COUNCIL AGENDA: 02-14-12
ITEM: 7.2

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Dennis Hawkins, CMC
City Clerk

SUBJECT: SEE BELOW

DATE: 2-8-12

SUBJECT: BIOSOLIDS TRANSITION – TIMELINE AND CIP DELIVERY APPROACH

RECOMMENDATION

As recommended by the Transportation and Environment Committee on February 6, 2012 and outlined in the attached memo previously submitted to the Transportation and Environment Committee:

(a) Accept the report on the capital project delivery approach for implementing the Plan CIP; and

(b) Direct staff to proceed with a Request for Information solicitation to determine market interest in Design Build, Design Build Operate, and Design Build Own Operate project delivery options for capital improvements using technology new to the City.

T&E: 02-06-12
ITEM: d(3)

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: TRANSPORTATION & ENVIRONMENT COMMITTEE

FROM: Kerrie Romanow
David Sykes

SUBJECT: **BIOSOLIDS TRANSITION - TIMELINE AND CIP DELIVERY APPROACH**

DATE: 01-17-12

Approved Date 1/27/12

RECOMMENDATION

1. Accept this report on the capital project delivery approach for implementing the Plant CIP;
2. Direct staff to proceed with a Request for Information solicitation to determine market interest in Design Build, Design Build Operate, and Design Build Own Operate project delivery options for capital improvements using technology new to the City; and
3. Cross-reference this item to the February 14, 2012 Council meeting for consideration.

OUTCOME

Approval of these recommendations will allow staff to continue procurement of engineering resources to implement the overall capital program to re-build the San Jose/Santa Clara Water Pollution Control Plant (Plant). It will also allow staff to further explore of Design Build options for priority projects, including alternative biosolids drying and energy solutions that assure a reliable power supply at the Plant and new facilities.

BACKGROUND

In April 2011, Council initiated the environmental review process for the Plant Master with the selection of a Plant Master Plan preferred alternative. In addition, Council directed staff to prioritize the implementation of odor reducing projects at the Plant and to perform an analysis on the feasibility of transitioning to a new biosolids process in three to seven years.

The recommended Plant Master Plan preferred alternative for capital improvement projects were based on six drivers:

1) Condition of the infrastructure

2) Regulatory requirements necessitating new or modified infrastructure
3) Economic benefit from modifying or replacing infrastructure in reduced operations and maintenance costs
4) Improved performance benefit in modifying or replacing existing infrastructure that improves reliability or treatment performance
5) Increased flows and loads that trigger the need for additional infrastructure
6) Policy decision triggers based on Council and stakeholder interests

A challenge to implementing Plant rehabilitation projects is effectively managing such a large initiative while keeping the current operations intact. While the Master Plan triggers inform when projects need to start, the feasibility of actual implementation depends on a wide variety of factors, such as: the availability of experienced staff resources for implementation; creation of redundancy in existing processes that would allow for the shut downs required; the re-distribution of incoming and outgoing wastewater flows to the Plant; and the mitigation of critical infrastructure failures that can result when the very limited existing Plant operational staff resources are diverted for capital projects. All of the above factors will limit the City's ability to deliver on long term project planning and implementation support needed to rehabilitate the Plant.

Over the last five years, the Plant has seen an unprecedented decline in staffing resources in all areas: engineering, operations and maintenance. At current engineering and supporting operations and maintenance staffing levels, capital project delivery has averaged about $20 million in expenditures per year over the last three years. To implement the Master Plan recommendations, the critical rehabilitation projects would average about $40 million a year. When combined with the accelerated biosolids transition, the total Plant capital outlay would require funding of about $100 million per year over the next five to seven years. The magnitude of this effort is risky and challenging, especially given the newer technology implementation for the biosolids transition and the disruptive nature of the critical rehabilitation projects to the everyday operations of the 24/7 Plant facility.

Another challenge is the financing of this effort. Attachment A shows the cash flow requirements needed to fund projects to meet these implementation timelines. Implementing the Plant's capital improvement program, as shown in the chart, requires considerable variability, in cash flow, from a low of less than $66,000,000 in a single year to a high of $133,000,000 per year in 2017 and 2018. Sustaining revenues on pay-as-you-go financing would create significant rate spikes for the residents and businesses in the Plant service area, potentially requiring rates to double in a single year.

ANALYSIS

To overcome these challenges, staff has developed a Capital Improvement Program (CIP) implementation strategy consistent with the goals and objectives of the Plant Master Plan preferred alternative which addresses the following objectives:

- Operational: Result in a reliable, flexible Plant that can respond to changing conditions
- Economical: Maximize economic benefits for customers through cost-effective options
- Environmental: Improve habitat and minimize impacts to the local and global environment
- Social: Maximize community benefits through improved aesthetics and recreational uses both for Plant neighbors and the public at large

Capital Improvement Program Delivery Strategy

Staff has developed a "Packaged Delivery" approach to delivering the capital projects recommended by the Plant Master Plan preferred alternative through 2040. This strategy is detailed in Attachment B and consists of three CIP "packages:"

- Package 1 - Includes the critical rehabilitation projects in the various processes areas such as the re-building of the headworks, rehabilitating and seismically upgrading the primary and secondary tanks, upgrading the corroding metallic components and machinery on the heating, cooling and ventilation systems, and electrical distribution systems upgrade. These projects are estimated to average $40 million a year over the next ten years.
- Package 2 – Includes projects that have the most significant impact to the current challenges faced by the Plant and have the largest impact in meeting the priorities set forth by the Plant Master Plan. These projects address the deteriorating power generation equipment, severe staffing shortages at the Plant, and odor impacts to the neighboring communities. Package 2 involves implementation of significant new technologies at an estimated cost on average of about $500,000,000 over seven years.
- Package 3 – Includes projects that are expected to exceed the ten to fifteen year implementation horizon and include estimated end of life replacement of existing infrastructure and new projects required to be implemented based on new regulatory drivers and/or changes in wastewater flows and volume loads. Total cost of these projects over the fifteen year period is estimated at $1.1 billion, with a highly variable annual average cost which is dependent on the regulatory requirements that would trigger these projects.

The remainder of this report reviews options for delivery of the nearer-term Package 1 and Package 2 CIP.

Package 1 Delivery Options

Package 1 projects rehabilitate existing processes and are therefore highly disruptive to Plant operations. They will require significant planning, coordination and oversight to ensure the Plant service is not interrupted and that there is not a spill or any violation of the Plant's discharge permits. These projects are typical of the Plant CIP implemented over the last five years using a standard Design/Bid/Build approach with consultant and other expert quality assurance and quality control resources. Staff is recommending that this approach be continued for Package 1

implementation. There may be opportunities for some projects under this package to be candidates for an alternative delivery approach such as Design/Build, and Environmental Services Department and Public Works staff will identify opportunities to take advantage of the benefits of Design/Build procurements. To ensure coordination with Plant operations, dedicated Plant operations and maintenance staff will be assigned to the engineering division of the Plant to provide site specific information, operational conditions and constraints, and shut down coordination to the consultants and engineering team. Funding for these projects is already programmed into the current adopted 5 – Year CIP and into proposed rate models, subject to council approval.

Package 2 Delivery Options

Package 2 projects include significant new technology implementation and provide significant potential for innovation and by extension cost savings and implementation schedule compression. Given this, staff has identified the following potential approaches to Package 2 CIP implementation:

- Design-Build (D/B): One contractor for both design and construction of a project, which was the method used to construct the Terminal Area Improvement Program at the Airport and is currently being used at the Convention Center.
- Design-Build-Operate (D/B/O): One contractor to design, construct, and operate the project, with the City retaining ownership of the constructed facilities.
- Design/Build/Own/Operate (D/B/O/O): Similar to D/B/O, except the City would not own the facility.

This package consists of the biosolids transition project which will transition the current open air drying process to mechanical dewatering and drying; energy generation projects which will replace the Plant's aging power generation equipment; and the filtration project which will replace the existing gravity bed filters with newer technology with the potential for much less staff resource needs for its operations. More detail on the state of energy infrastructure at the Plant and conceptual recommendations for replacement technologies will be presented at the March 5, 2012, Transportation and Environment Committee meeting. Due to the shorter timeline for implementation and the higher total costs for these projects, this package also could be considered for bond funding to mitigate the rate impact on users. Environmental Services staff is currently working with the Finance Department to identify the optimum financing options.

The magnitude and complexity of the transition to a new biosolids process for the Plant that treats the wastewater of 1.4 million people makes it one of the largest CIP projects by a public agency in the country. Staff engaged Carollo Engineers in October 2011 to determine if there are viable project delivery options for the biosolids project that could accelerate the timeline over the traditional design/bid/build method currently used at the Plant.

After reviewing potential technical issues for the D/B/B, D/B and D/B/O options, these approaches will be evaluated on several criteria, including:

- Schedule: opportunities to deliver the project in an accelerated timeline

- Financial Impacts: Capital and operations and maintenance costs, resulting rate impacts, and staffing needs
- Risks: operational performance, regulatory, compliance, design and construction flexibility to respond to changing conditions (compliance, disposal options)
- Control: level of City control, sustainability, quality

A final report including a comparison matrix is expected by mid-February after Public Works and Environmental Services Department staff complete the evaluation. This report will summarize the benefits and potential drawbacks of utilizing various alternate delivery options, with the primary emphasis on shortening the implementation schedule for the overall biosolids transition program. Compared to the traditional design/bid/build approach, all of the options highlighted above allow for a potentially shortened transition schedule, transfer the design risk to the contractor, and allow for a single point of responsibility. Some of these options may also provide cost savings and innovative solutions and reduced City staffing resources to implement.

Potential schedule constraints common to all of the service delivery options include:

1. Completion of the Environmental Impact Report (EIR) for the Plant Master Plan, including the biosolids transition project. Staff projects that the EIR will be completed by Spring 2013.
2. Site preparation of the legacy biosolids area that was identified for the future biosolids facilities (this area currently contains old biosolids that contain some elevated levels of metals): A recent analysis completed by the City identified three off-site disposal/reuse and two on-site disposal/reuse options for the legacy biosolids. The off-site options, which generally involve hauling material to disposal facilities, are extremely costly and time intensive due to the classification of the legacy biosolids as hazardous waste. On-site options are more cost-effective but could require up to four years to implement. As a result, the EIR analysis will include two preferred alternatives for the proposed biosolids facilities, in order to provide environmental clearance to move forward should this issue become a significant constraint on implementing the new biosolids process.
3. Final clean-up of existing lagoons and drying beds: Three years worth of biosolids is estimated to be in the lagoons and drying beds that will need to be treated and disposed following the installation of the new facilities. Options that will be investigated to determine the most efficient way to complete this task include: utilizing the current lagoon/drying bed process, using standby equipment from the new facility, or negotiating a short-term contract operations solution.
4. Staff resources and consultant availability to lead the transition, including contract management and procurement support, engineering specialties to review and ensure quality control: Environmental Services Department and Public Works staff is working collaboratively to address this staff resource and consultant availability issue through the creation of a "Packaged" approach to delivering the entire capital program at the Plant, not just the biosolids transition.

Staff is recommending direction to proceed with the necessary due diligence for all three Design/Build options for this package. If approved, the first step, in order to gauge industry interest in D/B, D/B/O, and D/B/O/O, would be a Request for Information (RFI) to solicit information and input regarding a future procurement process from the vendor community. Staff will report back to the Committee on the results of this effort in Fall 2012.

Staff and Consultant Resources for Implementing the CIP

In order to address Plant staffing challenges discussed earlier in the report, staff is recommending procurement of an overall program management consultant(s) to provide oversight and quality assurance/quality control over the consultant design and augment the limited City resources, especially for Package 1. Such a model of having distinct program management consultant(s) is consistent with the recently completed San Jose International Airport Expansion project, and other similar agencies' programs such as San Francisco Public Utilities Commission and Sacramento Regional County Sanitation District.

Most Package 1 projects will likely be implemented in a traditional D/B/B approach managed by a Division Manager directing a team of engineering staff and consultants. Program management support and technical expertise for the entire program will be provided by a combination of staff and specialty consultants. Approximately half of the staff resources needed are currently available within Environmental Services and Public Works. An additional Principal Engineer will be needed to provide technical expertise for the energy projects and another to provide leadership and technical guidance for automation projects. In addition to these positions, it is anticipated that two Senior Engineers and five Associate Engineers will be needed to manage the approximately 20 to 30 active projects a year in various phases of implementation. It is anticipated that this project workload will continue for a period of at least ten years.

Package 2 projects will be led by a Principal Engineer directing a small staff for each of the three project elements (biosolids, energy, and filtration). Initially during the procurement an additional Senior Engineer will be needed to assist in the procurement process. Once project design begins; this staff will be augmented by two additional Senior Engineers to manage the different project elements. Inspection, code review, surveying, materials testing and additional support will be added to the project through the yearly staffing plan developed by Public Works.

A functional organizational chart for the entire program with the staffing levels for various packages and support programs functions is shown in Attachment C.

Regional Solutions to Mitigate Cost of Alternative Biosolids Processing

Transition of the current low-cost biosolids drying technology to any other option will likely require an alternative disposal and/or beneficial reuse option for the dried biosolids, which are currently used at Newby Island Landfill adjacent to the Plant as an alternative daily landfill cover Reuse of the current material as cover works well because it contains 20% dirt from the clay-lined drying beds. Drying and disposal costs could account for up to 50% of the costs for the

new biosolids technology, depending on the option. To ensure the maximum options for biosolids disposal and/or reuse, staff is developing a proposal for Council consideration at a future date to join the Bay Area Biosolids to Energy Coalition, a joint effort by sixteen Bay Area wastewater agencies to develop sustainable waste to energy facilities for biosolids. The coalition invited San Jose to join at a reduced rate by accepting the City's Harvest Power pilot project, which will analyze the feasibility of gasifying woodwaste and biosolids, as part of San Jose's contribution. The benefits of joining the regional collaborative include leveraging resources for regional facilities, developing new technologies, and joint lobbying and grant writing to obtain funding. The Coalition plans to initiate a procurement process next year to construct one or more regional facilities that turn biosolids into energy.

EVALUATION AND FOLLOW-UP

The Committee, Council, and Treatment Plant Advisory Committee will receive regular updates on both the odor study and the biosolids transition process. Staff plans to return to Council in spring 2012 for consideration of a proposal for City participation in the Bay Area Biosolids to Energy Coalition.

PUBLIC OUTREACH/INTEREST

- ☐ **Criteria 1**: Requires Council action on the use of public funds equal to $1 million or greater.
  (Required: Website Posting)
- ☐ **Criteria 2:** Adoption of a new or revised policy that may have implications for public health, safety, quality of life, or financial/economic vitality of the City. **(Required: E-mail and Website Posting)**
- ☐ **Criteria 3:** Consideration of proposed changes to service delivery, programs, staffing that may have impacts to community services and have been identified by staff, Council or a Community group that requires special outreach. **(Required: E-mail, Website Posting, Community Meetings, Notice in appropriate newspapers)**

This report does not meet the criteria above. Direct engagement with the public and the Plant's many stakeholder groups has been an essential component in developing the Plant Master Plan over the past three years. When staff presented questions to the public at community meetings on the speed with which to both better treat odors at the Plant and change the biosolids dewatering and drying process, the public has consistently responded by saying that the Plant should begin the development of these processes but make sure not to overburden ratepayers. These results can be found in the Plant Master Plan public opinion summaries.

COORDINATION

This report has been coordinated with the City Attorney's Office, Department of Finance and the City Manager's Budget Office, and will be presented to the Treatment Plant Advisory Committee (TPAC) at its February 9, 2012 meeting.

CEQA

Not a Project, File No. PP10-069 (a) Staff Reports.

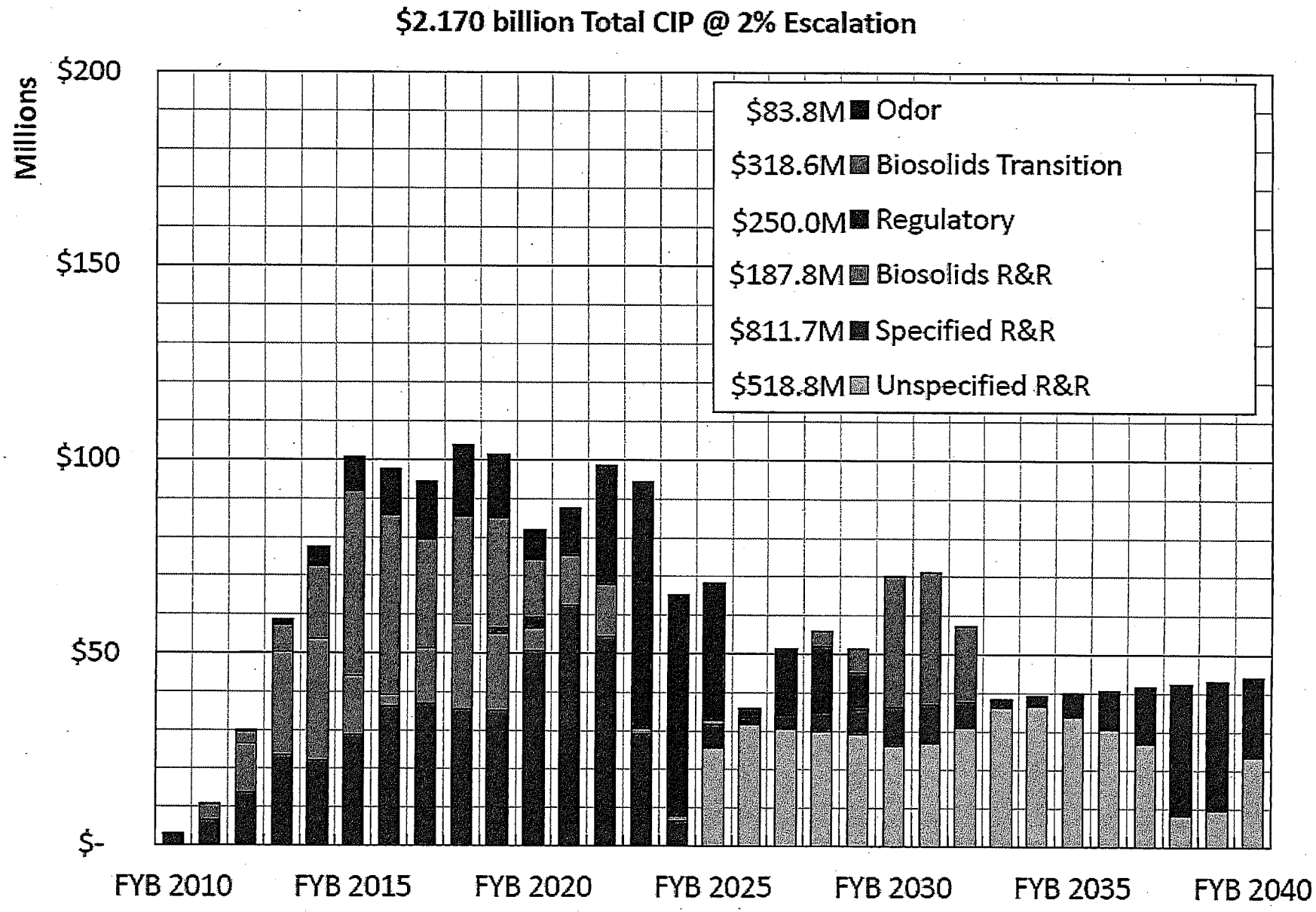
/s/
KERRIE ROMANOW
Acting Director, Environmental Services

/s/
DAVID SYKES
Director, Public Works

Attachment A: Annual Breakdown. (Draft)
Attachment B: Three Phases of the Plant Master Plan 30-year CIP and EIR linkage. (Draft)
Attachment C: Functional Organizational Chart

For questions, please contact Bhavani Yerrapotu, Deputy Director (ESD) at 945-5321 or Harry Freitas, Deputy Director (PW) at 535-8488.

Attachment A – Annual Breakdown from the Plant Master Plan

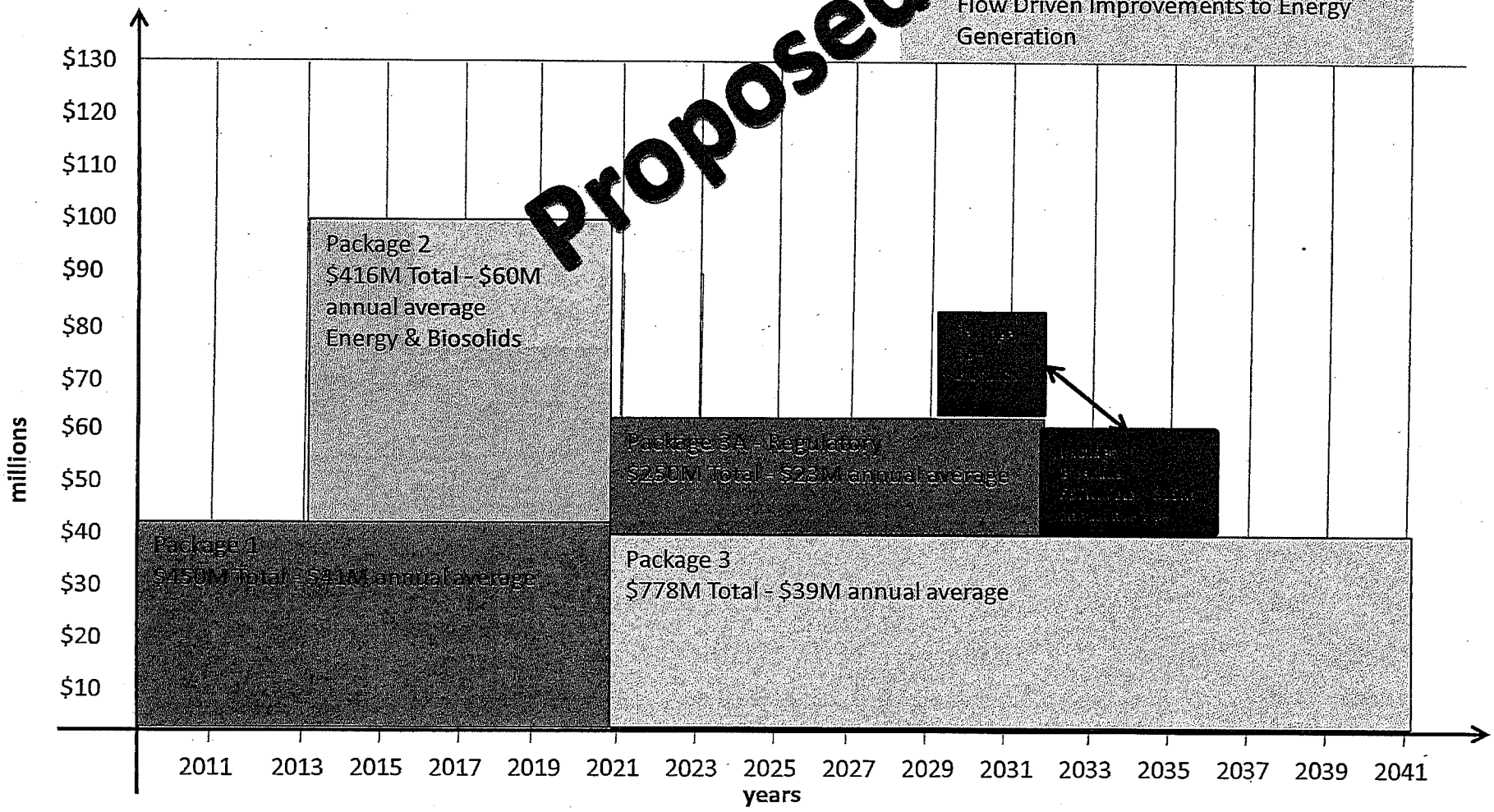


Attachment B - Three Phases of the Plant Master Plan 30-year CIP and EIR linkage

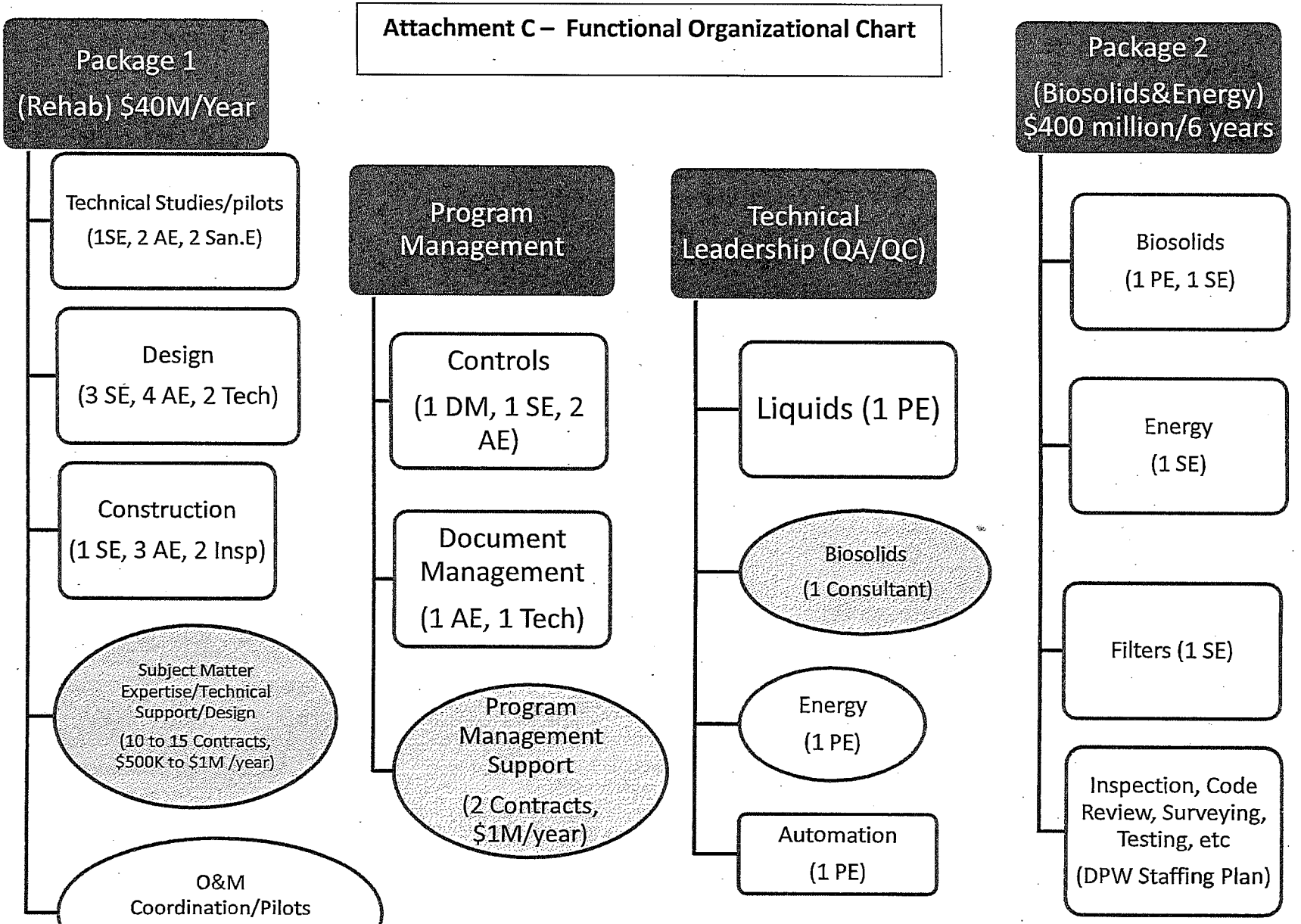
Package 1 (2011-2021)
$450M Current CIP
- Headworks Rehabilitation
- Primary Rehabilitation
- Secondary Rehabilitation
- Digester Rehabilitation
- Energy Distribution

Package 2 (2013-2021)
$416M Project Level
- Legacy Lagoon Clean-up
- Solids Dewatering and Drying
- Energy Generation
- Filter Reconstruction

Package 3 (2021-2040)
$1,124M Program Level
- Ongoing Repair and Rehabilitation
- Regulatory Driven Improvements to Secondary and Filtration ($250M from 2021 to 2029)
- Flow Driven Improvements to Solids Dewatering and Drying
- Flow Driven Improvements to Energy Generation



Attachment C – Functional Organizational Chart



Legend: SE – Senior Engineer; PE – Principal Engineer; DM – Division Manager; AE – Associate Engineer; San. E – Sanitary Engineer; Insp – Construction Inspector