastewater byproducts to accommodate planned outages for maintenance and unanticipated facilities outages.

2. Evaluate environmentally and economically sustainable operations and practices, innovative options and technologies, and the equitable distribution of wastewater system burdens and benefits.

3. Identify projects that provide the best cost/benefit to the public.

The *specific objectives* of the SSMP are aligned as follows:

1. Ensure Seismic Reliability
2. Provide a Reliable and Flexible Collection System
3. Provide a Reliable and Flexible Treatment System
4. Minimize Neighborhood Impacts
5. Provide Environmental Protection
6. Provide Beneficial Reuse of Resources/Minimize Consumption of Natural Resources
7. Protect Public and Worker Health and Safety
8. Minimize Impacts to Ratepayers

The Recommended Project

Of the four alternative programs that were developed for evaluation, the SSMP project staff recommends Alternative 1 which includes the Upper Alemany Diversion Watershed Improvements to relieve flooding in the Cayuga area. The primary focus of Alternative 1 is on providing the necessary repairs to the existing wastewater management system to ensure its future sustainability in an integrated urban watershed management approach. Alternative 1 provides the same benefits as the Alternatives 2, 3 and 4 while having the lowest energy demand and the smallest carbon footprint, while still maximizing the use of existing infrastructures. More importantly, the recommended alternative maintains the flexibility for the future implementation any of the other alternatives, should there be changes in regulatory requirements and/or other unknown circumstances.

The SSMP is made up of three ten-year capital improvement periods (CIPs). The first two periods are the same for all alternatives. The alternatives differ only in the third CIP. In this CIP a decision must be made on the future location of the liquid treatment portion of the Southeast Plant. Placing the decision on the

relocation of the Southeast Plant liquid stream treatment in CIP 3 allows the City to take advantage of the remaining useful life of the facility. This feature of Alternative 1 was important in making it the choice for the SSMP. Leaving the decision on the liquid stream treatment site location for future decision makers allows the SFPUC to develop an integrated urban watershed concept in the interim and to take advantage of any new technology that would allow future wastewater treatment to become a more distributed system.

TAC Consensus Opinion:

It is the consensus opinion of the TAC that the SSMP recommended project is, with two exceptions, consistent with the TAC Summary Report of 6 November 2006 "Recommended Master Plan Components and Elements". First, the TAC recommended that the North Point Plant operate in both dry and wet weather. The TAC recognizes that the SFPUC is currently addressing this issue through water reclamation by looking for alternative water reclamation sites that extract wastewater for treatment nearer the anticipated points of use. Second, the TAC recommended increasing dry weather treatment at Oceanside through the Cayuga diversion (aka Upper Alemany Watershed Diversion.) The SSMP calls for a wet weather only diversion. This recommendation, however, does not preclude future diversion of dry weather flow as may be necessary to meet future discharge regulations or needs. In conclusion, the TAC is in agreement with the SFPUC's Recommended Project.

ISSUE 2:

The SFPUC has taken an Integrated Urban Watershed Management approach in developing the SSMP. In addition to addressing the City's wastewater/stormwater collection and treatment system, the SSMP will encourage the SFPUC to consider the whole drainage basin (*i.e.*, watershed). Inputs and outputs of the basin will be evaluated for opportunities to:

- Maximize Treatment
- Harvest Stormwater
- Conserve Water

- Provide for Water Reuse
- Employ Low Impact Development
- Practice Pollution Prevention
- Use Renewable Power
- Provide Neighborhood Enhancement

Specifically, the SSMP will integrate the collection and treatment of stormwater and wastewater with land management, development and the transportation aspects of urban planning. This integration would include, but not be limited to, the local collection and re-use rainwater, the maximization of water reclamation and the provision of other methods for increasing the storm water capacity of the urban landscape.

The specific programs, policies and projects are:

- Low Impact Development emphasizing storm water reuse through ordinances for new developments, joint agency projects, and incentives.
- Opportunistic Water Reclamation, specifically using the McLaren Park and Central Basin scalping plants.

TAC Consensus Opinion:

It is the consensus opinion of the SSMP TAC that the Integrated Urban Watershed Planning approach is sound and will allow the SFPUC to achieve a sustainable wastewater management program.

SUMMARY OF FIFTH MEETING OF THE TECHNICAL ADVISORY COMMITTEE

The City and County of San Francisco, CA is currently in the process of developing a ***Sewer System Master Plan* (SSMP)*.*** To ensure that the planning process is comprehensive and consistent with the needs of the City, an independent Technical Advisory Committee (TAC) was formed. What follows is a summary of the fifth TAC meeting. Along with a summary of fifth TAC meeting, information on the charge to the TAC, the membership of the TAC, and the meeting schedule are included. Brief reviews of the first four TAC meetings are presented in the following section. Complete minutes of the first four TAC meetings are on file with the SFPUC.

TECHNICAL ADVISORY COMMITTEE CHARGE

The TAC was formed to:

1. Review and comment on major milestone reports and/or technical memoranda prepared by the Planning and Engineering teams,
2. Provide an independent extramural view of the work to be undertaken, and
3. Offer advice and council on topics that should be considered as part of the master plan

TAC MEMBERSHIP

The TAC is comprised of eight members, selected to represent a broad range of disciplines:

Robert Gearheart
Darla Inglis
David Jenkins
Michael Josselyn
Larry Kolb
Cecil Lue-Hing
E. Joe Middlebrooks (Absent for fifth TAC meting)
George Tchobanoglous, Chair

MEETING SCHEDULE

The first TAC meeting was held on March 5 and 6, 2006 in San Francisco at the PUC offices. The second meeting was held on June 1 and 2, 2006. The third was held on September 6, 2006. The fourth meeting was held on November 6, 2006. The fifth meeting, the subject of this report, was held on July 16, 2007. The next meeting of the TAC is scheduled for the early part of 2008.

INTRODUCTION TO FIFTH TAC MEETING

The TAC members and audience were welcomed by Bonnie Jones and Jon Loiacono, Following the welcoming remarks the objectives of the fifth TAC meeting were presented and the findings from the fourth TAC meeting were reviewed.

Detailed minutes of the fifth one-day meeting were taken by one of the TAC members, two member of the city staff, and by the project manager for the consulting consortium of engineering firms responsible for completing the work on the master plan. The minutes taken by the four different scribes are presented in Appendixes B, C, D, and E, respectively of this report.

Objectives of Fifth TAC Meeting

The objectives of the fifth TAC meeting were to:

1. Review the Sewer System Master Plan (SSMP) Alternatives, the selected alternative and proposed project phasing;
2. Review biosolids management options and siting issues; and
3. Review collection system projects and implementation options

Findings From the Fourth Meeting

The purpose of the fourth TAC meeting was to review the progress on the master plan and the overall direction. Major findings and observations from the fourth meeting are:

1. The TAC found the replacement of aging infrastructure to be the most important rationale for the master planning objectives.

2. The TAC members found that the SFPUC staff had been responsive to the rationale presented by the TAC following the third meeting, and that the overall direction was appropriate.
3. The TAC inquired if any response had been made to the SWALE comments. It was reported that SFPUC sent a letter in response. In general, the SFPUC staff is in agreement with all comments with the exception of having to treat all wet-weather flows to secondary treatment.

INTEGRATED URBAN WATERSHED MANAGEMENT

Following the introduction, presentation of the recommended Sewer System Master Plan (SSMP) Alternatives was the next subject on the agenda. However, before presenting the details of the SSMP alternatives, the concept of Integrated Watershed Management (IWM) was reviewed.

Planning Approach/Vision

Integrated Watershed Management was presented as an approach/vision for addressing the many different issues that need to be resolved in the Master Plan. A number of Low Impact Development (LID) approaches including water reduction or desynchronization, rainwater harvesting, and opportunistic water reclamation (i.e., treating wastewater for reuse within the watershed) were emphasized as key elements in this approach.

TAC Comments on Integrated Urban Watershed Management

The TAC noted that LID needs to be more integrated in the discussions of the alternatives. The SFPUC should commit to evaluating potential LID concepts, even those which may be experimental, in the alternative analysis and not necessarily commit to LID as an alternative. It was emphasized, by TAC members, that LID is a technique or “tool kit,” and not a stand-alone alternative. LID concepts should not be a box in a flow chart, but should be incorporated into all elements of the project alternatives. Further it was noted that while the implementation of LID approaches may not represent the lowest cost, they could result in the highest value to the customer.

PRESENTATION OF THE SSMP ALTERNATIVES

Following the discussion of the IWM approach to planning, the four alternatives, developed by the city staff and their consultants the recommended alternative, and the proposed project phasing were presented. Details on each alternative, identified below, and the recommended alternative may be found in the project reports on file at the SFPUC.

The Four SSMP Alternatives

The four alternatives can be summarized as follows:

Alternative 1: Improve existing wastewater management system

- Meets most pressing infrastructure needs
- Improves and makes existing infrastructure more reliable

Alternative 2: Decentralized treatment

- The North Point Facility (NPF) is improved
- The flow to Southeast Wastewater Treatment Plant (SEP) is reduced
- Improves and makes existing infrastructure more reliable

Alternative 3: Treat dry weather flows at Oceanside Wastewater Treatment Plant (OSP)

- Dry weather flow diverted from the bayside for treatment at the OSP
- Improves and makes existing infrastructure more reliable

Alternative 4: New Bayside treatment plant

- Relocation of existing SEP to a different site
- Improves and makes existing infrastructure more reliable

It should be noted that the improvements to make existing infrastructure more reliable are common to each of the alternatives. The major differences between the alternatives are in the location where the treatment, reuse, and disposal of the treated wastewater will occur.

The Recommended Alternative

The SFPUC staff and consultants conducted a master planning design charrette, and based on the findings, identified the recommended master planning alternative and common elements. The recommended alternative is Alternative 1 with elements of Alternative 2. The key elements and rationale/benefits of the recommended alternative are as follows:

- Key elements
  - Collection system improvements
  - LID improvements.
  - Improve existing facilities at SEP, OSP (in operation since 1993), and NPF.
  - Water reclamation
- Rationale/Benefits
  - Maximizes the remaining useful life of existing facilities
  - Replacement of liquid treatment facility occurs at the end of 30 year period: uncertain regulatory requirements
  - Upgrade/relocation of centralized biosolids treatment center to occur in Phase 1
  - Flexibility to implement any of the alternatives of the alternative locations for the future
  - Lowest cost alternative
- Advantages and Disadvantages
  - Advantages
    - Provides same benefits as other alternatives
    - Least energy demand
    - Smallest carbon footprint
    - Maximizes use of existing infrastructure
  - Disadvantages
    - Continues wastewater treatment in same Bayview location.

Project Phasing

To keep project costs manageable, implementation of the Master Plan will be accomplished in three phases each 10 years in duration.

Phase 1: Seismic Reliability Improvements, (0 to 10 years).

- Digester replacement and relocation (this project is about half the total cost of Phase 1).
- Repair deep-water outfalls.
- Upgrades to facilities at SEP, OSP, and NPF.
- Redirect wet weather flow from Channel PS to North Point Main (redundancy).
- Collection system improvements
  - Replace/repair aging infrastructure is the most pressing need.
  - Develop a plan for backflow prevention on CSDs. to counteract sea level rise (see subsequent discussion).
  - Implement LID technologies.

In Phase 1, the two primary elements are the replacement of the digesters at SEP and collection system improvements. Replacement of the SEP digesters early in the process is critical given the need to complete this upgrade as soon as possible. Even when placed in the first phase, the replacement of the digesters may take 9 years to implement and be operational. Collection system improvements also need to be undertaken as part of Phase 1

Phase 2: System Performance Reliability Improvements (11 to 20 years).

- Treatment improvements:
  - Increase capacity of outfalls
  - Increase NPF to 240 mgd
  - Increase SEP primary treatment to 400 mgd
- Collection System Improvements
  - Upper Alemany Watershed Diversion (Cayuga)
  - Increase wet weather pumping capacity in Westside
  - Repair aging sewers
  - Reduce flooding

In Phase 2, the emphasis is on improvements to the wastewater management system as a whole and specific measures to improve reliability.

Phase 3: System Maintenance (21 to 30 years).

Treatment Facility Improvements

Upgrade and/or relocate treatment facility in year 30.

Collection system improvements.

Phase 3 involves system maintenance and upgrades to existing facilities with new technologies.

TAC Comments on the SSMP Presentation

The TAC was pleased that the City had adopted the key elements of the plan proposed by the TAC at the fourth meeting. It was suggested that more emphasis be placed on the collection system repairs in the SSMP presentations and outreach material, as the needed repairs to the collection system represent the majority of the cost of the SSMP. Also, it will be important to discuss how the Bayview community concerns will be addressed in each of the three phases. The TAC raised some concerns with Phase 1, in particular, can the proposed new digester project be completed in 10 years. For better clarity, the TAC suggested that in future presentations, the recommended alternative(s) be presented first followed by back-up information for the other alternatives. The TAC also recommended that the urgency to replace the digesters should also be stressed in any presentation.

BIOSOLIDS MANAGEMENT

Following the presentation and discussion of the SSMP alternatives, the next presentation dealt with an updated presentation on the Biosolids Management Plan. The management of the biosolids is of critical importance as the City has a zero waste goal by year 2020

Long-Term Planning

A major theme of the presentation was the fact that land disposal of treated biosolids is being challenged throughout California and alternative biosolids management options must be investigated. The presentation emphasized on

using solar drying for sludge in small portions in San Francisco due to limited space availability in California and the cost of energy associated with heat drying.

Codigestion of Food Wastes and Wastewater Biosolids

The SFPUC is working with Norcal and evaluating how to best treat/recycle organic waste streams (e.g., fats, oils, and grease and food waste). Separate composting system for treatment plant sludge and food wastes has been proposed and is being investigated.

New Bayside Biosolids Center (BBC)

The need for a new or refurbished solids handling facility was identified. The Existing SEP digesters, which have been in operation for 55 years, are not in conformance with current seismicity standards and have significant maintenance requirements. The potential BBC sites include the existing Southeast Plant (with added adjacent CalTrans property, other CalTrans property (Parcel A and B), and the Port Authorities Pier 94. Pier 94 is in a public lands trust. To acquire this site it would be necessary to negotiate an agreement with the Port Commission, the Attorney General, and California State Land's Commission. A representative of the Port Authority emphasized that the Master Plan BBC concept development should be integrated with the surrounding area to ensure visual consistency.

TAC Comments on Biosolids Management

The TAC found that the recommendation to keep sludge digestion is sound from a treatment and technological standpoint. Most of the future sludge processing technologies begin with digestion and hence, the SFPUC will not lose by investing in sludge digestion. The TAC suggested investigating the use of biosolids in pelletized form in cement kilns as fuel. Regardless of the sludge management techniques employed, odor management is a major issue that must be addressed positively. Though difficult to accomplish, centralization of the solids handling facilities would result in economies of scale in energy recovery and in the production of a useful byproduct. The various architectural designs (renderings) for the biosolids handling facility were viewed positively by the TAC.

The range of options available for the visual screening of the digesters, and other possible beneficial uses was impressive.

COLLECTION SYSTEM PROJECTS

Following the presentation and discussion of the SSMP alternatives, the next presentation dealt with an overview of the challenges facing the collection system infrastructure.

Repair and Rehabilitation Program

Because of the increasing age of the sewer pipes in the collection system, including the old brick sewers (see Cover), the number of pipe failures is expected to increase over the next 30 years. With regard to the repair and rehabilitation of these sewers there are two schools of thought on how to proceed. One approach is ramping up quickly on expenditures (with the risk of spending in advance of failures), versus going slower in ramping up expenditures (with the risk of incurring increased pipe failures).

Rising Sea Levels

Another issue that was discussed is the impact of the rising sea levels in San Francisco Bay. If the rise in the sea level continues at the rate it has over the past 100 years, or is accelerated, sea water intrusion will occur into the existing stormwater storage boxes. Clearly, modifications will have to be made to avoid the intrusion of seawater. A representative from the City of San Jose noted that all of the treatment plants in the Bay Area will be impacted by the rising sea levels, and suggested that a concerted Regional approach be initiated to address the sea level rise.

TAC Comments on Collection System Projects

The TAC noted that selection of the best approach for sewer repair and rehabilitation is dependent on how well the existing condition of sewers is known. It is also dependent on determining what is an acceptable rate of (predicted) failure. The TAC suggested budgeting for more emergency repairs under the

delayed expenditure approach and to consider that seawater intrusion (from rising sea levels) would increase sulfides into the sewer and treatment plants.

PUBLIC COMMENTS

A number of comments were offered by the public on different aspect of the SSMP. The principal issues raised by the public included.

1. The need to consider LID technologies more thoroughly. Concern about the level of detail in the Master Plan on the LID program, could potentially waste money without a good formula for the "protocol". Need to quantify and set goals, or at least, define an approach. The selling components of master planning program - LID and watershed management program - should be presented in more detail.
2. Concern about the level of detail in the Master Plan on the LID program, could potentially waste money without a good formula for the "protocol". Need to quantify and set goals, or at least, define an approach. The selling components of master planning program - LID and watershed management program - should be presented in more detail.
3. The City Planning group should make stormwater control element a priority in planning the neighborhoods. Need to talk to the Supervisors.
4. For private developments, City coordination at the permitting level may be too late to be effective. Should get involved at the real estate transaction level. Development fees should also fund LID projects.
5. The City's east side drains to Mission Bay. The SFPUC should secure some land at the bottom of the basin for the future (e.g., Norcal property).
6. What are the regulatory concerns (e.g., ammonia removal)? Mission Creek and Islais Creek are both on the 303(d) list.
7. What about purple piping ordinance? What about gray water reuse similar to Orange County?
8. Need to coordinate within the SFPUC, too. Rainwater harvesting is part of the water side planning, and needs to be coordinated as part of their water supply estimates.

9. Why is Brisbane not being considered in the Master Plan,. It is a growing area with similar problems.
10. Seismic Reliability is one of the main elements for the Master Plan. Were the impacts from earthquakes evaluated?

CONCLUSION

In addition to the comments on various aspects of the program, some closing thoughts were also presented.

1. The TAC members are fully in support of the alternative selected for the SSMP. The ability to phase the program over a 30 year period allows positive action to be taken within budgetary constraints and does not foreclose the implementation of future technological developments.
2. Moving in the direction of decentralization treatment, as outline in the preferred alternative, is viewed positively by the TAC.
3. It is important to identify the “low hanging fruit,” with respect to opportunities to implement LID technologies in new developments. Begin coordination with major developers and public agencies for these projects now. The South of Market area is growing today. Get in early with the major developers, and public agencies, as it is not all about the technical, as it is about the political.
4. TAC members liked the design of biosolids handling and acknowledged that the ideas of SSMP have been demonstrated and indicated lot of options. Truly reflect all the work.
5. The architectural treatment of the biosolids center (any of the options) was well received by the TAC.
6. The TAC will review the comments and prepare a report integrating the comments and issues from other TAC members.

Abbreviated minutes, essentially the executive summaries, of the first four TAC meetings held on March 5 and 6, 2006, June 1 and 2, 2006, September 6, 2006, and November 6, 2006, respectively are presented below for easy reference. As noted in the summary of the fifth TAC meeting, copies of the complete minutes of the first four TAC meetings are on file at the SFPUC.

FIRST TAC MEETING–March 5 and 6, 2006

Prior to the first meeting of the TAC the City sent out a series of reports and technical memoranda for review. An agenda, prepared by the City engineering staff, was emailed to the TAC members prior to the first meeting. The agenda for the first TAC meeting was designed to provide the TAC members with a thorough introduction to the many issues to be resolved in the development of the master plan and included of a field trip on the first day, to familiarize the TAC members with the physical characteristics of the City and the facilities used for the management, treatment, and disposal of wastewater and residuals. Detailed minutes of the two-day meeting were taken by one of the TAC members, a member of the city staff, and by the project manager for the consulting consortium of engineering firms responsible for completing the work on the master plan. The minutes taken by the three different scribes are presented in Appendixes B, C. and D, respectively in the summary report for the first TAC meeting.

The presentations during the first TAC meeting were informational in nature and essentially served as an extension of the material contained in the reports and technical memoranda made available previously to the TAC. The principal subjects covered in the first TAC meeting included (1) the collection system, (2) stormwater management, (3) effluent discharge options, (4) biosolids management, (5) water reuse, and (6) master plan guidance. The key findings and recommendations made by the TAC following the first meeting were

organized around these subjects. A summary report of the first TAC meeting is on file at the SFPUC. An important question posed by the City at the first TAC meeting concerned the continued use of a combined wastewater collection system. The TAC developed a consensus opinion on the question that was included in the summary report for the first meeting and is included in this report following the TAC Recommended Plan.

SECOND TAC MEETING–June 1 and 2, 2006

An agenda for the second TAC meeting was sent out prior the meeting. The agenda for the second TAC meeting was designed to highlight key issues related to the Master Plan. Detailed minutes of the two-day meeting were taken by one of the TAC members, a member of the city staff, and by the project manager for the consulting consortium of engineering firms responsible for completing the work on the master plan. The minutes taken by the three different scribes are presented in Appendixes B, C. and D, respectively in the summary report for the second TAC meeting.

The presentations at the second meeting, as noted above, were limited to the key issues related to the Master Plan. Ample time was allowed for TAC interaction with city staff members, the public, and consultants. The principal issues addressed in the second meeting included: (1) collection system, (2) wastewater treatment, (3) biosolids management, (4) effluent discharge, (5) sitting of facilities, (6) disinfection of treated effluent, (7) stormwater management, (8) disinfection of combined sewage discharges, and (9) master plan guidance. The key findings and recommendations made by the TAC following the second meeting were organized around these subjects. A summary report of the second TAC meeting is on file at the SFPUC.

THIRD TAC MEETING–September 6, 2006

The focus of the third TAC meeting was twofold: (1) presentation of the preliminary alternatives under consideration for the Master Plan by the project team and (2) follow up presentations by project team and PUC staff members on topics and issues raised during the first two TAC meetings. Detailed minutes of

the one-day meeting were taken by one of the TAC members, a member of the city staff, and by the project manager for the consulting consortium of engineering firms responsible for completing the work on the master plan. The minutes taken by the three different scribes are presented in Appendixes B, C. and D, respectively in the summary report for the third TAC meeting.

Presentation of Preliminary Alternatives

In presenting the preliminary alternatives, the Project Team was seeking input from the TAC on the suggested alternatives. More specifically, the project team was concerned with whether the TAC thought all of the needed elements for the master plan had been considered. During and following the presentation of the alternatives, there was considerable discussion of the merits and limitations of each of the alternative, including a number of comments from the public. Ultimately, it was suggested by the TAC that several alternatives could be combined to form a more suitable alternative.

It was the preliminary opinion of the TAC members that such a combined alternative would provide the biggest benefits, meet all of the program objectives, and provide the vision that is a necessary part of any Master Plan. This portion of the TAC meeting was concluded with a recommendation that the TAC further formulate the proposed alternative including its rationale and the recommended components and elements to be included in the Master Plan. The recommended plan as developed by the TAC is presented following the Executive Summary in the summary of the third TAC meeting. In addition the consensus opinions reached by the TAC on several important aspects of the Master Plan are also included in the minutes of the third TAC meeting.

Presentation of Updates on Specific Topics and Issues Following the presentation and discussion of the alternatives, several presentations were made on topics and issues that had been raised in the first two TAC meetings including (1) collection system model and design storm, (2) new bayside outfall alternatives, (3) odor control, (4) disinfection, and (5) reclamation update.

FOURTH TAC MEETING–November 6, 2006

The focus of the fourth TAC meeting was threefold: (1) to hear the presentation of the Master Plan that will be given to the Commissioners on November 14, 2006, (2) and offer suggestions for improving the presentation, and (3) to discuss the letter sent by the Sustainable Watersheds Alliance, or SWAle (formerly known as the Alliance for a Clean Waterfront) to the TAC outlining their concerns and objectives. Detailed minutes of the one-day meeting were taken by one of the TAC members, a member of the city staff, and by the project manager for the consulting consortium of engineering firms responsible for completing the work on the master plan. The minutes taken by the three different scribes are presented in Appendixes B, C. and D, respectively of this report.

Presentation of the Master Plan

The Master Plan update was presented by Mr. Jon Loiacono. The slide presentation consisted of some 78 slides. The presentation of the Master Plan to the Commissioners is intended to be an update on the status of the Master Plan program. It is not considered to be a request for a decision at this time. It is a progress report for the Commission. The objective of the 2006 Master Plan update is to implement a sustainable plan to deal with specific problems with the current wastewater management system and to develop a range of solutions to these problems that will also improve the quality of life in the City.

Critique of Presentation

San Francisco Public Utilities Commission Wastewater Enterprise (WWE) staff asked that the TAC provide comments on the presentation. All of the TAC members present (Dr. J. Middlebrooks was absent) offered a variety of comments on all aspects of the presentation. Three key observations are as follows: (1) the presentation included too many slides and, as a result, the important concepts and take home message were lost; (2) the role of the TAC was not emphasized enough, especially the rationale offered by the TAC for the alternatives and the programs; and (3) a vision for the future should be clearly set forth in the beginning of the presentation.

The full range of comments on the presentation offered by the TAC members and the public may be found in Appendixes B, C, and D. Because of the importance of the TAC rationale for selecting the key elements and programs of the Sewer Master Plan the rationale, presented the minutes of the third TAC meeting, as part of the *TAC Recommended Master Plan Components and Elements* statement, is repeated here following the executive summary.

Letter From SWAle to the TAC

Three days before the fourth meeting, the TAC members received a letter and a statement of *Wastewater Master Plan Objectives* from the SWAle. Based on a preliminary review, the TAC found the material presented to be thoughtful and well reasoned. However, because the letter and the objectives statement was received too late for the TAC members to review thoroughly and respond to thoughtfully, it was agreed that the SWAle letter and the *Wastewater Master Plan Objectives* statement would be included in the minutes from the fourth meeting. Further, it was agreed that the minutes from the fourth TAC meeting would be made available before the presentation of the Master plan to the PUC Commissioners. The SWAle letter and *Wastewater Master Plan Objectives* are presented following the TAC rationale statement, as noted above.

Comparison of TAC Rationale and SWAle Objectives

In developing the Master Plan, it is of critical importance that the basis for developing programs and alternatives be stated clearly so that everyone can assess the soundness of the findings and conclusions. It is for this reason, that the rationale offered by the TAC is repeated in this summary report along with the Master Plan objectives offered by SWAle. In comparing the TAC rationale with the objectives of SWAle, it is clear that a greater number of issues has been identified by the TAC including those identified by SWAle. Similarly, it is clear the SWAle objectives are presented with far greater specificity as compared to the TAC rationale. It is anticipated that the WWE will, before the next TAC meeting, develop a comprehensive guidance document to go alone with the Master Plan that will incorporate the TAC rationale issues and SWAle objectives, which, in turn, will allow for metrics to be developed for comparisons and evaluations.

Appendix A

Agenda
Fifth Meeting Technical Advisory Committee

SFPUC Wastewater Master Plan
City of San Francisco, California

AGENDA

SFPUC Sewer System Master Plan
TECHNICAL ADVISORY COMMITTEE MEETING No.5
1155 Market St. 6th Floor Conference Room

Monday, July 16, 2007

9:00 – 9:05 am	Welcome and Introductions	Jon Loiacono/moderator
9:05 – 9:10 am	Meeting Objectives and Format	Dr. Tchobanoglous
9:10 – 9:30 am	Conclusions from last TAC meeting	Dr. Tchobanoglous
9:30 – 10:00 am	Integrated Urban Watershed Management Goal Alternatives Descriptions, Phasing	Jon Loiacono
10:00 – 10:30 am	Discussion of How Each Alternative Achieves SSMP Project Objectives	Jon Loiacono
10:30 – 10:45 am	<Break>	
10:45 – 11:15 pm	Review of Results of Design Charrette Site Renderings	Jon Loiacono
11:15 – 12:00 pm	TAC Discussion	
12:00 – 12:30 pm	Public Comment	
12:30 – 1:15 pm	<Lunch>	
1:15 – 2:00 am	Collection System Projects	Wallis Lee/Dave Bingham
2:00 – 2:30 pm	Common Elements of SSMP ● LID – costs and expected benefits ● Energy Management Program ● Water Reuse ● Bayside Biosolids Center	Jon Loiacono/Scope A
2:30 – 3:00 pm	TAC Discussion	
3:00 – 3:15 pm	Public Comments	
3:15 – 3:30 pm	Conclusions from this TAC meeting/ Closing Remarks	Dr. Tchobanoglous

Appendix B

Minutes (Taken by Michael N. Josselyn) From Fifth Meeting Technical Advisory Committee

SFPUC Wastewater Master Plan
City of San Francisco, California

MEETING NOTES

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

JULY 16 2007

Meeting was held to discuss the Draft SFPUC Master Plan. George Tchobanoglous (GT) gave an overview of the findings of the TAC from the last meeting.

Master Plan update

Jon Loiacono (JL) opened the discussion on the issue of Integrated Watershed Management. The Plan would focus on overall approaches to managing watersheds in the City through both retrofitting and new development. Requires that coordination be undertaken with the City Planning Department and others to assure that codes are developed that will promote these new technologies and ideas. This would require that City look at subdrainage areas and how best to manage those areas.

Darla Inglis (DL) opened the TAC discussion with a comment that LID needs to be more integrated in the discussions of the alternatives. The report should pull more of the LID concepts into the alternatives, even those which may be experimental. It is not a "box" in a chart, but is applicable to all elements of the project alternatives. Also, the LID may not represent the lowest cost but could result in the highest value. Mike Josselyn (MJ) noted that water restoration and enhancement and creek daylighting actually fit more into the Surface Water and Runoff Management, not Aquatic Resources Management.

Alternative 1 is referred to as "Improve Existing System" for a total WW Treatment of 940 MGD and would involve improvement at all three treatment facilities. Alternative 2 is called "Decentralized Treatment" in which the North Point Facility is improved and the SE Plant has reduced treatment in dry weather. Under Alternative 3, the system is entirely consolidated to the Oceanside Plant in dry weather flows. Alternative 4 is to relocate SEP to a different site, but retain discharge quantities as described in Alternative 1.

The phasing really requires that the plan address replacement of the SE Plant digesters early in the process given then need to complete this upgrade as soon as possible. Even when placed in the first phase, the replacement of the digesters may take 9 years to implement and be operational. Collection system improvements also need to be undertaken as part of Phase 1. Phase 2 would look at improvement of the system as a whole and improve reliability. Phase 3 is out into years 21 to 30 and involves system maintenance to deal with new technologies. David Jenkins (DJ) noted that the plan appears to focus on the upgrading

of treatment facilities but it only briefly mentions upgrades needed to the collection system (which has a huge price tag--$2 billion). More emphasis is needed on this portion of the plan given its huge cost.

The recommended alternative is Alternative 1 with elements of Alternative 2. It would include improvements at all the facilities, collection system improvements, water reclamation, and low impact developments. Moving additional wet weather flows to the OSP (from Cayuga) reduces some of the problems of sea-level rise on the bayside vaults. Replacement of liquid treatment facility occurs at the end of the 30 year period; upgrade/relocation of centralized biosolids treatment center to occur in Phase 1. Alternative 1 maintains flexibility to implement any of the alternative locations for liquid treatment in future. Biosolids treatment would remain at SE Plant site (or alternative bayside site), but all liquid treatment could shift to OSP or stay at SE. Plan also proposes to use UV for treatment and will reduce chemical use significantly, but will have an additional energy cost. But when considering the energy cost associated with the production of chemicals, the overall energy cost is lowered when going towards UV treatment.

MJ noted that the WWE needs to include the Master Plan the issues related to code changes necessary to implement LID; otherwise, the WWE will just be the recipient of stormwater and is not taking the lead. JL stated that this will be included in the WWE. GT noted that the document needs to be integrated with the general policies that are discussed at the beginning of the document otherwise the alternatives seem to be separated from the overall goals and principles of the program. DI emphasized that integrated watershed management is not just the WWE, but must incorporate all the governmental agencies charged with managing the growth and development of the City.

Public comments (also discussed by TAC members)

- Public raised a concern that land should be secured near Mission Bay so that pumping could be reduced. Land in Mission Bay is potentially available now; but may not be in future.
- Need to deal with environmental justice issues in the Master Plan
- More discussion of sustainability as a general theme and guiding principal for the alternatives
- Regulatory issues on CSO discharges at Islais and Mission “creeks” should be included as drivers in the selection of alternatives
- WWE should also look at opportunities in Brisbane and Hunters Point for stormwater treatment and eventually look at each of the subdrainages in the City to implement its idea of integrated watershed management. Without looking at the

subdrainages, Master Plan is incomplete because it doesn't discuss opportunities and constraints for watershed management.

Potential New Bayside Biosolids Center

Existing SEP digesters need replacement as they have been in operation for 55 years. They are not adequate at this time in terms of seismicity standards and have significant maintenance requirements. Sites under consideration for the new digesters include the Southeast Plant with the Caltrans sites, Caltrans site with Parcel A+B+C+D, and Pier 94 backlands. DJ asked what the urgency level is with the digesters since it may take 8 years until something new is on line. It is not just a location issue and the City must act quickly (in relative terms) in order to address replacement.

Robert Gearheart (RG) asked what the acreage requirement is. JL stated that about 15 acres would be needed for digesters and solids drying facility. MJ expressed concern that City may find itself in the same situation as the SE Plant if residential and upgraded land uses occurred around the site. Ports feel that industrial uses are appropriate at this site but noted that it is a landfill and requires geotechnical solutions before the site can be developed.

Collection System

WWE gave an overview of the collection system needs. Goal is to undertake an asset management approach rather than a reactive approach to the management of the collection system. The critical sewer program considers those which are "too important to fail" such as major sewers (60" and larger) and those located in residential areas. Brick sewers are also failing most rapidly and causing the most disruption.

Sea-level rise has the potential to contaminate vaults and the City will need to consider addition of backflow prevention devices to avoid flooding of the vaults during high tides and may need to invest in more pumping stations.

Appendix C

Minutes (Taken by SFPUC Staff Member) From Fifth Meeting Technical Advisory Committee

SFPUC Wastewater Master Plan
City of San Francisco, California

Gavin Newsom
Mayor

Ryan L. Brooks
President

Ann Moller Caen
Vice President

E. Dennis Normandy
Richard Sklar
David Hochschild

Susan Leal
General Manager

San Francisco Public Utilities Commission

Wastewater Enterprise

Sewer System Master Plan
TAC – July 16, 2007
Meeting Summary

TAC Members: Dr. George Tchobanoglous – Chair (UC Davis), Dr. Michael Josselyn (SFSU; Wetlands Research Associates), Dr. Bob Gearheart (Humboldt State University), Dr. Darla Inglis (Seattle Public Utilities), Dr. Cecil Lue-Hing (Cecil Lue-Hing, Consultants), Dr. David Jenkins (UC Berkeley), Dr. Larry Kolb (RWQCB). (Dr. E. Joe Middlebrooks was not in attendance.)

SFPUC Staff: Jon Loiacono, Bonnie Jones, Albert Velasco, Melissa Moehle, Nohemy Revilla, Don Birrer, Don Munakata, Carolyn Chiu, Meeh-Lih Ahmad, Karen Hurst, Manisha Shetye, Greg Moore, Natalie Sierra, Steve Medbery, Manfred Wong, Herb Dang, Tom Franza, Humphrey Ho, John Roddy (City Attorney's Office)

DPW Staff: Wallis Lee, Greg Braswell.

Consultant Staff: Steve MacDonald (Carollo Engineers), Tracy Clinton (Carollo Engineers), Lloyd Slezak (Brown and Caldwell), Denny Parker (Brown and Caldwell), Perry Schafer (Brown and Caldwell), Tom Price (CH2M Hill), David Wood (M&E)
.

Port of San Francisco: John Mundy, Brad Benson.

Community Members: Judy West (CAC), Ruth Gravanis, Jennifer Clary (CAC), Richard Hansen (CAC), Jill Hamilton, Matt Krupp, Howard Ash, Joan Girardot

WELCOME AND INTRODUCTIONS

Bonnie Jones and Jon Loiacono welcomed the TAC members, and audience.
Meeting objectives and format were addressed:

- Review the Sewer System Master Plan (SSMP) Alternatives, and the evaluation criteria, and metrics;
- Review the food wastes opportunity.
- Review the biosolids feasibility options, and siting issues.

Previous Meetings Summary:

- Review the progress of the master plan, and the overall direction.
- TAC found the rationale for the master planning objectives to be most important. At the top is the replacement of aging infrastructure. The TAC members found that the SFPUC staff has been responsive to their rationale, and see that the overall direction is appropriate.
- Three major elements at the last meeting
  1) Critique of Alternatives Presentation to the Commission
  2) SWALE letter,
  3) Comparison of objectives

TAC inquired if anything has been done to respond to the SWALE comments and, it was noted that SFPUC sent a letter in response. In general, the SFPUC staff is in agreement with all comments with the exception of having to treat all wet-weather flows to secondary treatment.

INTEGRATED URBAN WATERSHED MANAGEMENT

Jon Loiacono presented Integrated Watershed Management (IWM) as an approach/vision for addressing the Master Plan. Presentation emphasized storm water reduction or desynchronization, rainwater harvesting, and opportunistic water reclamation (i.e., treating wastewater for reuse within the watershed).

TAC encouraged integrating the focus with opportunities to provide services, utilities to customers, looking at breadth of options from innovative technologies that include Low Impact Development (LID) approaches to conventional treatment. LID is applicable to all areas.

Darla Inglis emphasized that LID is a technique or "tool kit," and not a stand-alone alternative. SFPUC should commit to evaluating potential LID implementation in the alternative analysis and not necessarily commit to LID as an alternative. The SFPUC should aim, not necessarily to provide the lowest cost to the customer, but highest value.

Dr. Jenkins noted that the move from the two centralized plant concept to a decentralized direction is promoted by the implementation of LID.

FOUR SSMP ALTERNATIVES

Jon Loiacono described the four alternatives.

Alternative 1: Improve existing system
Alternative 2: Decentralized treatment
Alternative 3: Treat dry weather flows at OSP
Alternative 4: New Bayside treatment plant

Replacing the collection system will cost more than improving the system.
The cost can be kept down by phasing the implementation of the Master Plan.

Phase 1: Structural improvements. Digester project is half the cost of all the Phase 1 cost
Phase 2: System performance reliability
Phase 3: System Maintenance

TAC raised concerns whether the project (Phase 1, in particular, the new digesters) can be completed 10 years from now. Jon estimates that the EIR will be initiated within a year and estimates it will take 2 years to complete. Planning and design will take at least another least 7 years, that is total 9 years

Dr. Jenkins suggested there be more emphasis on the collection system repairs in the SSMP presentations and outreach material since they represent the majority of the cost. Also, discuss how Bayview community concerns will be addressed in the phases. For better clarity, TAC suggests that for future presentations, the recommended alternative(s) be shown up front followed by back-up information for the alternatives. TAC also recommends emphasizing the urgency to replace the digesters.

Dr. Lu-Hing expressed concerns over "non-engineering" issues such as adequate funding and the ability to purchase real estate. SFPUC is developing a financial plan to secure the needed funding. Once the Master Plan is in environmental review, the SFPUC will be able to buy or obtain property through eminent domain.

Dr. Kolb noted that there is more organized opposition to water reuse based on public health issues. The shift to rainwater harvesting is consistent with decentralization; plus, it negates the problem of endocrine disruptor contaminants (EDCs) and other pollutants present in wastewater.

Dr. Jenkins noted that Sustainability was not discussed. Other TAC members emphasized that sustainability should be used also as a "tool kit" similar to LIDs. Sustainability is a value added term; it is the "lens" through which you view all the elements.

Dr. Kolb and other TAC members recognize that projects are prioritized to address critical needs first (e.g., seismic reliability), but those projects are not necessarily those with high visibility. You are catching up with deferred maintenance.

For LIDs, the SFPUC will be taking the lead, but most implementation would require coordination and agreement from other City departments. The Master Plan will identify the code and policy changes needed to promote implementation. TAC members suggests that this inter-agency involvement strongly emphasized. Ms. Inglis noted that both public and private entities to be involved for LID implementation.

COLLECTION SYSTEM

Wallis Lee described the challenges facing the collection system and potential projects.

R&R Program

- Large increase in aging pipes expected to increase pipe failures over the next 30 years.
- Two schools of thought on rate of replacement. One approach is ramping up quickly on expenditures (with the risk of spending in advance of failures), versus going slower in ramping up expenditures (with the risk of incurring increased pipe failures).

TAC notes that selection of the best approach is dependent on how well you know the existing condition of your sewers. It is also dependent on determining what is an acceptable rate of (predicted) failure. TAC suggests budgeting for more emergency repairs under the delayed expenditure approach and to consider that seawater intrusion (from rising sea levels) would increase sulfides into the sewer and treatment plants.

Matt Krupp from the City of San Jose that all facilities that all the treatment plants in the Bay Area are impacted by the rising sea levels, and suggests that concerted Regional approach be initiated address the sea level rise.

ORGANIC WASTE DIGESTION AND LONG TERM BIOSOLIDS MANAGEMENT PLAN

Perry Schafer from Brown & Caldwell provided an update presentation.

The Biosolids Management Plan recognized that land disposal is being challenged throughout California. Presentation emphasized on using solar drying for sludge in small portions in San Francisco due to limited space availability in California and the cost of energy associated with heat drying. The City has a zero waste goal by year 2020. The SFPUC is working with Norcal and evaluating how to best treat/recycle organic waste streams. Separate composting system for treatment plant sludge and food wastes is also proposed.

The TAC found Perry's report to be good, and the recommendation to keep digestion is "right on." Most of the future technologies begin with digestion and hence, the SFPUC will not lose investing in digestion. TAC suggests using biosolids in palletized form to be used in cement kilns as fuel. Issues like odor need to be addressed. . Though difficult, it is correct to centralize the solids handling facilities, e.g., economies of scale for energy recovery and production.

NEW BAYSIDE BIOSOLIDS CENTER (BBC)

Jon highlighted the need for a new or refurbished solids handling facility. The potential BBC sites include the existing Southeast Plant (with added adjacent CalTrans property, other CalTrans property (Parcel A&B), and the Port's Pier 94.

Pier 94 is in a public lands trust. As per Port staff, discussions with the Port's Commission, the Attorney General and California State Land's Commission are needed to acquire the land. Brad Benson also emphasized the Master Plan BBC concept development should be integrated with the surrounding area to ensure visual consistency.

TAC liked the various architectural designs (renderings) for the biosolids handling facility. It demonstrated the range of options available for the visual screening of the digesters, and possible other beneficial uses

PUBLIC COMMENTS

- More effort needs to be put forth for LID technologies. There are other LID techniques not mentioned (e.g., grassy swale, vegetated wetlands)
  - Other LID techniques are being considered. The LIDs that discussed today were the modeled ones. The first phase of modeling was done to look at the non-percolation techniques and the next step would be to look at other larger scale techniques. Dr. Inglis noted that it may be useful to include the approximate projected flows to be captured via the LID technique. Dr. Gearheart emphasized that LIDs will also be private investments that should be costed out.
- The City Planning group should make stormwater control element a priority in planning the neighborhoods. Need to talk to the Supervisors.
- For private developments, City coordination at the permitting level may be too late. Should get involved at the real estate transaction state. Development fees should also fund LID projects.
- The City's east side drains to Mission Bay. The SFPUC should secure some land at the bottom of the basin for the future (e.g., Norcal property).
  - As an update, Port staff is initiating a process to identify uses for a 14-acre parcels near Mission Creek and encourage coordination/input from the SFPUC.
- What are the regulatory concerns? Mission Creek and Islais Creek are both on the 303(d) list.
  - Ammonia removal is a potential concern. Reducing CSDs in the areas of the two creeks should be of benefit.
- Concern about the level of detail in the Master Plan on the LID program, could potentially waste money without a good formula for the "protocol". Need to quantify and set goals, or at least, define an approach. The selling components of master planning program - LID and watershed management program - should be in more detail.
- What about purple piping ordinance? What about gray water reuse similar to Orange County?
  - The Master Plan is currently evaluating opportunistic water reuse, and potential gray water, storm water reuse, in addition to, water reclamation. We are coordinating with the Water Planning group to identify the best approach.

- Need to coordinate within the SFPUC, too. Rainwater harvesting is part of the water side planning, and needs to be coordinated as part of their water supply estimates.
- Why aren't we looking at Brisbane in the Master Plan,. It is a growing area.
- Were the impacts from earthquakes evaluated?
    - Seismic Reliability is one of the main elements for the Master Plan

CONCLUSION

- TAC members liked the design of biosolids handling and acknowledged that the ideas of SSMP have been demonstrated and indicated lot of options. Truly reflect all the work.
- Dr. Inglis to identify the "low hanging fruit," with respect to opportunities to implement LID technologies in new developments. Begin coordination with major developers and public agencies for these projects now.
- TAC will review the comments and prepare a report integrating the comments and issues from other TAC members.

Appendix D

Minutes (Taken by SFPUC Staff Member) From Fifth Meeting Technical Advisory Committee

SFPUC Wastewater Master Plan
City of San Francisco,

7-16-07 TAC Meeting Notes DTM **7-18-07**

Subject: SSMP Recommended Alternative

A. Technical Advisory Committee (TAC)

1. George Tchobanoglous
   - Need to produce a public document that simply and clearly explains the preferred alternative; including the collection system. Noted that an adult's attention span is about 20 minutes which we need to be aware of.
   - With respect to the Cayuga flooding problem, can you wait that long (proposed in Phase 2) to address it?
   - LID implementation needs cooperation and support from other City agencies. Should state this
2. David Jenkins
   - Master Plan's biggest need is to address the collection system infrastructure ($2B) but it's not explained . Need to elaborate on what you're doing for the money and why. Very little said on sewers
   - Need to provide an explanation on how you are addressing the Bayview-Hunter's Point neighborhood issues
   - Slide -Alternative 1 Advantages & Disadvantages
     a. Didn't see anything about Sustainability
     b. Energy demands for each Alternative were very close. Is it really that much of an advantage for Alt. 1?
   - Slide –Types of LID's Considered – Add "by Modeling" as not all LID approaches were looked at
   - Slide – New Bayside Biosolids Center – Need to convey the urgency with respect to doing something about the digesters
   - Asset Management
     a. What is inspection status of the T/S boxes?
     b. Costs for emergency repair work needs to be included
     c. Seawater intrusion into the collection system will increase sulphides in the sewers. Needs to be considered
   - Comparison of Alternatives – Need a flyer that can be used to gain Public support for the preferred Program
   - Organic Waste Planning – Particle size of the waste input will govern what you can feasibly do with respect to digestion

3. Darla Inglis
   - Need to restate why you're doing the SSMP. Remind people by revisiting the problem statement. Drivers for the program are public safety/health and sustainability.
   - Put LID in the proper context. It's not a specific element with an associated cost but rather one of the drivers by which you decide what you

do and is applicable to both public and private facilities when considering sustainability

- Slide – Integrated Watershed Management- Important to be clear that LID options will be included when looking at the breadth of alternatives during the planning phase. You are not "implementing LID" but considering the added value resulting from the application of a LID option. Too many trees on the slide which creates a false impression
- Slide – Integrated Watershed – Representing LID as a separate element (shown under Surface Water and Runoff Management) didn't work in Seattle. LID is a guiding planning principle and can't be segregated by itself. LID is an approach on how to go forward.
- General Comments
    a. Need to get in early with the developers and city agencies. Look to getting and having staff that can look at development projects (where and who) to see where LID applications can be made. In Seattle they work with the Planning Dept. Agreed that you need sufficient staff to do this.
    b. Need to educate the Public. Tell them where you are with respect to decision making.

4. Cecil Lue-Hing
    - Master Plan Project Phasing – Need to answer the questions of what funding will be available and how are you going to acquire the real estate you need.
    - The Master Plan is projected to have a 30 year life. Need to be clear on what you expect to be done within that time span.
    - Collection System

    a. What happens if you have a failure in a T/S facility? Do you have a plan to address a repair situation while still maintaining operation?

    b. A major constraint will be having available funding to do the required work. Need to show the time impact on costs (i.e. the earlier you do the work, the better off you are from a cost standpoint)

    - Organic Waste Planning – You made the right decision to centralize the Bayside solids handling

5. Larry Kolb
    - Master Plan Phasing – Recently there has been a strong adverse reaction to the water reuse in certain communities. Might want to consider rain water harvesting as an alternative which maybe more palatable
    - In discussing the Infrastructure needs, an analogy to home remodeling could be applied. You might want an extra bedroom or deck but if your house needs to be seismically reinforced, that's what you do first.
    - Slide -Collection System Programs- The first thing you need to do is an assessment of the existing facilities and the risk (Asset Management). All the programs fall under that umbrella (bond funded and annual budget funded)

B. Public and Outside Agency Comments

1. Jennifer Clary
    - You need to address/define the Integrated Watershed Management planning goals & objectives and protocol
    - Collection System Sea Level Rise – BCDC has a regional group that can look at this
    - Consider purple pipe recycled water hookups to harvested rainwater (e.g. cisterns)

2. Judy West
    - Should seriously consider looking at acquiring land now in the Mission Bay area. The Port has 14 acres adjacent to Mission Creek.
    - What projects have you defined to address flooding in the Mission Creek area?
    - In looking at potential code changes, you need to catch potential problems in the very early planning stages. Require that this information be included in the real estate disclosure statement . Impact fees could be assessed for development projects.
3. Ruth Gravanis
    - In looking at the listing provided for "Types of LIDs Considered" other LID options such as wetlands and vegetated swales were not included. You should be looking at all options to detain and/or reduce storm water runoff into the sewer system.

4. San Jose City Representative
    - Collection System Sea Level Rise – A regional approach should be taken as this affects everyone in the Bay Area

D. City staff

1. San Francisco Port (Brad and John)
    - SSMP Comparison of Alternatives, Seismic Reliability – FEMA is producing a flood plain map for San Francisco.
    - Bayside Biosolids Center –Pier 94 Siting Option
        a. Port and PUC Commmissions have to come to agreement on the planning process if this is considered to be a viable option
        b. Port priority for this area is to maintain maritime and industrial use.
        c. The land is held in Public Trust under the State Lands Commission. Preferred usage is maritime and open space. Will need to talk to the State Attorney General's office early to confirm acceptability of a sewage treatment facility on the site.
        d. Port prefers appearance of new facilities to be consistent with the maritime and industrial nature of the area.

2. Jon Loiacono - Future Involvement of TAC
    - Assist in staff in the development of the approach and presentation to the PUC Commission and the public
    - Review of the draft reports (e.g. Project Report)
    - Project TAC wrap up in September – October after completion of the public meetings

Appendix E

Minutes (Taken by Steve McDonald) From Fifth Meeting Technical Advisory Committee

SFPUC Wastewater Master Plan
City of San Francisco, California

ROUTE	

CONFERENCE MEMORANDUM

Project:	SFPUC Wastewater Master Plan	**Conf. Date:**	July 16, 2007
Client:	City and County of San Francisco	**Issue Date:**	July 16, 2007
Location:	1155 Market St. 6th Floor		
Attendees:	TAC: Dr. George Tchobanoglous (Chair), Dr. Michael Josselyn, Dr. Bob Gearheart, Dr. Darla Inglis, Dr. Cecil Lue-Hing, Dr. David Jenkins, Dr. Larry Kolb		
Purpose:	TAC Meeting No. 5		
Distribution:	TAC members (inc. Dr. Joe Middlebrooks), SFPUC Staff, Consultants	**File:**	7240A00

Discussion:
The following is our understanding of the subject matter covered in this conference. If this differs with your understanding, please notify us.

1. **Welcome and Introductions**
   A. Bonnie Jones and Jon Loiacono welcomed the TAC members, and audience.

2. **Meeting Objectives and Format**
   A. Review the alternatives, and the evaluation criteria, and metrics.
   B. Review the food wastes opportunity.
   C. Review the biosolids feasibility options, and siting issue.
   D. The purpose of the meetings has been to review the progress of the master plan, and the overall direction. The major elements at the last meeting
      1) Critique of presentation to PUC
      2) SWALE letter, and comparison of objectives
   E. Most important: rationale for the master planning objectives that the TAC found important. At the top is the replacement of aging infrastructure.
   F. The TAC members find that the SFPUC staff has been responsive to the rationale, and see that the overall direction is appropriate.
   G. Dr. Jenkins: has anything been done to respond to the SWALE comments? Yes, sent a letter. In general, the SFPUC staff is in agreement with all comments with the exception of having to treat all wet weather flows to secondary treatment.

3. **Integrated Urban Watershed Management Goal Alternatives Descriptions, Phasing**
   A. Urban Watershed Management is a major framing concept for the Master Plan. This includes the implementation of low impact development (LID) as an element of the Master Plan.

B. An article in the International Water Association, “Cities of the Future”, (Dr. Vladimir Novotny), further explores the concept of “Urban Watershed Management” as a sustainable management framework for the future.

C. The waterside of the SFPUC serves a larger jurisdiction than the wastewater. They have determined that they need another 35 mgd to serve the future growth. Approximately 4 mgd is recycle from OSP. And they are also looking to other sources of water supply, of which LID can help.

D. Dr. Inglis: the LID write-up in the report so far seems to be driven by the needs of others. Need to make a commitment that you are going to look at the range of alternatives, and that LID is going to be a part of all of them. If you have some early projects (and champions), you can make them demonstration projects. Instead of “implement LID”, you are going to evaluate LID. You are trying to provide the “highest value”, and not the “lowest cost”. LID is a technique, or “tool kit”, and not a stand-alone alternative.

E. Dr. Jenkins: seems that you have moved from a centralized two plant concept to a decentralized direction, and LID helps achieve that.

F. Dr. Gearheart: comment on the graphic, need to make more consistent with the San Francisco

G. Discussed how that LID is similar to “pipes”, in that it is an overall tool. It should be a theme that plays across all the Integrated Watershed Management areas of focus.

4. **Discussion of How Each Alternative Achieves SSMP Project Objectives**

A. Alternative 1: Improve Existing Facilities

1) 940 mgd.
2) Driven by the budget, and meets the most pressing needs.
3) Improve and make more reliable the existing system.

B. Alternative 2: Decentralized

1) 966 mgd.
2) Reduces SEP flow by the most

C. Alternative 3: Treat Dry Weather Flows at OSP

1) 965 mgd

D. Alternative 4: New Bayside Treatment Plant

1) 940 mgd
2) Relocation of SEP, otherwise the same as Alt 1.

E. Overall Project Phasing

1) Three 10-year programs
2) Phase 1: Seismic Reliability Improvements, (0 to 10 years).
   a) Digester project is about half the cost.
   b) Repair deep-water outfalls.
   c) Upgrades to SEP, OSP, and NPF.
   d) Redirect wet weather flow from Channel PS to North Point Main (redundancy).
3) Water reuse projects. Dr. Kolb: we are seeing organized opposition to water reuse now, based on public health issues. I feel that these objections are going to have some success. I believe that the shift is towards rainwater harvesting, as it is a lot easier to fit in a decentralized directions, and it doesn’t have the problem of the EDCs and pollutants in wastewater.
4) Collection system improvements

a) Replace/repair aging infrastructure is the biggest driver.
b) Sea level rise is real. Have a plan for backflow prevention on CSDs.
c) Implement LID technologies.

5) Phase 2: System Performance Reliability Improvements (11 to 20 years).
   a) Treatment improvements:
      (1) Increase capacity of outfalls
      (2) Increase NPF to 240 mgd
      (3) Increase SEP primary treatment to 400 mgd
   b) Collection System Improvements
      (1) Upper Alemany Watershed Diversion (Cayuga)
      (2) Increase wet weather pumping capacity in Westside
      (3) Repair aging sewers
      (4) Reduce flooding
6) Phase 3: System Maintenance (21 to 30 years).
   a) Treatment Facility Improvements
      (1) Upgrade and/or relocate treatment facility in year 30.
      (2) Collection system improvements.

F. Dr. Lue-Hing: Several “nonengineering” issues still outstanding.
   1) Adequate funding? ANS: need to develop a financial plan, and have it reviewed by management, and to the commissioners. Recently, the recommended15% water, and 9% sewer rate requests were reviewed to revise the tiered water rate approach.
   2) Ability to buy real estate? ANS: once we are in environmental review we will either have the ability to buy, or to obtain through eminent domain.
   3) Dr. Jenkins: how to sell the overall plan if you aren’t making improvements to SEP immediately?

G. Dr. Jenkins: impression I got is that the major focus is on the treatment plants. But I see that collection system projects is $2 billion. Need to discuss it more, as it is a big expense. Need to show a graphic, and more detail.

H. Discussed the overall schedule and the challenge of getting the projects in Phase 1 completed in the first 10 years. Especially the digesters.

I. Seismic and Structural Reliability
   1) Digester needs
   2) Flooding improvements needed.
   3) Sewers aging and need repair/replacement.
   4) Odor controls.

J. Regulatory Changes
   1) Ammonia is becoming an issue for Bay discharge.

K. Recommended Alternative
   1) Alternative 1 with elements of Alternative 2.
      a) Improve existing SEP, OSP (in operation since 1993) and NPF.
      b) Collection system improvements
      c) Water reclamation
      d) LID improvements.
   2) Rationale/Benefits

a) Replacement of liquid treatment facility occurs at the end of 30 year period: uncertain regulatory requirements
b) Upgrade/relocation of centralized biosolids treatment center to occur in Phase 1
c) Flexibility to implement any of the alternatives of the alternative locations for the future
d) Lowest cost alternative
e) Maximizes the remaining useful of life of existing facilities

3) Dr. Jenkins: don't see enough mention of the collection system needs.
4) Dr. Lue-Hing: I can understand how you are doing a replacement of something that lasts 30 more years. ANS: I see I need to be able to be sure that when the recommended alternative is presented we need to be able to discuss the common elements.
5) Dr. Jenkins: I understand that you were asked to include elements of "sustainability". Where is it? Dr. Tchobanoglous: isn't sustainability the "lens" through which you look at all of these elements (all agree). For example, sewer repair is sustainability for the future.
6) Dr. Kolb: one issue is that if you prioritize the things that need to be done (e.g. seismic upgrade), you need to do the things that don't necessarily have high visibility.
7) Alternative 1: Advantages and Disadvantages
   a) Advantages
      (1) Provides same benefits as other alternatives
      (2) Least energy demand
      (3) Smallest carbon footprint
      (4) Maximizes use of existing infrastructure
   b) Disadvantages
      (1) Continues wastewater treatment in same Bayview location.

L. Alternative Comparison
1) Largest changes are in increase in power use versus a reduction in chemical use, due to change from chlorine to UV disinfection. Overall, the "global" power consumption is reduced for all alternatives compared to the baseline.
2) Dr. Jenkins: show nearshore discharges as less than 0.5 mgd +/- (i.e. all essentially the same).
3) Note: need to consider showing the recommended alternative in the alternative comparison table.

<Break>

5. **Review of Results of Design Charrette Alternative Comparison**
   A. The SFPUC staff and consultants conducted a master planning design charrette, and based on the findings, identified the recommended master planning alternative and common elements.
   B. Jon: based on comments from the TAC before the break, we need to be sure that we start with explaining the common elements for the master planning recommendations, and that we emphasize the collection system needs.

6. **TAC Discussion and Public Comment**

A. Dr. Lue-Hing: not sure we should “sell” LID on the basis that it will save us something. Dr. Tchobanoglous: I think it is a value added issue.
B. Dr. Josselyn: need to include in the master planning documents a discussion concerning the interdepartmental issue out. Jon: yes, and we need to work through the public works code, and how it affects us digging up the sewer, and that in an area that has settled a lot (3 or 4 feet), how do you address this? Jon: we need to have a section in the master planning concerning the need for code changes. John (Port), it would be good
C. Judy West: I can understand the frustration of developers. Coordination at the permitting stage may be too late. I think the place to catch them is at the liquefaction zone notification, and you can notify them before they are invested in their design. Also, impact fees can be established to help with developing LID projects.
D. Dr. Jenkins: are you going to develop a “popular” version to help sell this before the commission in August. Jon; this is just an update to get their input. The Plan won’t go to them until around October, with a series of public meetings in September.
E. Dr. Tchobanoglous: there needs to be a document that needs to present the whole picture, and you could include the review of the four alternatives. Jon: I agree that we need to put the LID and common program elements up front. Dr. Tchobanoglous: I suggest that the recommended alternative needs to go first. And it is important that all of the City departments need to be on-board with this.
F. Dr. Inglis: need to start with the common elements. Also, although the commissioners want to focus on the alternatives, policy and code changes are a common element and part of the solution.
G. Matt: City of San Jose One thing that is effective with us and our Council, is that infrastructure (repair/replacement) is not only our “gap”, but it is also a gap for a lot of cities nationally.
H. Judy West: the eastside drains to mission bay, and is pumped to SEP or NPF for redundancy. We need to secure some land at the bottom of the basin, as everything drains to Mission Bay, we need to reserve some land for the future now. NORCAL property opportunity will be missed if we don’t act now.
I. Brad Benson (Port of SF)): The Port is pursuing a project on a 14 acre parcel along Mission Creek project, and the SFPUC can coordinate with us on that.
J. John Mundy (Port of SF): it is important to have guidance with developers in terms of code requirements.
K. Dr. Inglis: need to review the problem statements. Dr. Tchobanoglous: need to include the Mission Statement too.
L. Jennifer Clary: what are the regulatory concerns? Jon: the one on the horizon is ammonia treatment. Mission Creek and Islais Creek are both on the 303(d) list, and could drive us to do something sooner in the schedule. Jon: we do have options to reduce the CSDs for these two locations. Jennifer: what are we going to see with respect to the theme of “watershed” management, a pro/con of each watershed? Jon: this is a concept we are developing, and not likely to be developed in the next 6 weeks. Jennifer: why aren’t we looking at Brisbane? It is a growing area.
M. Judy West: I like the graphic on the watershed program. Jon: it wasn’t intended to be specific to SF. Dr. Tchobanoglous: concerned that when you start identifying specific basin features on the graphic, you start choosing up sides. Dr. Inglis: there may be a desire to show how the functional parts of the system are connected.

7. **New Bayside Biosolids Center**
   A. Existing SEP solids handling facility (8 acres)

1) Aging infrastructure
    a) Have 10 digesters now, one with the roof fallen in. Post tension design, and have some leaking through the walls. About 32 feet, 25 feet above ground. Have tried to repair walls with epoxy. The roof failed due to leakage, and it tilted underneath the corbels, and collapsed. Operating 7 digesters now to meet the Class B requirements. Even though we are working to maintain them, they are really in bad shape. Dr. Jenkins: need to include more of the urgency and need to replace the digesters in the report.
2) Major odors in vicinity

B. BBC sites considered
1) SEP + CalTrans. (rebuild on existing site). If we did the food waste, we would need more property.
2) CalTrans with Parcel A&B.
3) Pier 94.

C. Site needs;
1) Acreage to address master planning needs:
    a) Class A & B treatment
    b) Flexible to accommodate growth
    c) Advanced biosolids treatment (e.g. drying or composting)
    d) Food waste
2) Location
    a) Zoned for industrial use
    b) Topography allow for easy mitigation
    c) Easy access from road, rail and/or Bay.
3) Presented and discussed the draft concept renderings. Jon: it is too premature to agree on a design concept.
4) Reviewed the BBC at Caltrans w/ Parcel A & B.
5) Reviewed the Port Pier 94 site.

D. Discussed the Pier 94 land use issues. Brad: need to talk to the Ca State Lands Commission and the Attorney General early in the process, as this land falls under the Public Trust Act.

E. John: need to be careful about communications with the Port Commission such that we don't get ahead of them in terms of their understanding. Need to try to get the backlands development discussion tracking with your needs, including the basic concepts. For example, we want to have the site showing as "park". Jon: we need to have a recommended site in the EIR. Brad: we may be able to sit down with several Port Commissioners to move forward with agreements on overall planning concepts. John: we need to build support for the SFPUC concept further up the organization. John: there are geotechnical concerns with the Pier 94 property development that can be addressed more readily by the SPFUC than the Port. Dr. Kolb: it is worth considering roof top wetlands, and the renderings that we see by Angela.

F. Dr. Lue-Hing: in summary, the land can be obtained for the digesters, even though it won't be easy.

<Lunch>

8. **Collection System Projects**

A. Master Plan Programs and Projects
   1) Integrated Watershed Management.
   2) Flood Control/System Improvement Projects & Proposed Phasing.
   3) Asset Management.
   4) Critical Sewers.
   5) R&R ($11 million for collection system today, growing to $20 million or so).

B. Flood Control/System Improvement Projects. The plan is to incorporate LID opportunities as well.
   1) Many options to address flooding. Not all engineered pump/piping solutions. Some rainwater harvesting options.
   2) Case study: Cesar Chavez Sewer Improvement Project.
      a) Have an engineering solution.
      b) Now, working with LID opportunities (e.g. a cistern under the park).
   3) Reviewed the matrix showing the 5-year CIP, and the Phase 1,2 & 3 master planning timeframes and approach to be taken.
   4) Asset Management
      a) Inspection and conditions assessment. Have inspected 80 miles last year. Brick sewers are the greatest concern. Transport/storage boxes are ok, with the exception of the roof.
      b) Optimized decision-making program.
      c) Hydraulic modeling program (now modeled 30-inch and larger). Still need to bring in the inner core of the City.
      d) Operations data collection system (DCS) upgrade.
      e) Permanent collection system flow meters.
      f) Data systems upgrade.
      g) Operation coordination.
   5) Critical Sewer Program (sewers “too important to fail”).
      a) Major sewers (60-inch of larger)
      b) Tunnels
      c) Brick sewers
      d) Large Transport/Storage Boxes and Outfall Overflow Structures. Dr. Lue-Hing: do you have a plan to take a box out of service? ANS: not a problem in dry weather in terms of capacity.
      e) Pump stations
      f) Force mains.
   6) R&R Program
      a) Large increase in aging pipes expected to increase pipe failures over the next 30 years.
      b) Two schools of thought on rate of replacement. One approach is ramping up quickly on expenditures (with the risk of spending too far in advance of failures), versus going slower in ramping up expenditures (with the risk of incurring increased pipe failures). Dr. Jenkins: are there any cost differences in terms of one approach or the others. Dr. Inglis, why not a hybrid approach? Dr. Kolb; seems like the best approach depends on how well you know the condition of

existing facilities. Dr. Jenkins: seems like you need to budget for more emergency repairs under the delayed expenditure approach.

c) Dr. Lue-Hing: seems like the program is dependent on acceptable rate increases. Jon: yes, and the approach I had suggested is that we look at the graph of predicted failures under different levels of funding. TAC: all agree.

7) Sea Level Rise.
   a) Rate of SLF over last 150 years is 0.08 inches per year.
   b) Over last 20 years:
      (1) Rate of SLR has increased to 0.13 inches per year.
      (2) Mean tide level is up to 2.5 inches.
      (3) High tide level is up by 6 inches.
   c) Short-term solution
      (1) In the short-term we are seeing the concern in the wet weather only a few days at a time. Now analyzing what happens in 30 years. We anticipate that we will have to pump continually at the end of the century.
      (2) Short-term solution is backflow devices on overflow weirs such as Tideflex Duckbill Values
   d) Long-term solution
      (1) Protect overflow outfalls and install pump stations.
      (2) West vs. Southeast. There is a concern that as the SLR occurs the current Bayside 4.5 ft below will become 2 to 3 ft, and there will be increased “ponding” or flooding.
   e) Dr. Jenkins: I would be concerned over an increased in sulfides in the sewers.
   f) Dr. Kolb: the SLR effect will cause an even bigger problem as it continues beyond the end of the century. Ocean front property in Chicago!
   g) The Cayuga diversion is a major flood control project that is now included in the recommended alternative.

9. **TAC Discussion/Public Comments**
   A. Judy West: what is being done to address the existing flooding problems, for example the Channel PS? The City planning is rezoning and we need to move forward to coordinate now. ANS: don’t have the exact recommendation at this time.
   B. Matt: seems as if there is a need to be able to join together to pool resources and funding to address solutions to the SLR, as wastewater/water facilities in the Bay Area are mostly all along flood zones.

10. **Organic Waste Handling**
   A. City has a zero waste goal for 2020 - requires organics removal. Therefore, NORCAL is looking at recycling certain waste streams (food wastes, paper, etc.). Concept is to clean the waste streams, and compost. Locate it in concert with the new BBC, to improve efficiencies.
   B. Composting is proven, but VOC emission limits are a concern.
   C. Dr. Lue-Hing: you are proposing two separate composting systems: one for sludge and one for food wastes. ANS: yes.
   D. Dr. Lue-Hing: difference in gas quality? ANS: not sure, UCD is doing work on that now

E. BTA/CCE Process. Removes the big pieces of contamination (e.g. glass, etc.). Dr. Tchobanoglous: only problem is the glass separation process, hard to get out the small particles.

F. Digestion/dewatering of organic wastes:
   1) Digester feed l= 123 dtpd
   2) Average flow at 7 to 8% = 400,000 gpd
   3) Digester volume (18-day SRT) = 7 mg.
   4) Gas production = 1.4 to 2.4 MMCFD
   5) Power from engines = 4 to 6.5 MW
   6) Dewatered material = 25 to 30%.

G. Siting:
   1) Existing + Caltrans
   2) Caltrans +
   3) Pier 94

11. **Biosolids Master Plan**

A. Land disposal is being challenged throughout California.

B. Result: need to move to Class A, and to more public ally acceptable types of treated biosolids product.

C. Dr. Tchobanoglous: Greece produces pellet material is very attractive, and used as a fuel for kilns. Perry; yes but the heat to dry takes a lot of energy, and become a sustainability issue. That is why solar drying options are more favorable.

D. Dr. Tchobanoglous: do you think that the screening is adequate at the plan. Jon: we looked at the slotted (6 mil) screens. Dr. Tchobanoglous: I mention this because if you are considering MBR, need much finer screening. Jon: we need to pilot slotted screens at the SEP.

E. Dr. Lue-Hing: the report is good, and the recommendation to keep digestion is “right on”. You need to deal with the odors, but you do produce a product that is acceptable. Most of the future technologies begin with digestion, so you are not losing your investment in digestion. You made a tough, but correct call, to centralize the solids handling facilities. For example, economies of scale for energy recovery and production.

F. Discussed the risks of the regulations changing, and the purchase of land for land application.

12. **Common Program Elements**

A. LID Program
   1) Develop protocol.
   2) Dr. Tchobanoglous: need cooperation of other agencies.
   3) Jon: yes, need code changes, and partnerships with other City agencies and non-profits.
   4) Types of LIDs considered:
      a) Cisterns
      b) Roof disconnect
      c) Ecoroofs
      d) Street trees
      e) Permeable pavement

f) Bioretention areas
g) Daylight streams

B. Reuse
1) Mclaren Park Project
a) Scalp 2 mgd
b) Satellite MBR + UV disinfection (inc. odor control)
c) Reclaimed water storage tank
d) Distribution pipelines
2) Flynn P.S. Project
a) Scalp 3.6 mgd
b) MBR + UV
c) Storage
d) Distribution

13. **Public Comment**

A. Ruth Gravanis: we need to put more effort into LID technologies. For example, if we are doing vegetated swales, we need talk about right-of-way. ANS: Rosey: we are not only considering those LID techniques that we showed today, as those were just the ones that we modeled. We did the first phase of modeling to look at the nonpercolation techniques. The next step is to look at other larger scale techniques. Dr. Inglis: it may be useful to capture the uncertainty with the plus and minus of the projected flows in the discussion. Dr. Gearheart: some of the LIDs are going to be private investements too, and will be costed out then.

B. Judy West: it would be useful to tune into the City planning group to make a priority for them the stormwater control element in planning the neighborhoods. Need to talk to the Supervisors. They need to know that you have a problem. Jon: yes, we need to do a lot more work with them. Dr. Kolb: seems that the Supervisors need to know what other Cities are doing too, that they have to do better.

C. Jennifer Clary: need to coordinate within the SFPUC too. Rainwater harvesting is part of the waterside planning, and needs to be coordinated as part of their water supply estimates. Purple piping: Jon: we are working with the Planning Dept. to resolve the best approach to this. Are we going to look at grey-water reuse similar to Orange County. Jon: our first stop is opportunistic water reuse. Rainwater cisterns could be used in conjunction with the purple piping. Jennifer: concerned about the level of detail about LID program, and concerned about wasting money without a good formula for the “protocol”. I am concerned that what will sell this master planning program is the LID and watershed management program, and there needs to be more detail. Jon: what we are going to do is to develop a protocol for LID, including our applicable to sewers. We will have policies and programs come out of the Master Plan.

D. Emeric Kalman: have we evaluated the impact of earthquakes? Jon: we have included that in the seismic reliability element of the Master Plan. We want to seismically strenghten the system first. If there is an earthquake tomorrow, we would have an emergency declaration to raise the money needed.

14. **Conclusions from this TAC meeting/Closing Remarks**

A. Dr. Tchobanoglous. Want each TAC member to send me your comments, and I will integrate them into a common report back to the City, and group the comments by topic.

B. Dr. Kolb. I liked the architectural treatment of the biosolids center (any of the options).

C. Dr. Inglis: might be worthwhile looking at the “low hanging” fruit with respect to new development in the City. For example, I have heard that the South of Market area is growing today. Get in early with the major developers, and public agencies, as it is not all about the technical, as it is about the political. Jon: I agree, and we should get from the Planning Dept and pick up those projects close to implementation (Dr. Inglis: yes, that is what we have done in Seattle). Arleen Navarret: we are currently looking at surveying the available opportunities. We are getting calls from the developers looking for LID criteria. Hoping to have plans for at least four of the basins at the end of the year.

D. Dr. Lue-Hing. I like what you have done with moving in the direction of decentralization.

E. Dr. Tchobanoglous: thank you for taking time, it has been a positive meeting, and a lot of work has been done.

Prepared By:

Steve McDonald

HSM:hsm