CIP Program Technical Memorandum

San José-Santa Clara Regional Wastewater Facility

To: John Cannon, Julia Nguyen **Date:** March 11, 2014

From: Ed Wetzel **CC:** John Buttz, Don Bassett

Subject: Tech Memo 6.7 – Validation Process Summary

Background and Purpose

Project Validation is the process by which the CIP Program team reviewed existing information, and obtained additional input from City of San José (City) staff related to the San José – Santa Clara Regional Wastewater Facility's (Wastewater Facility) needs, in order to develop five-year and ten-year Capital Improvements Plans (CIPs). The existing information included the current Plant Master Plan (PMP) and over 16 additional studies, as well as other projects initiated since the PMP was completed. The validation process was designed to be a systematic approach to project review, identification, prioritization, and sequencing. It drew upon the combined knowledge of MWH consultant staff, the City's Executive Program Advisor and O&M Technical Coordinator, executive leadership from the Environmental Services and Public Works Departments, and City engineering and Operations and Maintenance (O&M) teams.

The validation process took place over a four-month period (from late October 2013 through February 2014) during the start-up phase of the CIP Program. It included six formal day-long workshops, multiple process related meetings, and production of seven technical memoranda, the program master schedule and all documentation required for generation of the five-year and ten-year CIPs. The validation schedule was driven by the City's annual budget process and a commitment to provide a Proposed Five-Year CIP budget to the City of Santa Clara and the tributary agencies to the Wastewater Facility by March 1, 2014. A Validation Team was formed with representation from the CIP Program consultant team, including a senior project manager assigned to lead the efforts in each of four primary process areas:

- Liquid treatment processes
- Solids treatment processes
- Energy & automation
- Plant-wide facilities

Process Area Working Groups were established for each of the four major process areas, consisting of additional consultant staff and City engineering and O&M staff. These multi-disciplined teams remained intact throughout the validation process, and were the primary developers of the project development and review activities. A six-step process was used to develop the CIP projects, with workshops held at each step of the process to review progress and receive input from other senior leaders within the City. Documentation in the form of workshop agendas, presentation materials, and minutes were produced along with technical

memoranda and other relevant documentation. These materials were uploaded to both the CIP Program SharePoint site (the CIP Portal) and the ESD intranet website.

The ten-year CIP is described in a single-line Primavera P6 (P6) schedule showing each project, their estimated total project cost, and the implementation schedule over the next ten years. The validation project information was translated into the City budget documentation and submitted to the City Budget office as part of the annual budget process.

Process

The validation process activities followed a six-step process defined at the beginning of the validation effort, as summarized on Figure 6.7-1 below.

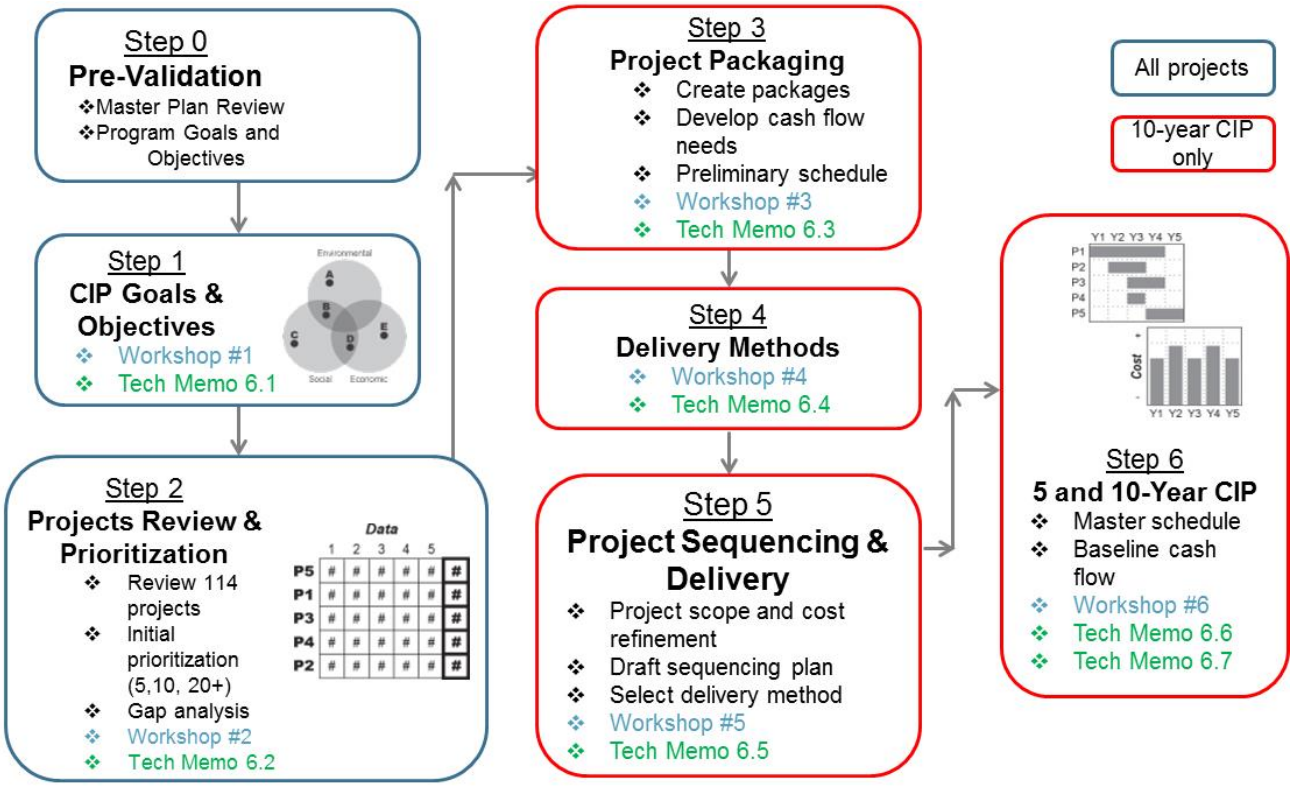


Figure 6.7-1: Validation Process Summary

The initial step (Step 0) shown in Figure 6.7-1 was completed prior to the validation process, and is therefore not included in the scope of work, yet represented an important predecessor activity in order to understand the PMP and the overall CIP Program goals and objectives.

The following sections provide additional detail for each of the six steps used by the validation team to develop the ten-year CIP for the program.

Step 1: CIP Goals and Objectives

***Purpose**:* Within the framework of the project validation process, develop criteria for project evaluation and prioritization, along with associated weighting factors.

Process: Development of the overall program goals and objectives used a "Triple Bottom Line Plus" approach with plant operational considerations included as the "plus" component along with the environmental, social and economic aspects of the Triple Bottom Line. During the Task 6.1 workshop, a silent brainstorming exercise was conducted in order to generate criteria for project evaluation. Ultimately the five criteria shown below were established and weighted:

- Operations: Health & Safety
- Operations: Asset Dependability
- Environmental
- Social
- Economic/Financial

Results: A score sheet was developed by the Validation Team for project evaluation and prioritization using the above criteria.

Step 2: Projects Review and Prioritization

Purpose: To review the CIP projects and prioritize into low, medium and high priority categories based on criteria developed during the Validation Goals and Objectives Workshop, and to ensure that any gaps in the PMP and Adopted 2014-2018 CIP have been identified and included in the Validation Team's updated project list for informing the five-year and ten-year CIPs.

Process: The criteria developed in Step 1 were used to place all projects into one of three priority categories:

- High: to be initiated within the first five years of the program
- Medium: to be initiated in years six through ten of the program
- Low: to be considered for implementation beyond the first ten years of the program

The project prioritization process consisted of the following five steps:

1. ***Project Inventory.*** A comprehensive listing of future CIP projects was developed. The list included over 100 separate projects from the PMP as well as over 50 additional projects obtained from O&M input. Information sources included the PMP, review of supplemental documentation, lists provided by O&M personnel, and conversations with O&M staff. The projects were then compiled and coded.
2. ***Project Descriptions.*** A project summary sheet was created for each project identified. These project descriptions are located on the CIP Portal, and were electronically distributed to all workshop participants prior to the meeting. Information provided included the project's current status, estimated cost from PMP, need for project, benefits of project, and description of planned improvements.
3. ***Preliminary Prioritization.*** An initial review and preliminary prioritization of the projects in each major process area was undertaken by the consultant process area leads. These preliminary rankings were reviewed with the entire Validation Team.

4. ***Process Areas Working Groups Reviews.*** Process Area Working Groups, including both consultant and City staff members, were established to review and evaluate the projects in each process area. One or more meeting(s) were held with each group prior to Workshop 6.2 in order to preliminarily rank the projects and place them into one of the three priority categories. In addition, a gap analysis was conducted to identify and include any additional projects not included in the initial PMP and City CIP lists. The prioritization criteria and weighting factors developed during Workshop 6.1 were utilized to develop an initial ranking of projects and helped inform the teams as to their eventual prioritization.
5. ***Workshop Review and Prioritization Finalization.*** Project prioritization, as developed by the Process Area Working Groups, was presented in Workshop 6.2 to a cross-section of City management, CIP staff, and O&M personnel. Based upon the input received, the prioritizations were finalized for each of the process areas.

Results: The projects were evaluated and the final rankings from each process area are summarized in Table 6.7-1, with the numbers indicating the number of projects in each priority category.

Table 6.7-1: Final Process Area Rankings

Process Area	High	Medium	Low
Liquids Processing	27	5	6
Solids Processing	4	10	14
Energy & Automation	17	0	5
Plant-wide Facilities	14	1	6
Totals	**62**	**16**	**31**

The summary Table 6.7-1 indicates that over 50% of the projects have been prioritized into the high priority category. This is not surprising given the age and condition of the Wastewater Facility's infrastructure, and the fact that it has been three years since the PMP was developed, with many projects from the PMP still uninitiated, despite indicated start dates before 2013.

In addition to the more than 100 capital projects under consideration, a number of program-wide studies were identified as important to help inform the projects and clarify design requirements.

Step 3: Project Packaging

Purpose: To develop design and construction packages for the projects previously identified as being high or medium priority, and therefore included in the five-year and ten-year CIPs. Larger project packages result in greater efficiencies, a reduced number of concurrent procurements, and fewer construction contractors working on site.

Process: The high and medium priority projects were consolidated into logical, larger packages for implementation. Prior to the Task 6.3 Workshop, the Process Area Working Groups were convened to develop the preliminary packaging of projects in their respective process area. Criteria for packaging were developed and refined throughout the process, with the final packaging criteria including:

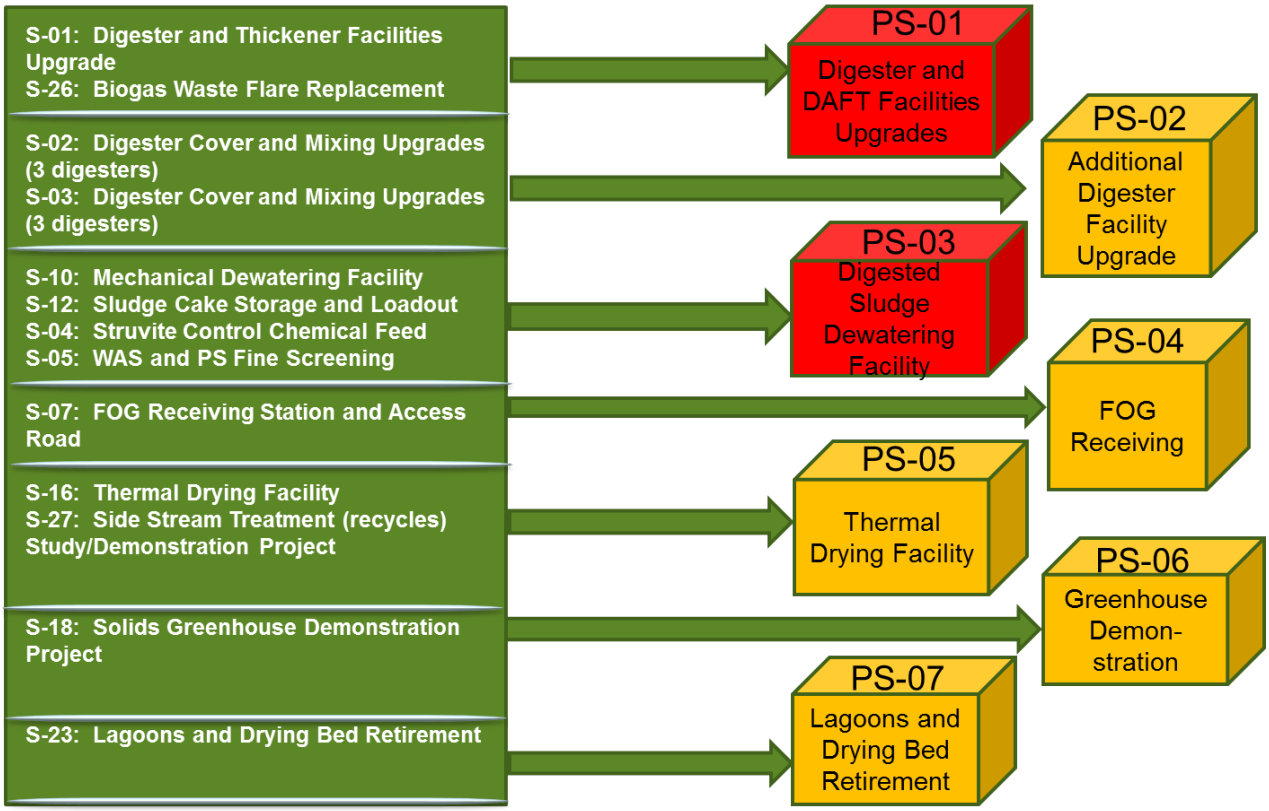
- Previously packaged by the City

- Project implementation already underway
- Location and proximity on plant side
- Process and/or system interdependency
- Avoid interferences by multiple contractors
- Similar priority rating
- Maintain plant compliance through phasing
- Bundling of small projects where possible
- Opportune timing – schedule alignment
- Comprehensive scope to include ancillary facilities/utility feeds (i.e., road and support utilities)
- Incorporate O&M projects into larger packages

The packaging was subsequently refined both by the workshop participants and additional meetings among the Process Area Working Groups.

Results: The results of this exercise were that the 100 plus projects were consolidated into 33 packages for implementation, nine critical plant-wide studies, and a future update to the PMP. Packaging was presented graphically for all process areas and projects. An example (for the solids processing area) is provided in Figure 6.7-2 below, with the red boxes indicating a high priority project package and the yellow boxes indicating a medium priority project package. The green boxes to the left list the designations and names of the former, individual projects that make up the new consolidated packages.

Figure 6.7-2: Solids Processing Projects Packaging



Step 4: Delivery Methods

Purpose: To discuss the attributes, advantages, and disadvantages of project delivery methods that are allowable and applicable to the CIP Program; and to establish an approach for selecting a delivery method for each project.

Process: Most of the activity surrounding Project Delivery Methods was addressed in a special workshop, covering the following topic areas:

- Project Delivery Overview
- State and City Procurement Regulations/Policies
- Design-Build Legislation and Authority
- Project Delivery Methods
- Selecting a Project Delivery Method

At the time, the only legally acceptable methods of delivery for the program, based upon the City Attorney's interpretation, were Design-Bid-Build (DBB) and Low-bid Design-Build (DB). In addition, there is a State pilot program that allows for the use of best value DB. Price must be at least 10 percent of the evaluation criteria and application of this pilot program may be limited. However, much of the effort of this task was centered on assessing preferred methods of delivery, should these alternative methods become allowed in the near future.

Results: A summary table (Table 6.7-2) was developed highlighting both a default method of delivery for each project package (DBB or DB), as well as potential alternative methods for consideration in the future, should additional methods become approved for use. The project packages were subdivided into six package types that were evaluated to assess the optimum project delivery approach. Note that a number of the project types, including process facility rehabilitation and infrastructure rehabilitation projects, are best suited for either Progressive Design-Build (PDB), Construction Management at Risk (CMAR) or Job Order Contracting (JOC), given the nature of the work and the risks associated with a conventional delivery approach. Subsequent to Workshop 6.4, positive feedback was received by the City attorneys that may suggest an opportunity to pursue PDB on future projects.

Table 6.7-2: Delivery Method Summary

Package Type	Features	Risk of Unknowns (H,M,L)	Phased Construction? (Y or N)	Accelerated Schedule? (Y or N)	Multiple Rehab Projects? (Y or N)	Project No. & Project Description	Default Delivery Method	Possible APD Methods
Process Facility Rehab	• Existing infrastructure • Maintain operations • Repair, rehab and replace • Mechanical, electrical, structural improvements	H	Y	N	N	PLH-01 Near-term headworks improvements PLP-02 East primaries R&R PLS-01 Aeration Tanks R&R PLS-02 Final Clarifiers R&R PLS-03 Aeration Basin Future Modification PLF-01 Filters R&R PE-04 Digester Gas Holder PS-01 Digester and DAFT Facilities Upgrade PS-02 Additional Digester Facility Upgrade PS-07 Lagoons and Drying Bed Retirement	DBB	PDB or CMAR
Infrastructure Rehab	• Civil infrastructure • Primarily structural, mechanical • Phased construction • Spans plant site • Site constraints • Linear projects	H	Y	N	Y	PLD-02 Outfall R&R PF-01 Tunnel Rehab PF-02 Support Building improvements PF-04 Yard piping and road improvements PF-06 Facility-wide water systems	DBB	JOC, PDB or CMAR
New Construction-On Site	• New facility/structure • Site constraints • Process interactions • Construction interference	M	N	N	N	PLH-02 New Headworks PLP-01 Iron salts facilities PLD-01 New disinfection facilities	DBB	PDB or CMAR
New Construction-Greenfield Site	• New facility/structure • Defined construction scope • Limited process interactions • Limited construction interference • Available lay-down areas • Schedule constraints	L	N	Y or N	N	PLD-03 Final effluent PS and storm water channel PE-01 Emergency generators PE-02 Cogeneration facilities PE-03 Digester Gas Compressor PS-03 Digested sludge dewatering facility PS-04 FOG receiving station PS-05 Thermal drying facility	DB	DBO
Equipment Renewal/ Replacement	• Electrical/mechanical/instrumentation • Limited construction • Primarily equipment and supplies	M	Y	N	Y	PA-01 Advanced facility control PE-05 Electrical reliability PF-03 Handrail replacement PF-07 Instrument air system	DBB	JOC
Pilot Facilities	• Testing of new technologies • Smaller or temporary facilities • Process area inter-ties • Physically adjacent to process areas • Significant engineering and data collection	L	N	N	N	PLF-02 Alternative filter technology field verification PS-06 Greenhouse demonstration project	DBB	PDB or CMAR

Step 5: Project Sequencing and Delivery

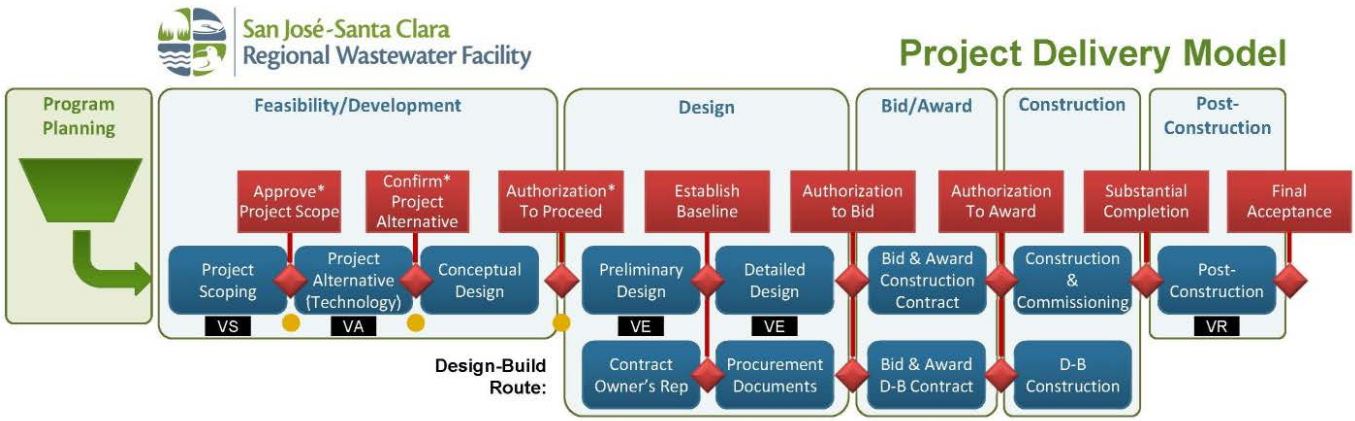
Purpose: To develop a cost-loaded schedule for the ten-year CIP, with the sequencing and delivery method specified for each of the previously developed project packages.

Process: P6 is the principal scheduling software tool used by construction contractors and program managers around the world. It was selected for use on the CIP Program over less sophisticated software tools such as Microsoft Project because of its ability to address:

- Complex project schedules involving multiple tasks and phases
- Relationships between predecessor studies and projects
- Program cash flow projections
- Encumbrance planning
- Resource capacity planning
- Plant O&M new asset burdening
- Procurement management (design and construction)
- Project cost escalation over time

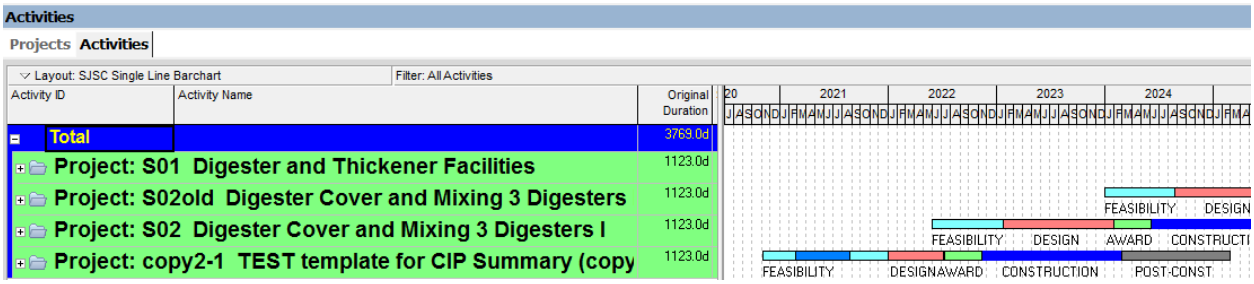
Projects were broken down into various phases consistent with the Project Delivery Model (PDM) for the program (Feasibility/Development, Design, Bid/Award, Construction and Post-Construction) as shown on the PDM graphic (Figure 6.7-3).

Figure 6.7-3: Project Delivery Model



Single line schedules were developed for each project, including each of the PDM phases, as illustrated in Figure 6.7-4 below.

Figure 6.7-4: P6 Single Line Schedule Example



Cost and schedule data for each of the 33 project packages, the nine programmatic studies and the master plan update were initially uploaded to P6 to create a preliminary cost-loaded schedule. This schedule was then reviewed by the validation team members on a project-by-project basis, and during that process a number of potential issues that might impact the sequencing and delivery of the projects were identified. These issues include:

- Resource needs to develop, procure and manage each project
- Treatment process interactions
- Predecessor and successor projects, especially with regard to the programmatic studies
- Phasing of rehabilitation projects to maintain plant operations and compliance
- Site limitations related to lay-down areas and site access for personnel and vehicles
- Contractor interferences
- Financial constraints and peak cash flow needs
- Additional O&M resources needed to operate and maintain the new facilities

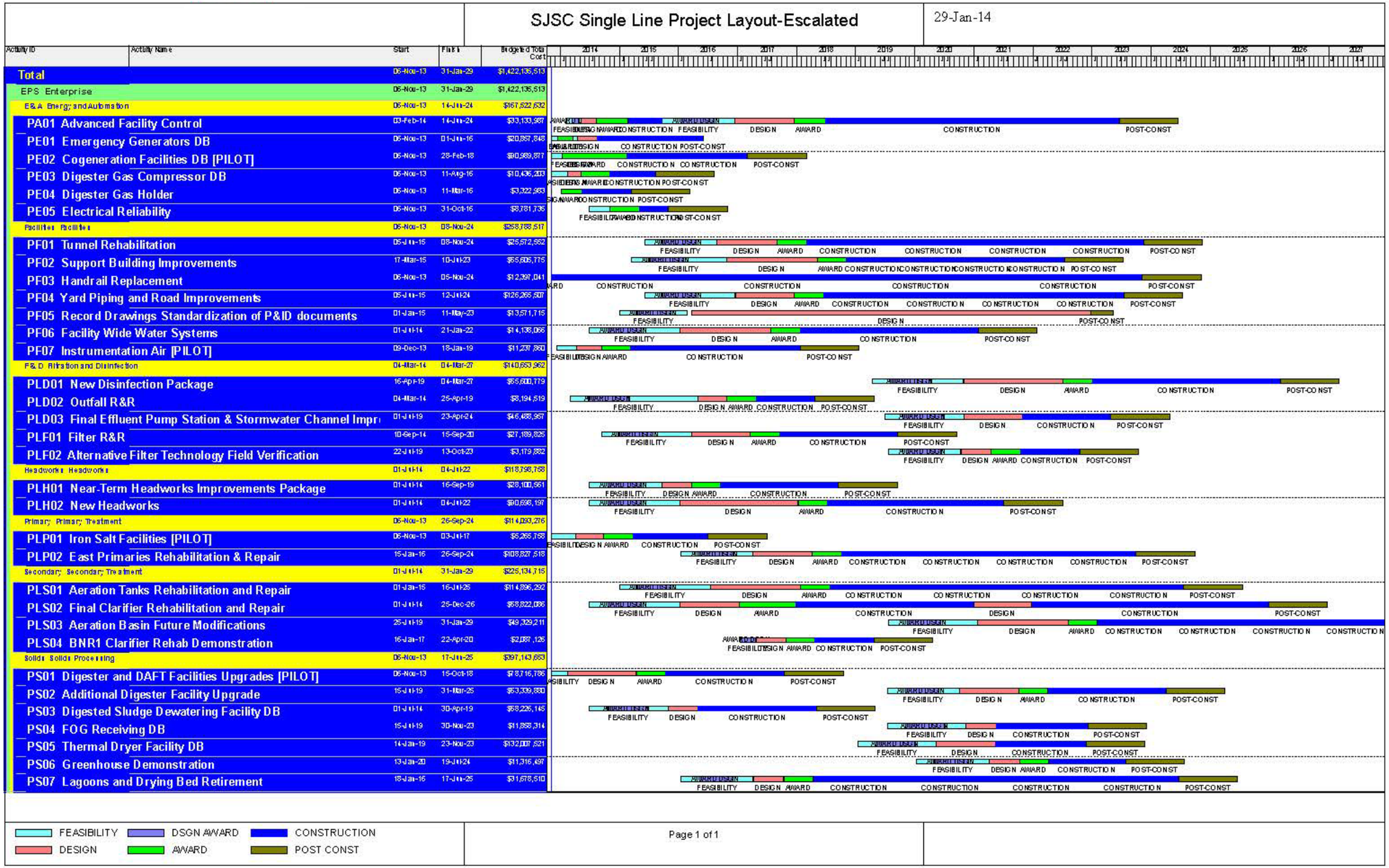
Cost estimates were developed for each project based on the information provided in the scope of work for each project package. Cost estimates were derived in 2013 dollars and subsequently escalated to actual time of construction using a 3 percent per year escalation factor. This approach differs from the PMP, where cost estimates were based on 2010 dollars and escalated at a less conservative 2 percent per year escalation factor. Most of the projects are still at a planning stage of development and include no conceptual engineering analysis; projects at this stage result in Class 5 estimates as defined by AACE International (formerly the Association for the Advancement of Cost Engineering International) classification system. (Class 5 being the most preliminary of cost estimates, and Class 1 being the most accurate.)

At this stage of the CIP Program, it is assumed that all projects will be delivered by either the DBB or DB method. The validation team sees many benefits to the use of PDB for a number of the projects, and remains hopeful that this delivery method will be allowed in the near future. For the purposes of this sequencing exercise, it was assumed that all projects are delivered by DBB, except for the following DB projects:

- Emergency Diesel Generators (PE-01)
- Cogeneration Facilities (PE-02)
- Digester Gas Compressor (PE-03)
- Digested Sludge Dewatering (PS-03)
- FOG Receiving Station (PS-04)
- Thermal Dryer Facility (PS-05)

Results: The principal result of the sequencing task is the creation of a cost-loaded P6 schedule for the 10-year CIP Program, as illustrated on Figure 6.7-5 below.

Figure 6.7-5: 10-Year CIP Program Schedule



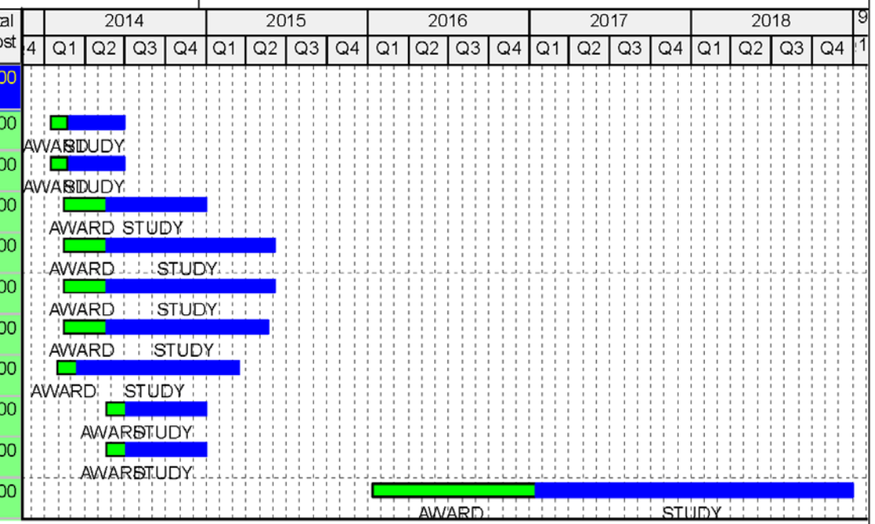
A separate schedule was also created for the nine programmatic studies and the Master Plan update, and that single line schedule is shown as Figure 6.7-6.

Figure 6.7-6: Schedule for Programmatic Studies

SJSC Single Line Study Layout

16-Jan-14

Activity ID	Start	Finish	Budgeted Total Cost
Total	13-Jan-14	31-Dec-18	$6,780,000
STUDY01 Design Criteria and Sizing Basis	13-Jan-14	30-Jun-14	$300,000
STUDY02 Aeration Capabilities Assessment	13-Jan-14	30-Jun-14	$100,000
STUDY03 Odor/ Emission / Corrosion Study	12-Feb-14	31-Dec-14	$580,000
STUDY04 Automation Master Plan	12-Feb-14	04-Jun-15	$600,000
STUDY05 Piping and Tunnel Condition Assessment	12-Feb-14	04-Jun-15	$1,000,000
STUDY06 Facility wide Support and Utility Systems	12-Feb-14	21-May-15	$500,000
STUDY07 Site Improvement Guidelines (by City)	31-Jan-14	16-Mar-15	$400,000
STUDY08 Plant wide Process Risk Assessment	22-May-14	31-Dec-14	$100,000
STUDY09 Asset Management Approach and Strategy	22-May-14	31-Dec-14	$200,000
STUDY10 Master Plan Revision	13-Jan-16	31-Dec-18	$3,000,000



AWARD
STUDY

Page 1 of 1

Using escalated costs, the ten-year CIP totals approximately $1.42 B, broken down by major process area as follows:

Energy & Automation	$ 167,500,000
Plant-wide Facilities	$ 258,800,000
Liquids Processing	$ 598.700,000
Solids Processing	$ 397,100,000
Total Estimated Ten-Year CIP	$ 1,422,100,000

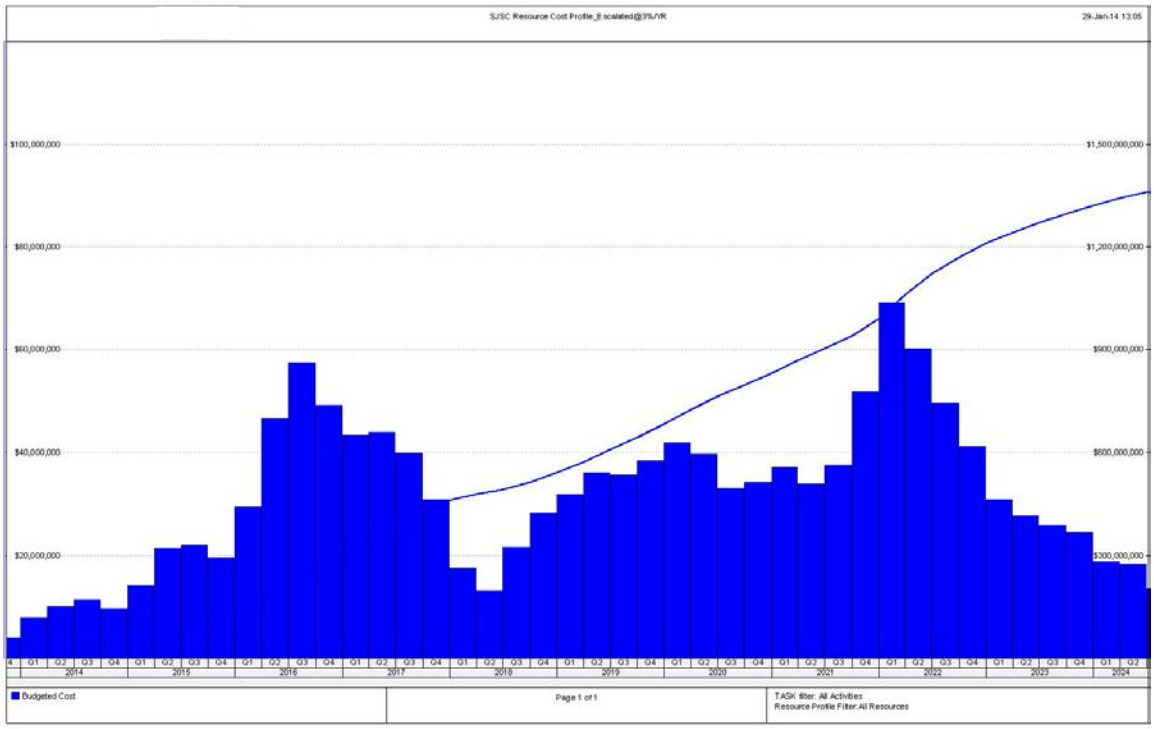
The cash flow curve (Figure 6.7-7 below) indicates a nearly equal spread of costs between the first five-year and the second five-year period. Each five-year period shows some peak spend periods created by the initial ramp-up of projects in fiscal years 2014-15 and again in 2019-20.

Step 6: 5-Year and 10-Year CIP Documentation

Purpose: To review the status of the validation CIP and develop an approach to incorporating it into the Proposed Five-Year CIP submittal to the City budget office.

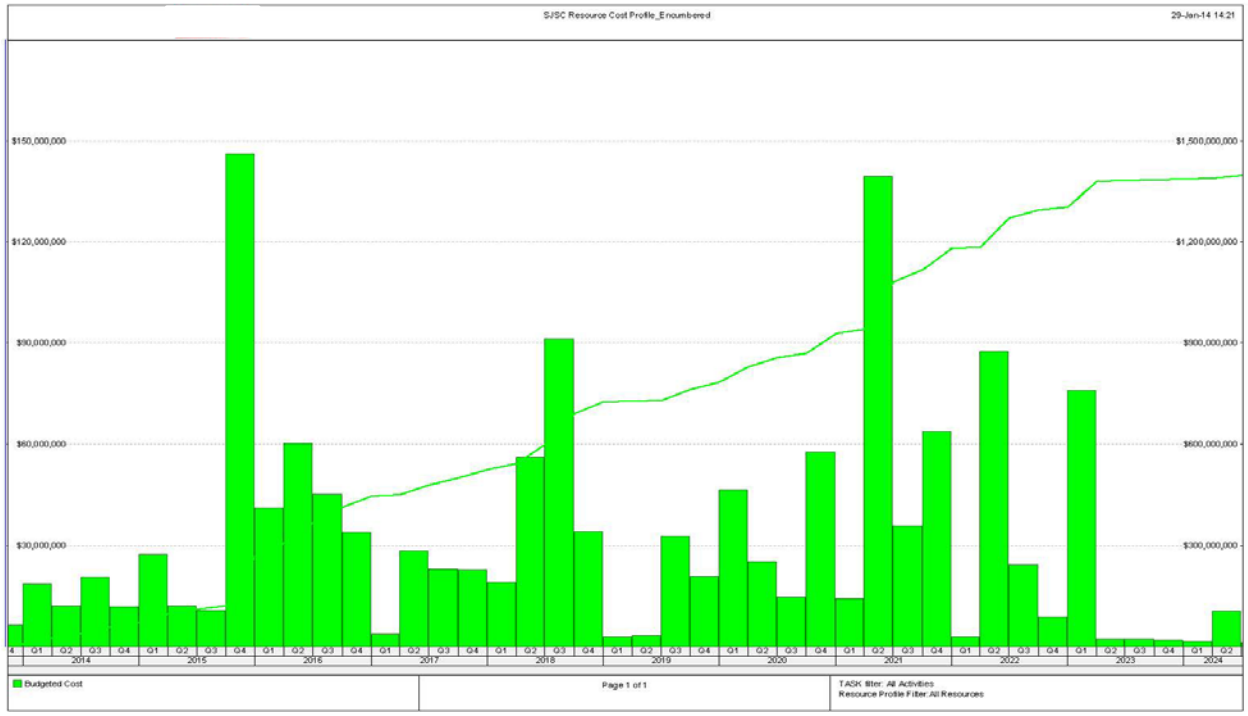
Process: Revised P6 schedules (Gantt charts) were prepared for the Task 6.6 Workshop based on input from the Process Area Working Group members. Cash flow curves were prepared using both the un-escalated costs (using the project cost estimates in 2013 dollars) and escalated costs assuming a 3% per year escalation factor (Figure 6.7-7). In addition to the ongoing cash flow requirements, encumbered costs were also considered and separate encumbrance curves developed using P6 (Figure 6.7-8). In these cases, it was assumed that the costs are encumbered when the notice to proceed is issued for both the engineering design agreements and construction contracts.

Figure 6.7-7: Ten-Year Escalated Cash Flow



The P6 curves use calendar costs and present the results on a quarterly basis. Separate curves were also developed for the City fiscal year (from July 1 through June 30), so that the fiscal year curves help inform the financial planning efforts and illustrate when large jumps in capital expenditures will necessitate bond financing for both the City and the tributary agencies. Additional curves were also developed to help assess critical time periods when engineering procurements overlap for a number of projects, as well as the resource needs to manage the projects over the life of the program.

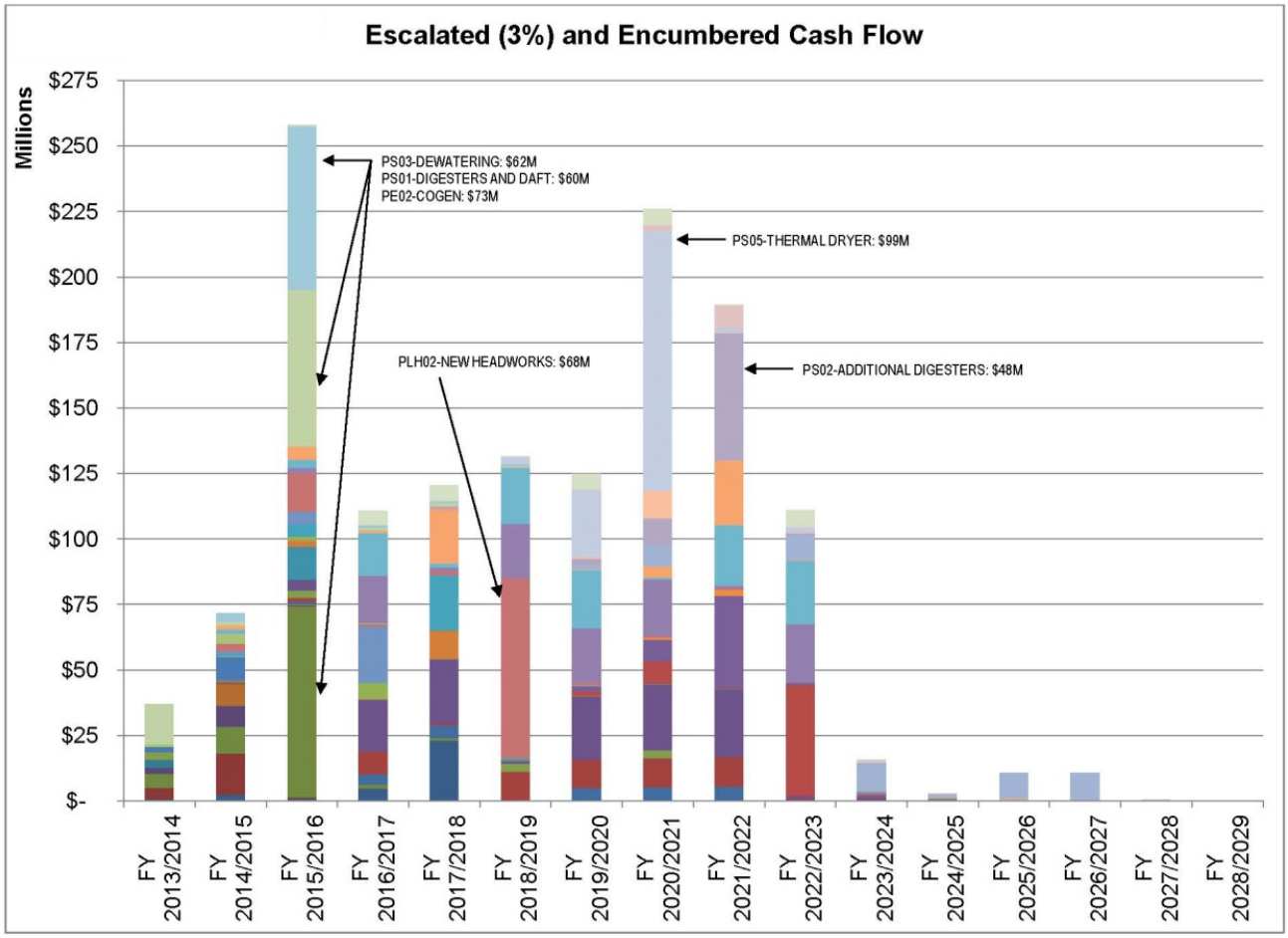
Figure 6.7-8: Ten-Year Escalated Encumbrance



A summary table showing the total estimated project costs for each project, and how those costs are encumbered over the ten-year life of the program, is included on Table 6.7-3. Group 1 projects are those that are initiated within the first five years of the program (FY 2014-15 through FY 2018-19), while Group 2 projects do not begin until FY 2019-20.

The fiscal year plot (Figure 6.7-9) shows three major peaks over the 10-year program timeframe. The first, with an encumbrance of $250M, occurs in FY 2015-16 and is driven largely by the cogeneration facilities ($72M), the sludge dewatering facility ($60M) and the first phase of the digester and dissolved air flotation thickener (DAFT) facilities upgrade project ($58M). The second major peak of $210M occurs in FY 2020-21, which includes the thermal dryer facility ($96M). The final peak occurs the next year at FY 2021-22, resulting in a $180M spend driven by the second phase of the digester facility improvements ($46M). All other FY encumbrance spends, with the exception of next year and FY 2023-24, fall within the $100M to $130M per year range of capital needs.

Figure 6.7-9: Fiscal Year Encumbered Cash Flow



Summary

The validation process is one element of this program's overall start-up effort. It has provided foundational information for the development of the Proposed 2015-2019 Five-Year CIP and associated budgeting documents. The project definitions provided in terms of cost, schedule and scope also serve as the basis for ongoing resource planning. It is anticipated that on an annual basis, in connection with the budget cycle, the validation results will be revisited and updated to reflect the most current conditions.

Table 6.7-3: Summary of Total Estimated Project Costs for Each Project

Project Name	Capital		Costs per FY											
	2013 $s	Escalated $s (3%/yr)	FY 2013/ 2014	FY 2014/ 2015	FY 2015/ 2016	FY 2016/ 2017	FY 2017/ 2018	FY 2018/ 2019	FY 2019/ 2020	FY 2020/ 2021	FY 2021/ 2022	FY 2022/ 2023	FY 2023/ 2024	Costs Beyond 10-Year CIP
Group 1 - Initiate in Years 1-5														
PA01 Advanced Facility Control - Phase 1	$ 28,800,000	$ 33,133,997	$ 637,261	$ 2,340,935	$ 904,176	$ 4,794,160	$ 23,136,279	$ 220,907	$ 222,605	$ 221,755	$ 221,755	$ 221,756	$ 212,408	$ -
PE01 Emergency Generators DB	$ 20,600,000	$ 20,857,850	$ 4,484,386	$ 15,849,795	$ 523,669	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PE02 Cogeneration [PILOT]	$ 87,500,000	$ 90,989,882	$ 5,358,524	$ 10,223,901	$ 72,958,737	$ 1,472,618	$ 976,102	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PE03 Digester Gas Compressor	$ 10,420,000	$ 10,436,201	$ 2,180,913	$ 7,955,498	$ 268,990	$ 30,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PE04 Digester Gas Holder	$ 3,320,000	$ 3,322,984	$ 3,079,558	$ 143,096	$ 100,330	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PE05 Electrical Reliability	$ 8,610,000	$ 8,781,724	$ 188,186	$ 8,200,263	$ 295,238	$ 98,037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PF01 Tunnel Rehabilitation	$ 21,910,000	$ 25,572,519	$ -	$ 63,991	$ 931,410	$ 3,803,179	$ 4,921,640	$ 189,316	$ 4,859,186	$ 5,086,716	$ 5,268,548	$ 190,044	$ 189,316	$ 69,173
PF02 Support Building Improvements	$ 48,180,000	$ 55,605,792	$ -	$ 494,090	$ 1,703,310	$ 8,630,726	$ 622,194	$ 10,768,455	$ 10,670,869	$ 10,965,982	$ 11,276,993	$ 462,540	$ 10,633	$ -
PF03 Handrail Replacement	$ 10,990,000	$ 12,397,061	$ 2,632,881	$ 80,103	$ 2,842,914	$ 80,103	$ 79,796	$ 3,050,427	$ 80,410	$ 3,282,189	$ 80,103	$ 80,103	$ 79,796	$ 28,236
PF04 Yard Piping and Road Improvements	$ 108,170,000	$ 126,265,500	$ -	$ 268,752	$ 3,911,835	$ 19,735,692	$ 24,457,840	$ 962,907	$ 24,119,010	$ 24,972,889	$ 25,870,023	$ 966,611	$ 962,906	$ 37,035
PF05 Record Drawings Standardization of P&ID documents	$ 11,900,000	$ 13,571,709	$ -	$ 252,207	$ 12,699,123	$ 90,458	$ 90,110	$ 90,111	$ 90,804	$ 90,457	$ 90,458	$ 77,981	$ -	$ -
PF06 Facility Wide Water Systems	$ 12,600,000	$ 14,138,071	$ -	$ 461,117	$ 2,294,519	$ 128,828	$ 10,794,566	$ 128,335	$ 129,321	$ 128,827	$ 72,558	$ -	$ -	$ -
PF07 Instrumentation Air [PILOT]	$ 10,810,000	$ 11,237,867	$ 2,140,223	$ 8,545,174	$ 155,977	$ 155,382	$ 154,787	$ 86,324	$ -	$ -	$ -	$ -	$ -	$ -
PLD01 New Disinfection Package	$ 42,790,000	$ 55,600,802	$ -	$ -	$ -	$ -	$ -	$ 368,863	$ 1,789,663	$ 8,657,751	$ 485,721	$ 42,514,105	$ 483,860	$ 1,300,839
PLD02 Outfall R&R	$ 7,600,000	$ 8,194,522	$ 97,205	$ 298,478	$ 1,471,602	$ 6,044,078	$ 155,319	$ 127,840	$ -	$ -	$ -	$ -	$ -	$ -
PLF01 Filter R&R	$ 24,700,000	$ 27,189,808	$ -	$ 776,934	$ 4,685,462	$ 460,725	$ 20,577,468	$ 310,567	$ 312,956	$ 65,696	$ -	$ -	$ -	$ -
PLH01 Near-Term Headworks Improvements Package	$ 26,220,000	$ 28,100,556	$ -	$ 1,235,549	$ 4,775,878	$ 21,260,682	$ 373,952	$ 373,952	$ 80,543	$ -	$ -	$ -	$ -	$ -
PLH02 New Headworks	$ 79,900,000	$ 90,698,204	$ -	$ 2,883,596	$ 14,614,716	$ 776,463	$ 1,606,513	$ 68,478,602	$ 779,438	$ 776,463	$ 776,463	$ 5,950	$ -	$ -
PLP01 Iron Salt Facilities [PILOT]	$ 5,150,000	$ 5,265,755	$ 1,071,104	$ 3,904,086	$ 145,283	$ 144,727	$ 555	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PLP02 East Primaries Rehabilitation & Repair	$ 92,470,000	$ 108,827,520	$ -	$ -	$ 1,857,853	$ 18,322,193	$ 1,353,791	$ 20,645,859	$ 20,796,860	$ 21,510,195	$ 875,228	$ 22,379,051	$ 871,875	$ 214,615
PLS01 Aeration Tanks Rehabilitation and Repair	$ 97,170,000	$ 114,896,287	$ -	$ 1,579,294	$ 3,207,558	$ 16,306,977	$ 1,521,398	$ 21,324,743	$ 22,029,009	$ 605,868	$ 23,079,604	$ 24,004,565	$ 603,547	$ 633,724
PLS02 Final Clarifier Rehabilitation and Repair	$ 43,970,000	$ 58,822,138	$ -	$ 1,622,697	$ 5,063,346	$ 590,088	$ 20,279,534	$ 326,832	$ 329,346	$ 4,542,802	$ 24,595,492	$ 328,089	$ 326,832	$ 817,080
PLS04 BNR1 Clarifier Rehab Demonstration	$ 1,880,000	$ 2,087,123	$ -	$ -	$ -	$ 413,416	$ 1,557,487	$ 63,884	$ 52,336	$ -	$ -	$ -	$ -	$ -
PS01 Digester and DAFT Facilities Upgrades [PILOT]	$ 75,420,000	$ 78,716,800	$ 15,045,402	$ 1,437,175	$ 59,676,051	$ 1,118,397	$ 1,114,112	$ 325,663	$ -	$ -	$ -	$ -	$ -	$ -
PS03 Digested Sludge Dewatering Facility DB	$ 64,320,000	$ 68,226,148	$ -	$ 2,942,452	$ 62,491,754	$ 987,395	$ 983,610	$ 820,937	$ -	$ -	$ -	$ -	$ -	$ -
PS05 Thermal Dryer Facility DB	$ 108,170,000	$ 132,007,525	$ -	$ -	$ -	$ -	$ -	$ 2,589,767	$ 25,661,374	$ 99,229,969	$ 1,887,211	$ 1,887,211	$ 751,993	$ -
PS07 Lagoons and Drying Bed Retirement	$ 26,860,000	$ 31,678,505	$ -	$ -	$ 573,950	$ 5,385,318	$ 5,935,126	$ 337,924	$ 5,882,322	$ 6,153,998	$ 339,226	$ 6,405,188	$ 337,925	$ 327,528
TOTAL	**$ 1,080,430,000**	**$ 1,236,622,850**	**$ 36,915,643**	**$ 71,559,183**	**$ 258,153,681**	**$ 110,830,442**	**$ 120,692,179**	**$ 131,592,215**	**$ 117,886,052**	**$ 186,291,557**	**$ 94,919,383**	**$ 99,523,194**	**$ 4,831,091**	**$ 3,428,230**
Group 2 - Initiate in Years 6-10														
PLD03 Final Effluent Pump Station & Stormwater Channel Improvements	$ 37,530,000	$ 46,488,947	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,995,342	$ 8,302,973	$ 34,976,640	$ 669,878	$ 544,114	$ -
PLF02 Alternative Filter Technology Field Verification	$ 2,600,000	$ 3,179,891	$ -	$ -	$ -	$ -	$ -	$ -	$ 164,511	$ 579,508	$ 2,339,460	$ 74,892	$ 21,520	$ -
PLS03 Aeration Basin Future Modifications	$ 36,990,000	$ 49,329,213	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,420,808	$ 7,746,554	$ 359,586	$ 9,552,365	$ 9,417,192	$ 20,832,708
PS02 Additional Digester Facility Upgrade	$ 50,230,000	$ 63,339,875	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,579,768	$ 10,295,790	$ 48,357,182	$ 767,033	$ 764,093	$ 576,009
PS04 FOG Receiving DB	$ 9,700,000	$ 11,858,308	$ -	$ -	$ -	$ -	$ -	$ -	$ 591,127	$ 10,613,523	$ 270,372	$ 270,372	$ 112,914	$ -
PS06 Greenhouse Demonstration	$ 9,050,000	$ 11,316,493	$ -	$ -	$ -	$ -	$ -	$ -	$ 278,963	$ 2,149,840	$ 8,377,619	$ 248,375	$ 247,422	$ 14,274
TOTAL	**$ 146,100,000**	**$ 185,512,727**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 7,030,519**	**$ 39,688,188**	**$ 94,680,859**	**$ 11,582,915**	**$ 11,107,255**	**$ 21,422,991**