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# Report on Public Works Cost Review Workshop

*Peer Review Panel: June 7, 2017*



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## SECTION 1 PROJECT HISTORY

In 2013 and 2014, the City Council adopted a series of community goals for the new Water Reclamation Facility project, which were based on extensive community input resulting from public outreach. The central goal was to treat the wastewater, at a location that is in keeping with the Coastal Commission's 2013 denial, to tertiary standards, so that high quality water could be produced and reclaimed, in order to augment the City's existing water supplies. The intent of this and other key goals was to find a suitable site that minimized constraints, including potential land use conflicts, where such a facility could be built and operated cost-effectively.

In June 2016, after a lengthy public process, the City Council chose the South Bay Boulevard site as the focus for efforts related to planning the WRF. A draft Facilities Master Plan (FMP) that addressed adopted community goals was prepared for that site based on a series of technical workshops, and released in November 2016. A draft Master Water Reclamation Plan (MWRP) that addressed the most effective approach to water reuse was released in March 2017.

Following the release of these documents, the WRF program management team presented how the resulting cost estimates contained in those documents could translate into increased user rates. Both the City Council and many members of the general public expressed concern about the high project costs and their potential effect on user rates.

On April 25, 2017, the City Council explored this issue, seeking ways to reduce project costs, before committing to moving forward on the project described in the draft FMP and MWRP, including its analysis in the required Environmental Impact Report (EIR). As a result, the Council gave two key directions. The first was to explore two lower cost alternatives, including a project that met minimum permit requirements, and another that achieved tertiary disinfected treatment. The other direction was for City staff work to with other local public works departments, and convene a study session with key public works officials, for the purpose of reviewing the assumptions contained in the City's draft master planning documents. The effort was to provide an outside professional perspective on the City's project, its inherent assumptions, and methodologies used in developing the cost estimates. The intent was for such a review to be a candid assessment, based on the experience of these public works professionals. Their recommendations would then be presented in a report to the City Council, in order to help the Council potentially re-assess the overall project goals in the context of finding ways to reduce project costs.

## SECTION 2 TECHNICAL REVIEW PANEL

City Public Works Director Rob Livick worked with the WRF program management team to assemble a peer expert panel, with recent experience in the development and construction of a major municipal wastewater/water reclamation infrastructure project, for the review. The panel included:

- Matt Thompson, Wastewater Division Manager, City of Paso Robles
- John Waddell, PE, Construction Division Manager and Project Manager for the Los Osos Wastewater Project, Public Works Department, San Luis Obispo County
- Russ Fleming, Utilities Manager, City of Pismo Beach
- Dave Hix, Utilities Department Deputy Director for Wastewater, City of San Luis Obispo

### 2.1 Review Process

The review workshop occurred on June 7, 2017, lasting from 9 AM to 4 PM. The review process was facilitated by Rob Livick and the City's Program Management team, including John Rickenbach, Mike Nunley, and Eileen Shields. The City's Utilities Division Manager, Joe Mueller, attended and provided information on current operations as questions came up. In addition, Matt Thomas and Mari Garza-Bird from Black & Veatch, the firm that prepared the FMP, were also available to provide information and answer questions.

During the workshop, the City's team presented the draft FMP and MWRP, focusing on key issues related to cost, assumptions, and methodologies developed for the South Bay Boulevard site. It was a highly interactive and productive discussion, and the four expert panelists frequently provided observations and asked questions along the way. Many of their observations ranged beyond the issue of cost, but were relevant to the overall intent to improve the project. They also recommended reconsideration of reducing costs by moving the project to another location.

As a result of this discussion, the panel made several important recommendations, which are listed below.

### 2.2 Expert Panel Recommendations

1. *The biggest contributor to cost at the South Bay Boulevard (SBB) site is the site itself. Pipeline and earthwork costs there are very high. The most effective way to reduce construction cost is to go back to near or on the existing WWTP site.*
2. *Reliance on State Water is a paramount problem facing the City. If the City wants to achieve water independence cost effectively, and in a timely manner, the most effective approach is to build a new compact plant at or near the current WWTP location. Developing a recycled water project will be cheaper and potentially more achievable than at the South Bay Boulevard site or any other relatively distant site. To do this, the City will need to work closely with the Coastal Commission and RWQCB, and gain buy-in from key community groups.*

3. *Due to the State’s fiduciary responsibility, the high cost and rate and resultant controversy may impact the ability to receive low interest State Revolving Fund financing compared with less controversial projects. If the City had to rely on conventional municipal bond financing, the sewer rate would be even more unaffordable.*
4. *The cost estimates developed for the SBB site are reasonable as presented, and the underlying assumptions are appropriate, including for soft costs and contingency percentages, with a few minor changes recommended. Construction Management for the WRF might be reduced from 8% to about 6% of construction costs because of going to design-build. Design for the WRF might be reduced overall from 10% to 6-8% considering the design-build delivery concept, which needs less outside design. However, the 10% assumption for the design-bid-build component is appropriate.*
5. *Some cuts to the cost estimate for the SBB site could be made. These could include:*
  - a. *Depending on the secondary treatment process, the proposed equalization basin could be reduced. An oxidation ditch would not require as much equalization as an MBR or SBR system.*
  - b. *Because of its relatively isolated location, minimize odor control to the extent possible, focusing on the headworks.*
  - c. *Locate the WRF on the portion of the site that requires less grading—where the corporation yard had been planned.*
  - d. *Remove the septage receiving station and reduce the size of fire pump facility.*
  - e. *If the City does not intend to go to full tertiary treatment, consider going to an oxidization ditch with secondary clarifiers.*
  - f. *Reduce masonry and architectural details, since the site won’t be that visible from the highway, but it still has to be made of durable low-maintenance materials.*
6. *If the City is eventually going to full reclamation, don’t defer the development of onsite buildings and infrastructure related to recycled water. It will be much more expensive later on.*
7. *The proposed combined water/sewer rate of \$250/month seems untenable in the context of average Citywide household income of \$50K—about 6% of annual income, which is approximately double the EPA’s affordable index. It is reasonable to expect a reduction will be required to make this project more palatable to the public.*

### **2.3 Other Key Observations from Reviewers**

In developing their recommendations, the panel made many related observations and raised important points that the City Council may wish to consider as it moves forward on the project. These are grouped by topic and summarized below.

## Cost Estimates and Assumptions

1. All agree with the way B&V has put together the cost estimate for the WRF—seems like a reasonable approach. Won't get a drastically different number if someone else put it together.
2. Could you lower planning contingency percentage if you didn't have the lengthy pipelines and potential complications of running through town? Some did not think this was true. Overall, the 25% contingency seemed appropriate to the group.
3. Lifecycle costs will be an important factor in addition to capital costs.
4. Engineering and Admin estimate of 30% of construction cost is reasonable, and possibly even a bit low on projects of this type. The engineering/admin costs for Paso Robles Tertiary Treatment Facilities Project ended up to be about 32% of construction costs. Assumptions about soft costs seem appropriate.
5. Escalation assumptions of 2-3% per year are good.
2. Procurements and Preliminary engineering estimate of 4% is good.
3. Permitting/CEQA estimate of 1% of construction cost is good.
4. Construction Management at 8% is a little high; some think it can be reduced, especially for design-build. (One reviewer uses 7.5% for design-bid-build. Another thinks 8 – 10% for design-bid-build, but with a smaller team on design-build, it might be reduced to maybe 6% for DB portion of project)
5. Contingency of 25% seems right at this stage of planning.
6. Decommissioning cost estimate seems reasonable.
7. Design as 10% of construction costs seems a bit high (maybe 6-8%), considering part of the project is design-build.
8. Move the WRF to the area on the proposed site that will require less grading, which will save \$0.8M + 50% for soft costs and contingency. No reason not to do it, especially if there is no corp yard planned.
9. Odor Control cost seems high at \$4.8M for a relatively remote site, like the South Bay Boulevard site. Refine the cost in some fashion.

10. Remove the septage receiving station as there are no large septage generators within the City's service area, and Los Osos and the Paso Robles facilities are satisfying the County demand and reduce size of fire pump facility. Saves \$1M.
11. The overall estimating is reasonable—this is a complicated project with lots of technical studies and coastal permitting.
12. Some pieces of the existing WWTP (headworks screens) might be reusable if the WRF is built at the existing WWTP site, but the group does not recommend it unless the EQ basin is collocated with the lift station.
13. The City of SLO's project is \$140M, but they are building it more central to the city and reusing some existing facilities, so there's less to build. Paso's \$47M plant benefited from being able to reuse some facilities on a compact footprint, with a bidding climate during the recession. Los Osos ox ditch plant for Title 22 tertiary was \$48M.
14. One reviewer: "You've got a really good team on this project, and they made good cost estimates with reasonable assumptions to implement community direction. To really reduce costs, Council should redirect to a new site closer to the existing WWTP."

#### WRF Delivery Method, Project Components, Design Issues and Technology

1. Design-Build is the way you want to go to save costs. It's also the right way to go if you want to speed delivery and have the city maintain control of the project. That's true at either greenfield site or even at the existing WWTP site, since that would be a new plant and not an upgrade.
2. There are no new technologies that will be more effective than the ones that are typically used.
3. The proposed treatment trains look very complicated—can't we simplify this somehow? Some on the panel acknowledge the desire to reduce the footprint as much as possible.
4. Odors can be addressed at the site or any site. If the sewer flows a long way, could it increase odors?
5. Contaminants of Emerging Concern haven't been a big concern to the other communities, and state regulations are adequately addressing this concern.
6. Operations/Admin building at 11,500 SF consolidated PW facility (versus 7,000 SF for WRF only) seems reasonable, but only if general fund can pay the difference. Strip out masonry and make it out of metal.
7. Don't waste the money on a septic receiving station.

8. The corp yard is never going to happen, so why prepare the SBB site for something that will never happen?
9. All agree the IPR approach for recycled water is appropriate and makes sense as opposed to ag exchange.
10. All encouraged the City to pursue IPR, some stating that diversification of water supply should be a main goal for the community.

#### Project Siting Issues and Options Related to Cost

1. Get Regional Water Quality Control Board (RWQCB) on board to go back to (or near) the existing WWTP site. Emphasize that the proposed project will be too expensive otherwise... and SRF loan might not happen if the state senses there is political uncertainty and controversy in moving this forward at the high costs. Not economically viable. How is it a town of 10,000 has a \$165 million sewer plant?
2. Why bother building at SBB, because the lift station at the current site will be vulnerable...still have raw sewage going into the ocean if the lift station fails...what is gained by doing this?
3. SBB site is another Los Osos in the making. Re-evaluate.
4. Maybe easier to accomplish recycled water goals on or near the current WWTP site, because you'll have funds to do this earlier. Perhaps be able to get CCC support for that kind of project when balanced with other coastal concerns. Will need to get Council support for this.
5. If a new plant is built at or near the current WWTP site, it will require working with CCC to explore the idea of balancing these competing goals: *More important to have water independence through recycled water? Or move the plant off the coast? What conditions could CCC explore to allow for a new plant at the current WWTP site?*
6. If a new WRF is built at the current WWTP site, you'll also need to make sure such a plant is consistent with long-range master plans for the waterfront. Could have a tie in to future waterfront development to recycled water in a more timely manner.
7. Could do effective odor control on or near the current WWTP site.
8. Could get a very small footprint for 1 mgd plant on or near the current site—could use the rest of the site for other coastal uses.

9. Was there much homegrown opposition to the existing site in 2011-12? Is there still now? Need to explore this in depth... Because if there's not, the only real hurdle might be CCC.
10. Need to emphasize this will be a drought-proof water supply, which you can guarantee at or near the existing WWTP site...which you will not be able to accomplish at SBB because you may not ever see the water recycling component happen...
11. Did you explore co-locating equalization basin with lift station at the current WWTP site—since you're already considering the lift station there, and that will need CCC permitting? *B&V RESPONDS: Yes, this was considered, but there was a concern this could interfere with long-range reuse opportunities of the existing WWTP site.*
12. Is CMC now a feasible option if there is capacity in the plant because they are cutting the prison population? Not sure. *NUNLEY RESPONDS: There are constraints to doing this...a lot of pipeline...high TDS...cost...lack of desire from California Department of Corrections and Rehabilitation (CDCR) to participate...at least a year for CDCR to determine legality of connecting a new service... the recycled water would not benefit the city.*
13. Los Osos plant does not have capacity to handle Morro Bay wastewater. Not an option.

#### Logistics, Timing and Financing

1. If the project is very expensive, and does not have community acceptance for the cost/rates, not sure city will be able to answer the SRF application questions ensuring certainty that there will be a long-term revenue stream...so may not get the loan.
2. SRF loan might not happen if the state senses there is political uncertainty and controversy in moving this forward at the SBB site.
3. Need to have a recycled water component if you hope to get grant funding.
4. Setting rates in advance and then reverse engineering the plant to get there won't work. They ran into this problem on the Nacimiento project. They need to see what they are getting before they raise the rates.
5. Present a project at or near the current WWTP site as a water plant, not a sewer plant...and work with CCC to convince them, framing it this way: More important to have water independence? Or move the current plant off the coast? Is it worth the delay in keeping a substandard WWTP near the coast while other questions are resolved, or moving forward with a safer, more efficient plant that produces water? Show how new plant will address all the other CCC concerns.

6. Have the city set the time schedule for compliance and removal of the 301h waiver; don't let the RWQCB dictate the time.
7. Are you sure you're asking all the right questions? How (and where) can the community best accomplish its goals?
8. What kind of liability are you getting from the RWQCB in not moving this forward?  
*LIVICK RESPONDS: There is a letter from them saying we need to be done by 2021 per former Executive Officer Ken Harris...*
9. Don't go to conventional bond funding—it will kill you financially... Do whatever you can to ensure SRF financing – not only low interest, but not having to pay back until after construction helps reduce amount borrowed.
10. Cost of producing water includes the energy needed to produce it...and those costs will never go down.
11. Citizens are reasonably concerned if their combined sewer/water rates would go to \$250/month. That's 6% of the average median income in Morro Bay, which is \$50K per household. That's extremely high.
12. Recent sewer and water rate increases were critical to correct the revenue shortfalls in the water rate from long-time lack of steady rate increases. City should have done that much sooner. This will make additional increases, however reasonable they might be, politically difficult.
13. City demographics make moving a project forward anywhere very difficult, from three perspectives:
  - a. Many highly-educated retirees closely follow and actively influence the course of the project;
  - b. A relatively low average communitywide household income, and
  - c. A small population base that can't easily handle the spread of costs associated with a large capital project

## SECTION 3 REFINED COST OPINIONS

### 3.1 Originally Recommended WRF Project

The recommended WRF project presented in the Draft Master Water Reclamation Plan (MWRP) incorporated the membrane bioreactor (MBR) WRF option presented in the Draft Facility Master Plan (FMP) with an indirect potable reuse recycled water program. The project took into account the community goals, costs, and recommendations presented in the Draft FMP and MWRP. Major components of the project included:

- Tertiary Treatment<sup>1</sup> – Membrane Bioreactor process
- Disinfection – UV process
- Full advanced treatment<sup>2</sup>– Reverse osmosis and advanced oxidation
- Space for future public facilities
- Extensive odor control system
- Recycled water program – Indirect potable reuse
  - Recycled water pump station and storage tank
  - Recycled water piping
  - Groundwater injection wells
  - Groundwater monitoring wells

The total estimated program costs for the WRF and recycled water project as presented was \$167 million. A breakdown of the project costs is provided in Table 1.

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<sup>1</sup> A WRF with tertiary treatment includes primary, secondary, and tertiary treatment. Tertiary treatment consists of filtration.

<sup>2</sup> Advanced treatment includes reverse osmosis and advanced oxidation, and provides salts removal, additional pathogen and virus removal, and contaminants of emerging concern (CECs) destruction.

<b>Table 1: Cost Opinion: FMP/MWRP Recommended Project</b>	
<b>Cost Category</b>	<b>Estimated Cost (2017 \$MM)</b>
Influent Lift Station, Force Main, and Effluent Disposal	13.5
WRF Onsite Facilities	61.5
WRF Operations Facilities	12.5
<b>WRF Construction Cost Subtotal</b>	<b>87.5</b>
Engineering/Design (10%)	8.7
Procurement (4%)	3.5
Project Admin & CM (12%)	10.5
Permitting, Monitoring, and Mitigation (1%)	0.9
Existing WWTP Demolition	3.0
Property Acquisition (WRF)	0.3
Escalation (2.7%)	2.4
<b>WRF Capital Cost Opinion Subtotal</b>	<b>116.8</b>
Recycled Water Project Capital Construction Cost	18.1
Engineering/Admin/CM (30%)	5.3
<b>Recycled Water Capital Cost Opinion Subtotal</b>	<b>23.4</b>
<b>Subtotal Program Capital Cost Opinion (WRF + RW)</b>	<b>140.2</b>
Construction Contingency (25% WRF + RW)	26.4
<b>Total Program Capital Cost Opinion</b>	<b>166.6</b>
Notes:	
<ol style="list-style-type: none"> <li>1) Estimated WRF Capital Construction Cost includes the WRF Project (lift station, pipelines, and treatment plant) without any recycled water components, based on costs presented in the Draft FMP. WRF costs assume the MBR option from the Draft FMP.</li> <li>2) Based on estimates in the Draft FMP, the total program capital cost opinion would be approximately \$2M less with the SBR option.</li> <li>3) Recycled water project construction costs are based on Alternative 4, Indirect Potable Reuse as presented in the Draft MWRP.</li> <li>4) Construction contingency consists of 25% of WRF plus Recycled water construction cost subtotals.</li> </ol>	

### **3.2 Cost Opinions for Council-Directed Project Alternatives**

Per City Council direction, two main project alternatives were explored with the peer review panel. Preliminary opinions of probable cost for each alternative were prepared for the panel and costs were further refined using panel input. The first alternative explored was a Secondary Treated facility at the South Bay Boulevard site. The second alternative was a Tertiary Disinfected treatment facility at the South Bay Boulevard site at the lowest possible price.

Council also directed City staff to work with other public works departments, forming a Peer Review Panel to review the assumptions used in the City’s draft master planning documents.

The Peer Review Panel provided specific input on assumptions related to cost estimating categories and odor control savings. The Panel suggested that for Design Build (DB) projects

Engineering/Design could be closer to 8% of the construction costs than 10% as is typically used for Design Bid Build (DBB) projects. Similarly, Administration and Construction Management services could be estimated at 10% for DB projects instead of the 12% typically used for DBB projects. These changes to the estimating approach would incrementally reduce the overall cost estimate for WRF program costs, as the WRF facility itself is anticipated to be delivered as a DB pursuit, but it would not realize any savings for the influent lift station and force main project, which would be delivered by DBB. The Panel also noted that full odor control is costly and may not be needed for the South Bay Boulevard site, since it is some distance from the nearest neighbors who may be affected. Odor control costs could potentially be refined, and costs have been adjusted to consider an allowance for budgeting purposes.

#### Alternative 1: Full Secondary Treatment, defer tertiary treatment and recycled water

The first alternative assumes an oxidation ditch and secondary clarifiers as the treatment technology for Full Secondary Treatment, the minimum treatment level required to meet the permitting requirements for discharge to the ocean. Using this technology instead of a sequencing batch reactor as assumed in the Draft MWRP “Alternative 0, Secondary Only” option, allows for some potential cost savings mainly due to the ability to handle a larger range of flows (resulting in a smaller equalization basin). This alternative assumes construction of the treatment facility on the lowest portion of the originally proposed site plan from the FMP, as shown in the figure below. The FMP conceptual site plan included space reserved for potential future consolidated public works facilities, per community project goals.



**Figure 1: Conceptual Site Plan from the Draft FMP (Black and Veatch, 2016). The alternatives explored per Council direction included moving to the lower section of the site, enclosed in red.**

Major components of this alternative, the cost opinion, and description of changes from the MWRP recommended project are included in Tables 2 and 3 below.

<b>Table 2: Alternative 1 - Full Secondary WRF Cost Opinion</b>	
<b>Cost Category</b>	<b>Estimated Cost (2017 \$MM)</b>
Influent Lift Station, Force Main, and Effluent Disposal	13.5
WRF Onsite Facilities	38.4
WRF Operations Facilities	10.7
<b>Subtotal Construction Cost Opinion</b>	<b>62.6</b>
Construction Contingency (25%)	15.7
Engineering/Design (10% DBB, 8% DB))	5.3

<b>Table 2: Alternative 1 - Full Secondary WRF Cost Opinion</b>	
<b>Cost Category</b>	<b>Estimated Cost (2017 \$MM)</b>
Escalation (2.7%)	1.7
Procurement (4%)	2.5
Project Admin/CM (12% DBB, 10% DB)	6.5
Permitting, Monitoring, and Mitigation (1%)	0.6
Existing WWTP Demolition	3.0
Property Acquisition	0.3
<b>Total Phase 1 Capital Cost Opinion</b>	<b>98.2</b>

The main cost savings (for both alternatives) are due to reductions in project scope from the project recommended in the MWRP, including no space for future consolidated public works facilities or corporation yard, reduced odor control, removal or reduction of auxiliary facilities, and reduced level of treatment in the case of Alternative 1.

Possible savings based on the Peer Review Panel’s recommendation to reduce estimated Engineering/Design and Administration and Construction Management costs for the DB portions of the project were approximately \$2.0 million for Alternative 1 and \$2.4 million for Alternative 2.

Table 3 summarizes the main changes from the previously recommended project and the associated cost savings and estimated costs that can be deferred to a later phase. Cost savings and deferrals were identified by the program management team (based on Council direction) and by the Peer Review Panel in the June 7<sup>th</sup> meeting.

<b>Table 3: Alternative 1 - Full Secondary WRF: Changes from FMP/MWRP Recommended Project and Estimated Impact to Construction Costs</b>			
<b>Category</b>	<b>Description</b>	<b>Estimated Construction Cost Savings (2017 \$MM)</b>	<b>Estimated Deferred Construction Cost (2017 \$MM)</b>
Secondary Treatment	Oxidation Ditch/Secondary Clarifiers instead of MBR Reduced Equalization Basin Volume (3.3 MG to 1.5 MG)	12.42	
Disinfection	Defer UV Disinfection and use chlorine contact process instead Sufficient contact time in pipe for rapid mix tank, no contact basin needed		7.28
Full Advanced Treatment	Deferment of Microfiltration, Reverse Osmosis and Advanced Oxidation Process		12.69

<b>Table 3: Alternative 1 - Full Secondary WRF: Changes from FMP/MWRP Recommended Project and Estimated Impact to Construction Costs</b>			
<b>Category</b>	<b>Description</b>	<b>Estimated Construction Cost Savings (2017 \$MM)</b>	<b>Estimated Deferred Construction Cost (2017 \$MM)</b>
Future Public Facilities	No space allotted Reduced earthwork costs for site Smaller admin/operations building (Note any significant future construction will be more challenging)	2.3	
Auxiliary Facilities	Removed septage receiving station and remote operations facility. Reduced size and capacity of fire pump facility	1.64	
Odor Control System	Reduced from extensive to moderate	1.75	
Recycled Water Program	Deferment of recommended project recycled water program		9.64
<b>Total Estimated Construction Cost Savings</b>		<b>18.1</b>	
<i>Estimated Soft Costs</i>		4.7	
<i>Construction contingency (25%)</i>		4.5	
<b>Total Estimated Capital Cost Savings</b>		<b>27.3</b>	
<b>Total Estimated Deferred Construction Costs</b>			<b>29.6</b>
<i>Estimated Soft Costs</i>			7.6
<i>Construction contingency (25%)</i>			7.4
<b>Total Estimated Capital Cost Deferment</b>			<b>44.6</b>
Note: Estimated Soft Costs include: Engineering/design (8%), escalation (2.7%), procurement (4%), administration and construction management (10%), and permitting, monitoring, and mitigation (1%). Possible savings based on the Peer Review Panel's recommendation to reduce estimated Engineering/Design and Administration and Construction Management costs for the DB portions of the project represent approximately \$2.0 million.			

Deferred construction costs are not costs savings, and are estimated to increase over time with inflation (currently estimated at 2 to 3 percent per year), should the City move forward with increased treatment and/or a reclamation program at some time in the future.

Alternative 2: Tertiary Disinfected WRF, defer recycled water

The second alternative considered the recommended FMP treatment technology, MBR, with potential costs savings. The site planning assumes construction of the WRF at the lower portion of the South Bay Boulevard site as described for the first alternative. The equalization basin for this alternative did not change in size, but would be uncovered and with reduced odor control measures. A cost opinion is included below. Major components of the project alternative, and

description of changes from the MWRP recommended project are included in Tables 4 and 5 below.

<b>Table 4: Alternative 2 - Tertiary Disinfection WRF without Recycled Water Cost Opinion</b>	
<b>Cost Category</b>	<b>Estimated Cost (2017 \$MM)</b>
Influent Lift Station, Force Main, and Effluent Disposal	13.5
WRF Onsite Facilities	49.4
WRF Operations Facilities	10.7
<b>Subtotal Construction Cost Opinion</b>	<b>73.6</b>
Construction Contingency (25%)	18.4
Engineering/Design (10% DBB, 8% DB)	6.2
Escalation (2.7%)	2.0
Procurement (4%)	2.9
Project Admin/CM (12% DBB, 10% DB)	7.6
Permitting, Monitoring, and Mitigation (1%)	0.7
Existing WWTP Demolition	3.0
Property Acquisition	0.3
<b>Total Phase 1 Capital Cost Opinion</b>	<b>114.7</b>

Table 5 summarizes the main changes from the previously recommended design and the associated cost savings and estimated costs that can be deferred to a later phase. Cost savings and deferrals were identified by the program management team (based on Council direction) and by the Peer Review Panel in the June 7<sup>th</sup> meeting.

<b>Table 5: Alternative 2 – Tertiary Disinfected WRF without Recycled Water: Changes from FMP/MWRP Recommended Project and Estimated Impact to Construction Costs</b>			
<b>Category</b>	<b>Description</b>	<b>Estimated Construction Cost Savings (2017 \$MM)</b>	<b>Estimated Deferred Construction Cost (2017 \$MM)</b>
Tertiary Treatment	Membrane Bioreactor process No change to equalization basin	0	
Disinfection	Defer UV Disinfection and use chlorine contact process instead Sufficient contact time in pipe for rapid mix tank, no contact basin needed		7.28

<b>Table 5: Alternative 2 – Tertiary Disinfected WRF without Recycled Water: Changes from FMP/MWRP Recommended Project and Estimated Impact to Construction Costs</b>			
<b>Category</b>	<b>Description</b>	<b>Estimated Construction Cost Savings (2017 \$MM)</b>	<b>Estimated Deferred Construction Cost (2017 \$MM)</b>
Full Advanced Treatment	Deferment of Reverse Osmosis and Advanced Oxidation Process to recycled water program phase		10.08
Future Public Facilities	No space allotted Reduced earthwork costs for site Smaller admin/operations building Future construction will be on less constructible areas of the site	2.3	
Auxiliary Facilities	Removed septage receiving station and remote operations facility Reduced size and capacity of fire pump facility	1.64	
Odor Control System	Reduced from extensive to moderate	1.75	
Recycled Water Program	Deferment of recommended project recycled water program to later phase		9.64
<b>Total Estimated Construction Cost Savings</b>		<b>5.7</b>	
<i>Estimated Soft Costs</i>		<i>1.5</i>	
<i>Construction contingency (25%)</i>		<i>1.4</i>	
<b>Total Estimated Capital Cost Savings</b>		<b>8.6</b>	
<b>Total Estimated Deferred Construction Costs</b>			<b>27.0</b>
<i>Estimated Soft Costs</i>			<i>6.9</i>
<i>Construction contingency (25%)</i>			<i>6.8</i>
<b>Total Estimated Capital Cost Deferment</b>			<b>40.7</b>
Note: Estimated Soft Costs include: Engineering/design (8%), escalation (2.7%), procurement (4%), administration and construction management (10%), and permitting, monitoring, and mitigation (1%). Possible savings based on the Peer Review Panel’s recommendation to reduce estimated Engineering/Design and Administration and Construction Management costs for the DB portions of the project represent approximately \$2.4 million.			

Both alternatives result in a total cost savings for the treatment facilities over the previously recommended WRF project, generally due to reductions to the project scope. Since recycled water costs are deferred for both alternatives these costs will increase over time. No long-term savings can be realized from deferring the recommended recycled water project, if the City pursues recycled water at some point in the future.

## Rough Cost Opinion for Building the WRF at or near the Existing WWTP Site

To address the Peer Review Panel's adamant recommendation to reconsider locating the new facility on or near the existing WWTP site, the team worked with Black & Veatch to estimate a rough cost savings potential for relocating the project adjacent to this location. Such a project would be based on similar assumptions as the one at SBB, and would be intended to meet community goals, including producing tertiary treated recycled water, and implementing the reclamation component (indirect potable reuse). However, this is a very rough preliminary estimate, for comparison purposes only. If the City Council wishes to explore this option, a more detailed estimate can be provided.

Preliminary estimates indicate a **cost savings potential between \$38M and \$43M**, for a total program cost of approximately \$124M to \$129M, to construct the project on or near the existing WWTP site. The cost savings potential includes construction and soft costs consistent with the other alternatives presented. This assumes a full advanced treatment facility on the existing WWTP property and a full indirect potable reuse reclamation program as described in the MWRP. Approximately 85% of the potential cost savings can be attributed to changes in the WRF costs (through tertiary treatment, but not including advanced treatment), and approximately 15% of the cost savings are associated with the recycled water project. The cost savings are generally due to the following attributes:

- *Site work: substantial reductions in the amount of site work that would be required.*
- *Yard piping: smaller site would result in some reduced yard piping*
- *Wall thicknesses: several WRF structures doubled as retaining walls, due to terracing of the site, which would not be required here.*
- *Reduced access road length*
- *Reduced offsite piping lengths*
- *Removed septage receiving station*
- *Removed fire protection facility (City's water system pressure would be sufficient at existing site)*
- *Removed remote operations facility*

It should be noted that if the Council wishes to consider moving the new WRF to a location on or near the existing WWTP site, the FMP and MWRP would need to be modified, with cost estimates refined as a result. This concept would also need to be vetted with the California Coastal Commission and RWQCB, since these agencies have until now assumed that the project will be re-located away from the existing WWTP site. The program management team would initiate these discussions if Council provides direction to pursue this approach.

## SECTION 4 NEXT STEPS

1. The WRFCAC should review the report's recommendations, and provide additional input for City Council consideration
2. The City Council should consider the report's recommendations, including WRFCAC's input. Based on that, they should provide clear direction that could include, but not be limited to, one of these options:
  - a. Move forward at the South Bay Boulevard site based on the revised cost estimates provided in this report;
  - b. Refine the community's goals, and direct staff to modify the project accordingly at the SBB site;
  - c. Direct staff and the WRF program management team to provide a refined cost estimate for building the new WRF that meets community goals at or near the existing WWTP site. Depending on the outcome of this exercise, the City Council may want direct staff to take steps to clarify an appropriate site, and refine the draft FMP and MWRP to focus on that site, with the EIR focused on examining the impacts associated with building at such a site. This would include working with the RWQCB and Coastal Commission to determine whether a project at such a location is supportable.