Agenda Item

4

DATE: April 20, 2021

TO: Mayor Rhoades and City Council

FROM: John Wanger, City Engineer

SUBJECT: Request for Proposals (RFP) for Design of Improvements Associated with the WWTP Headworks Replacement, Irrigation Well and Interconnection with the Castle Oaks Water Reclamation Plant

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RECOMMENDED ACTION:

Provide direction to staff to issue the RFP to design professionals.

FISCAL IMPACT:

Based on the 2020 Water Balance Report, 3 capital projects were recommended for immediate attention. These included reconstruction of the WWTP Headworks, interconnection of the WWTP and the Castle Oaks Water Reclamation Plant (COWRP) and installation of a new irrigation well. The estimated combined design costs for all of these facilities is estimated to be approximately $206,000.

BACKGROUND:

In March 2021, the Council approved the 2020 Water Balance Report. In that report, several capital projects were identified; however, three of the projects were higher priority due to the potential cessation of ARSA water in 2022. The 3 projects include projects 1, 2 and 4 as identified in Revised Table 10-1 from the Report as shown below.

REVISED TABLE 10-1 CIP COST ESTIMATES		
Priority Projects		
Project	Estimated Cost	
1. Irrigation Well[1]	$	296,000
2. Replacement of Existing Headworks at the WWTP	$	1,905,120
3. COWRP Plant Rehabilitation	$	1,584,225
4. Interconnection of the WWTP and COWRP and Effluent Pump Station	$	295,000
5. Town Field Tailwater Modifications	$	857,000
Subtotal Priority Projects	**$**	**4,937,345**
Contingent Projects		
Project	Estimated Cost	
6. Lining Ponds 6 and 7	$	2,297,000
7. City Field Reservoir (Pond 8 @ 50 ac-ft)	$	5,045,000
8. Effluent Disinfection	$	864,000
9. Preston Reservoir Connection to WWTP	$	6,101,000
10. Additional Storage[2] (589 ac-ft)	$	22,264,000
Subtotal Contingent Projects	**$**	**36,571,000**

[1] The 2016 Wilson Report provided an estimated cost for this project. The estimated cost from the 2016 Wilson Report was updated using ENR Construction Cost Index from 2013 to 2020. Therefore, no detailed cost estimate is provided in the appendix for the Irrigation Well project.

[2] This estimate is only for the construction of the additional storage pond. The estimated cost does not include land acquisition, pipeline, or easement costs.

Detailed costs estimates for each of the prjoects are located in Appendix D of the 2020 Water Balance Report.

Upon acceptance of the report by the Council, the Wastewater Committee recommended moving forward with the design of the improvements associated with projects 1, 2 and 4. Accordingly, staff has prepared the attached RFP.

The RFP proposed to include all 3 of the projects into one overall design contract. If the Council authorizes release of this RFP, staff will solicit the RFP to at least 4 to 6 known qualfied consultants. The anticipated schedule for the project is as follows:

- Release of RFP: April 23, 2021
- Proposals from consultants due: May 21, 2021
- Complete evaluation of proposals: June 2, 2021
- Award of Design Contract: June 15, 2021

Design should be able to be completed in the first quarter of 2022. This would allow construction bids to be solicited around March 2022 and construction could commence in May or June 2022.

Attachments:

Request for Proposal

CITY OF IONE
PUBLIC WORKS DEPARTMENT

REQUEST FOR PROPOSAL

WASTEWATER TREATMENT PLANT HEADWORKS UPGRADE, INTERCONNECTION AND IRRIGATION WELL PROJECT

City of Ione
P.O. Box 398
1 E. Main Street
Ione, CA 95640
(209) 274-2412

PROPOSAL DUE May 21, 2021 at 4 p.m.

CITY OF IONE
REQUEST FOR PROPOSAL
WASTEWATER TREATMENT PLANT
HEADWORKS UPGRADE, INTERCONNECTION AND IRRIGATION WELL PROJECT

I. INTRODUCTION

The City of Ione (City) is soliciting proposals for engineering design service for a project combining 3 distinct components, all associated with the City's Wastewater collection system.

The City currently operates two distinctly different wastewater treatment plants. The original treatment plant (WWTP) that handles effluent from the City's population and treats it to a secondary level with no disinfection. Treated wastewater from this plant is disposed of by a combination of percolation ponds as well as spray irrigation on two different fields (the Town field and the City Field.) The headworks at the WWTP has reached the end of its useful life and needs to be replaced and upgraded.

The second wastewater plant is the Castle Oaks Water Reclamation Plant (COWRP). The COWRP was originally constructed to provide irrigation to the Castle Oaks Golf Course. Effluent flowing into the COWRP comes from a combination of the Mule Creek State Prison (transmits treated secondary effluent) and Amador Regional Sanitation Authority (ARSA) (transmits treated secondary effluent from Sutter Creek and surrounding areas through a pipeline that empties into Preston Reservoir.) The flows from both the prison and ARSA combine into a single pipe south of the Preston Reservoir and are transmitted to the COWRP. The contract with the prison allows the City to accept up to 350 acre-feet of effluent annually and the contract from ARSA allows for the City to accept up to 650 acre-feet of effluent annually.

In 2017 the City of Ione informed ARSA that starting in 2022, Ione no longer would be accepting ARSA flows. To better understand the impacts that cessation of the ARSA flows will have on the overall system, the City commissioned that a water balance report be completed. The Water Balance Update and 2020 Capacity Expansion Completion Report was prepared by Coastland Civil Engineering and was approved by the City Council in March 2021. A copy of the report is attached as Exhibit C to this RFP.

The Water Balance Update report discovered that once ARSA flows stop, flows from the prison will not be sufficient to meet the golf course's irrigation needs. The report evaluated several options and concluded that in order to provide adequate flows into the COWRP to meet golf course irrigation needs, the City needs to interconnect the WWTP and the COWRP allowing secondary treated water from the WWTP to be pumped to the COWRP for tertiary treatment. Additionally, the City currently has commitments to provide irrigation to both the Town Field and City Field for growing alfalfa. The Water Balance Update report also discovered that in order to meeting the irrigation needs of the Golf Course, the Town Field and the City Field, it is anticipated that flows from the

prison and the City may not be sufficient to meet all of the irrigation needs. According, the City wishes to install an irrigation well on the WWTP property to provide supplemental water when needed for irrigation.

Based on these needs identified in the Water Balance Report, the City is desiring to retain the services of a consultant to develop construction documents for three projects The three projects include:

- Replacement of the Headworks in the existing Wastewater Treatment Plant (WWTP) – the existing headworks at the WWTP is aged and hydraulically undersized. Plant Operations staff have had to implement bypass pumping during wet weather events to handle influent flows. This project will increase the capacity of the headworks to handle wet weather flows and future influent to the treatment plant. Envisioned improvements include a rehabilitated flume channel and grinder pump station, installation of a vertical screen (none currently in operation), influent pumps, screen wet well, pump wet well, and updates to instrumentation and controls. The estimated cost (including soft costs) for replacement of the headworks is $1.9M.

- Interconnection of the WWTP and the Castle Oaks Water Reclamation Plant (COWRP) - this portion of the project will allow stored, secondary treated effluent to be pumped from the WWTP to the Castle Oaks Water Reclamation Plant (COWRP) for tertiary treatment. This project element provides redundant supply the ability to treat secondary effluent from the Ione WWTP for use at the Castle Oaks Golf Course during dry seasons. The estimated cost for this portion of the project is $295,000. This estimate is based on the following assumptions:

    - The existing effluent pump station at the WWTP provides adequate pumping capacity to send effluent to the COWRP.
    - The existing 12" PVC pipe between the WWTP and the COWRP is suitable for use as a force main. Just to note, this line is currently configured with valving to allow water from Mule Creek State Prison and the Amador Regional Sanitation Agency to go to either the COWRP or the WWTP, but the City has not used this line to pump water from the WWTP to the COWRP. Adequacy of the line for this new configuration needs to be done.
    - Assuming the existing line can be used, the only additional piping needed would be to connect the effluent pump station to the existing line at the junction structure between Ponds 4 and 5 (approx. 750 LF.) Additional valving and controls would need to be installed to allow for automation of this operation through SCADA.
    - The COWRP can function on an intermittent backwash cycle to allow the line to be used for flow in both directions between the two plants.

  As part of their preliminary engineering phase, the consultant should perform the detailed engineering analysis to determine the adequacy of the existing pump

station and 12" PVC line to serve this purpose and identify any improvements which may be needed if deficiencies are found.

The timing of this project should allow construction to begin late spring of 2022.

- Irrigation Well - This project would provide the City with an alternative irrigation water source to be used in a dry year, when not enough effluent is produced to meet the City's irrigation demand. The well would only be used during dry seasons and months where water produced from the treatment plants can not sufficiently cover the irrigation demand. This estimated cost for this project is $296,000.

II. PROJECT OVERVIEW

The City of Ione is issuing this Request for Proposal (RFP) for the purpose of identifying a qualified consultant/team that can assist the City with Wastewater Treatment Plan Headworks Upgrade, Interconnection and Irrigation Well Project (the "Project").

The work includes preparation of plans, specifications and estimates for replacing the headworks at the WWTP, interconnecting the WWTP and the COWRP, and installation of an irrigation well, all which have been described in Section I of this RFP.

The successful consultant (or consultant team) will have a strong background in design of wastewater treatment facilities and the 3 components of the project as described in this RFP, sensitively to local and regulatory issues, and experience with similar projects.

a) Supporting Material

- Exhibit A – detailed scope of work and background information
- Exhibit B – example Professional Services Agreement
- Exhibit C – "Water Balance Update and 2020 Capacity Expansion Completion Report" dated March 2020.
- Exhibit D - Waste Discharge Requirements (Order R5-2014-0166).

III. CONTACT PERSON

Questions regarding this RFP may be directed to the following person:
John Wanger
City Engineer
City of Ione
(707) 495-5201
wanger@coastlandcivil.com

IV. SCOPE OF SERVICES

The consultant's overall responsibility and scope of work is to provide construction management, inspection and administration services during the construction phase of the Project.

The scope of work shall include tasks described in the attached Exhibit "A", Scope of Services, as well as other elements or modifications which may be suggested by consultants presenting proposals to better meet the needs of the City. All services shall be provided in accordance with the City's standard Professional Services Agreement and general provisions attached as Exhibit "B" to this request for proposal.

V. INSURANCE REQUIREMENTS

The insurance requirements are set forth in the City's Professional Services Agreement and general provisions as attached on Exhibit "B".

VI. MINIMUM REQUIREMENTS

- Consultant shall have demonstrated experience working with municipalities or local agencies.
- Consultant shall have demonstrated experience working with regulatory agencies.
- Consultant shall demonstrate that they have experience in at least 3 like projects in the last 5 years.
- Consultant and subconsultants shall have ability to obtain the insurance policies and coverage limited included as part of the attached Professional Services Agreement.

VII. PROPOSAL SUBMITTAL REQUIREMENTS

Written proposals shall include, at a minimum, the following items:

a) Cover Letter

The cover letter, which should be signed by an official authorized to bind the consultant, shall include the following:

- Identification of consultant and any subconsultants;
- Brief overview of qualifications of consultant; and
- Contact information (address, phone and e-mail)

b) Project Understanding and Approach

Describe your understanding of the project goals and your approach to meeting the task objectives outlined in this RFP. Include a narrative of potential challenges and what special services your firm has to meet the City's needs for this Project.

c) **Project Team**
Identify all personnel who will be assigned to work on this project and include a description of their abilities, qualifications and experience. Identify any subconsultants and a description of their qualifications and experience.

d) **Project Work Plan**
Explain in detail your proposed work plan, including all anticipated tasks along with any supplemental tasks (those not specifically identified in this RFP) you deem necessary for successful completion of this project.

e) **Fee Proposal**
Propose a fee proposal based on an hourly rate schedule with a "not to exceed" maximum cost for all work identified in the Scope of Services. Include a copy of your firm's current itemized hourly rate fee schedule. Indicate if travel time and mileage will be charged. Include any sub-consultant cost. Provide a breakdown of the proposed fee by task in accordance with the tasks defined in the consultants proposed Work Plan. Direct costs should be identified separately.

f) **References**
Provide a list of similar projects completed by the consultant under which services similar to those required by this RFP were performed. Include a brief description of the services, dates the services were provided, and name and telephone number of references familiar with the services provided.

g) **Exceptions**
Identify any exceptions you are proposing with respect to the Scope of Services. The City's insurance requirements and/or the City's contract provisions.

VIII. DEADLINE and DELIVERY

One (1) digital copy (PDF) of the proposal must be submitted to:
Janice Traverso
City Clerk
City of Ione
Email: ctyclk@ione-ca.com

The deadline for submittal of a proposal is **May 21, 2021 at 4:00 p.m.** No information submitted by will be accepted unless otherwise required by the City during the proposal review process. Proposals received after the deadline will not be accepted.

IX. REVIEW PROCESS

Written proposals submitted by the deadline will be evaluated based upon the following criteria:

- Demonstrated understanding of the work to be done

- Experience with similar projects
- Qualifications and experience of key personnel
- Quality and thoroughness of proposed Work Plan

These items are not listed in order of importance. Based on evaluation of submitted proposals, a list of the top-qualified consultants will be established. Selected consultants may be requested to participate in an oral interview, although this is not anticipated. The City reserves the right to select the top-ranked consultant based solely on the written proposal. If for any reason an acceptable contract cannot be negotiated with the top-ranked consultant, negotiations will commence with the next-ranked firm.

X. GENERAL TERMS and CONDITIONS

- The City reserves the right to reject any and all proposals.
- The City is not responsible for any costs incurrent by respondents in the preparation and submittal of a response to this RFP.
- The City reserves the right to modify or withdraw all or a portion of the scope of work for this project at any time.
- All responses to this RFP shall be the property of the City.

OVERALL SITE PLAN

CITY OF IONE
CITY OF IONE WASTEWATER PLANT AND COWRP

OVERALL SITE PLAN
FIGURE 1

EXHIBIT A
SCOPE OF SERVICES
WASTEWATER TREATMENT PLANT
HEADWORKS UPGRADE, INTERCONNECTION AND IRRIGATION WELL PROJECT

The proposal should be organized into five main sections:

- Section 1 – Preliminary Engineering.
- Section 2 – Project Design, PS&E
- Section 3 – Bidding Assistance
- Section 4 – Construction Support
- Section 5 - Optional Services

The consultant will need flow and treatment capacity information to complete the work requested in this RFP. To help fulfill these needs, the consultant should examine the "Water Balance Update and2020 Capacity Expansion Completion Report", dated March 2021 attached as Exhibit A and the Waste Discharge Requirements (Order R5-2013-XXX) attached as Exhibit . Any supplemental work the consultant recommends to further develop flow and/or capacity information for their work should be clearly stated in their proposal.

The scope of work is focused on three project elements. Each element is outlined below.

PROJECT ELEMENT 1 – IRRIGATION WELL: This portion of the project is the development of an irrigation well on the City's Wastewater Treatment Plant (WWTP) site. The purpose of this well is to provide supplemental irrigation water for the Castle Oaks Golf Course (COGC) and the irrigation of the crops on the Town Field (Figure 1) during periods when treated effluent is not available in quantities sufficient to meet irrigation demands. The pumping rate required to meet the irrigation demands of the COGC are roughly approximated to be 1,250 gpm. The irrigation needs of the Town Field are roughly approximated to be 450 gpm. This well would have the potential secondary benefit of reducing groundwater mounding in the area surrounding the existing percolation ponds at the WWTP. There is a stock pond south of the percolation ponds that was used to temporarily used to irrigate the Town Field, however the long-term viability of using this pond for supplemental irrigation is not known, as yields at the time of the temporary irrigation of the Town Field were less than 1,000 gpm. The consultant should consider both the installation of a new well and the potential use of the stock pond and recommend the highest value option to the City. The construction cost for this project has been preliminarily estimated to be is $296,000.

In the preliminary engineering phase for Element 1, the consultant should include:

- Site Assessment:
    - Determine the condition, capacity and potential for utilizing the stock pond for reliable irrigation purposes.
        - The scope should include pumping to determine its safe yield capacity as an option.

- Calculate the estimate dry year irrigation capacity needs for the COGC and Town Field and supply deficit in dry years.
- Determine improvements required to deliver well water to COGC and Town Field or otherwise ensure adequate irrigation supply is available to each.

Timing of this portion of the project would be to be under construction or completed construction by July 1, 2022.

PROJECT ELEMENT 2 – REPLACE EXISTING HEADWORKS: The existing headworks at the Ione Wastewater Treatment Plant is aged and hydraulically undersized. Plant Operations staff have had to implement bypass pumping during wet weather events to handle influent flows. This project will increase the capacity of the headworks to handle wet weather flows and future influent to the treatment plant. Envisioned improvements include a rehabilitated flume channel and grinder pump station, installation of a vertical screen (none currently in operation), influent pumps, screen wet well, pump wet well, and updates to instrumentation and controls. This previously estimated cost for this project is $1.9M, but no detailed design has been done to validate this cost estimate.

The City's WDRs as currently written require the recirculation of all stormwater runoff year-round from the land application areas back to storage or percolation. The current system recirculates these tailwater flows back to the headworks. Although the City will be pursuing getting the WDRs amended to only require recirculation of any stormwater runoff within 30 days of any irrigation, as an alternative the City is also interested in a future project to route these tailwater flows back to storage rather than through the headworks. These flows should be accounted for separately to help the City determine the impact and costs associated with treating these flows. This portion of work should be considered an optional task

In the preliminary engineering phase for Element 2, the consultant should include:

- Site Assessment.
- Determination of sizing criteria including:
    - Current design wet-weather flows,
    - Projected wet weather flows for 2045,
    - Peak wet weather flows from the Town Field tailwater recirculation system.
- Recommend most appropriate design for new headworks system.
- Recommended approach for processing influent flows during construction.

The timing of this work should be as soon as possible.

PROJECT ELEMENT 3 - INTERCONNECTION OF WWTP AND COWRP AND EFFLUENT PUMP STATION: This portion of the project will allow stored, secondary treated effluent to be pumped from the WWTP to the Castle Oaks Water Reclamation Plant (COWRP) for tertiary treatment. This project element provides redundant supply the ability to treat secondary effluent from the Ione WWTP for use at the COGC during dry seasons.

The estimated cost for this project is $295,000. This estimate is based on the following assumptions:

- The existing effluent pump station at the WWTP provides adequate pumping capacity to send effluent to the COWRP.
- The existing 12" PVC pipe between the WWTP and the COWRP is suitable for use as a force main. Just to note, this line is currently configured with valving to allow water from Mule Creek State Prison and the Amador Regional Sanitation Agency to go to either the COWRP or the WWTP, but the City has not used this line to pump water from the WWTP to the COWRP. Adequacy of the line for this new configuration needs to be done.
- Assuming the existing line can be used, the only additional piping needed would be to connect the effluent pump station to the existing line at the junction structure between Ponds 4 and 5 (approx. 750 LF.) Additional valving and controls would need to be installed to allow for automation of this operation through SCADA.
- The COWRP can function on an intermittent backwash cycle to allow the line to be used for flow in both directions between the two plants.

As part of their preliminary engineering phase, the consultant should perform the detailed engineering analysis to determine the adequacy of the existing pump station and 12" PVC line to serve this purpose and identify any improvements which may be needed if deficiencies are found.

The timing of this project should allow construction to begin late spring of 2022.

PRELIMINARY ENGINEERING

The Preliminary Engineering Phase is intended to aid the City in determining the scope, schedule, and estimated cost of each element of the Project. The items listed above should be included as well as any additional items the consultant believes are important to helping the City make informed decisions about these project elements. The results of this task should be included in a Technical Memorandum. The consultant should plan on two cycles of submittal/City review/revision and resubmittal of the Technical Memorandum.

In addition to the Element-specific items outlined above, the consultant should also include the following items for each project element as part of the Preliminary Engineering Phase:

- Preliminary construction cost estimate.
- Preliminary project schedule.

In the Preliminary Engineering Phase, the Consultant should plan and budget for attendance of up to three meetings with City staff to review work progress and design issues. The Consultant should plan and budget for attendance and making a presentation at one Wastewater Committee meeting and one City Council meeting.

PROJECT DESIGN, PLANS, SPECIFICATIONS AND ESTIMATES (PS&E)

Following approval by the City of the Technical Memorandum and any deletions, modifications, or additions to the scope of work, the Consultant shall prepare PS&E documents including improvement plans, specifications, and engineer's estimate. For the

purpose of preparing their proposal, the consultant should assume that any improvements required to distribute irrigation water not located on the City's WWTP site are not included and will be added later if desired buy the City through an amendment to the Agreement.

Surveying should be included as part of the PS&E phase. Submittals should be made to the City for review at 65%, 90% and 100% design stage. Construction cost estimates shall be included with each submittal. The 65% submittal should include an outline of the technical specifications. Complete technical specifications should be submitted with the 90% and final submittals. The City will provide the front-end specifications that the Consultant is to incorporate with their technical specifications.

The Consultant should provide the final PS&E documents in a bid-ready form. Final specifications shall be delivered to the City in both MS Word and PDF formats. Plans shall be submitted electronically in both PDF and AutoCAD drawing files.

The Proposal should also include adequate staffing and budget to provide monthly progress and budget status reports to be included with monthly invoices.

BIDDING ASSISTANCE

The proposal shall include assistance during bidding as optional services. These services may include clarifications to the City and potential bidders and issuance of addenda.

CONSTRUCTION SUPPORT

The proposal shall include also include engineering support during construction. These services may include submittal review, RFI response, change order review, field reviews, preparation of Record Drawings based on records kept by the contractor and the construction manager/inspector, and other support services requested by the City.

OPTIONAL SERVICES

The proposal shall include the optional services identified above for Project Element 1. The consultant should also include engineering support to the City in processing a revised Report of Waste Discharge necessitated by the project. The Consultant may also include any additional services they would like the City to consider as part of this Project.

EXHIBIT "B"

AGREEMENT FOR PROFESSIONAL SERVICES

This Agreement is made and entered into as of the __ day of _____, 2021, by and between the City of Ione, a municipal corporation ("City") and _____ ("Consultant").

RECITALS

A. Consultant is trained, experienced and competent to perform the special services which will be required by this Agreement; and

B. Consultant possesses the skill, experience, ability, background, certification and knowledge to provide the services described in this Agreement on the terms and conditions described herein.

C. City desires to retain Consultant to render professional services as set forth in this Agreement and as authorized by Government Code section 37103.

AGREEMENT

1. *Scope of Services.* Consultant shall perform the services described on Exhibit A which is attached hereto and incorporated herein by reference. Consultant shall provide said services at the time, place, and in the manner specified in Exhibit A, subject to the direction of the City through its staff that it may provide from time-to-time.

2. *Time of Performance.* The services of Consultant are to commence upon execution of this Agreement and shall continue until all authorized work is approved by the City. All such work shall be completed on a schedule to be directed by the City.

3. *Compensation.* Compensation to be paid to Consultant shall be in accordance with the Scope of Services, Project Budget and Fee Schedule set forth in Exhibit A and attachments thereto, which is attached hereto and incorporated herein by reference. In no event shall Consultant's compensation exceed $_____ without additional authorization from the City. Payment by City under this Agreement shall not be deemed a waiver of defects, even if such defects were known to the City at the time of payment.

4. *Method of Payment.* Consultant shall submit monthly billings to City describing the work performed during the preceding month. Consultant's bills shall include a brief description of the services performed, the date the services were performed, the number of hours spent and by whom, and a description of any reimbursable expenditures. City shall pay Consultant no later than thirty (30) days after approval of the monthly invoice by City staff. When payments made by City equal ninety percent (90%) of the maximum fee provided for in this Agreement, no further

payments shall be made until the final work under this Agreement has been accepted by City.

5. *Extra Work.* At any time during the term of this Agreement, City may request that Consultant perform Extra Work. As used herein, "Extra Work" means any work which is determined by City to be necessary for the proper completion of the Project, but which the parties did not reasonably anticipate would be necessary at the execution of this Agreement. Consultant shall not perform, nor be compensated for, Extra Work without written authorization from City.

6. *Termination.* This Agreement may be terminated by the City immediately for cause or by either party without cause upon fifteen (15) days' written notice of termination. Upon termination, Consultant shall be entitled to compensation for services performed up to the effective date of termination.

7. *Ownership of Documents.* All plans, studies, documents and other writings prepared by and for Consultant, its officers, employees and agents and subcontractors in the course of implementing this Agreement, except working notes and internal documents, shall become the property of the City upon payment to Consultant for such work, and the City shall have the sole right to use such materials in its discretion without further compensation to Consultant or to any other party. Consultant shall, at Consultant's expense, provide such reports, plans, studies, documents and other writings to City upon written request. [i]

8. *Consultant's Books and Records.*

a. Consultant shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services, or expenditures and disbursements charged to City for a minimum period of three (3) years, or for any longer period required by law, from the date of final payment to Consultant to this Agreement.

b. Consultant shall maintain all documents and records which demonstrate performance under this Agreement for a minimum period of three (3) years, or for any longer period required by law, from the date of termination or completion of this Agreement.

c. Any records or documents required to be maintained pursuant to this Agreement shall be made available for inspection or audit, at any time during regular business hours, upon written request by the City Manager, City Attorney, City Finance Director or a designated representative of these officers. Copies of such documents shall be provided to the City for inspection at City Hall when it is practical to do so. Otherwise, unless an alternative is mutually agreed upon, the records shall be available at Consultant's address indicated for receipt of notices in this Agreement.

d. Where City has reason to believe that such records or documents may be lost or discarded due to dissolution, disbandment or termination of Consultant's

business, City may, by written request by any of the above named officers, require that custody of the records be given to the City and that the records and documents be maintained in City Hall. Access to such records and documents shall be granted to any party authorized by Consultant, Consultant's representatives, or Consultant's successor-in-interest.

9. *Independent Contractor.* It is understood that Consultant, in the performance of the work and services agreed to be performed, shall act as and be an independent contractor and shall not act as an agent or employee of the City. Consultant shall obtain no rights to retirement benefits or other benefits which accrue to City's employees, and Consultant hereby expressly waives any claim it may have to any such rights.

10. *Interest of Consultant.* Consultant (including principals, associates and professional employees) covenants and represents that it does not now have any investment or interest in real property and shall not acquire any interest, direct or indirect, in the area covered by this Agreement or any other source of income, interest in real property or investment which would be affected in any manner or, degree by the performance of Consultant's services hereunder. Consultant further covenants and represents that in the performance of its duties hereunder no person having any such interest shall perform any services under this Agreement.

Consultant is not a designated employee within the meaning of the Political Reform Act because Consultant:

a. will conduct research and arrive at conclusions with respect to his/her rendition of information, advice, recommendation or counsel independent of the control and direction of the City or of any City official, other than normal agreement monitoring; and

b. possesses no authority with respect to any City decision beyond rendition of information, advice, recommendation or counsel. (FPPC Reg. 18701).

11. *Professional Ability of Consultant.* City has relied upon the professional training and ability of Consultant to perform the services hereunder as a material inducement to enter into this Agreement. Consultant shall therefore provide properly skilled professional and technical personnel to perform all services under this Agreement. All work performed by Consultant under this Agreement shall be in accordance with applicable legal requirements and shall meet the standard of care or quality that is expected of competent professionals in Consultant's field of expertise.

12. *Compliance with Laws.* Consultant shall use the standard of care in its profession to comply with all applicable federal, state and local laws, codes, ordinances and regulations.

13. *Licenses.* Consultant represents and warrants to City that it has all licenses, permits, qualifications, insurance and approvals of whatsoever nature which are

legally required of Consultant to practice its profession. Consultant represents and warrants to City that Consultant shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Agreement, any licenses, permits, insurance and approvals which are legally required of Consultant to practice its profession. Consultant shall maintain a City business license.

14. *Indemnity.* Consultant agrees to defend, indemnify, and hold harmless the City, its officers, officials, agents, employees and volunteers from and against claims, demands, actions, losses, damages, injuries, and liability, direct or indirect (including reasonable costs and expenses in connection therein), arising out of the negligent performance of this Agreement or its failure to comply with any of its obligations contained in this Agreement, or any reckless or willful misconduct of Consultant, except for any such claim arising out of the willful misconduct or active negligence of the City, its officers, agents, employees or volunteers.

15. *Insurance Requirements.*

a. Consultant, at Consultant's own cost and expense, shall procure and maintain, for the duration of the contract, the following insurance policies:

i. *Workers' Compensation Coverage.* Consultant shall maintain Workers' Compensation Insurance and Employer's Liability Insurance for his/her employees in accordance with the laws of the State of California. In addition, Consultant shall require each subcontractor to similarly maintain Workers' Compensation Insurance and Employer's Liability Insurance in accordance with the laws of the State of California for all of the subcontractor's employees. Any notice of cancellation or non-renewal of all Workers' Compensation policies must be received by the City at least thirty (30) days prior to such change. The insurer shall agree to waive all rights of subrogation against City, its officers, agents, employees and volunteers for losses arising from work performed by Consultant for City.

ii. *General Liability Coverage.* Consultant shall maintain commercial general liability insurance in an amount not less than one million dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage. If a commercial general liability insurance form or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the work to be performed under this Agreement or the general aggregate limit shall be at least twice the required occurrence limit.

iii. *Automobile Liability Coverage.* Consultant shall maintain automobile liability insurance covering bodily injury and property damage for all activities of the Consultant arising out of or in connection with the work to be performed under this Agreement, including coverage for owned, hired and non-owned vehicles, in an amount of not less than one million dollars ($1,000,000) combined single limit for each occurrence.

iv. *Professional Liability Coverage.* Consultant shall maintain

professional errors and omissions liability insurance for protection against claims alleging negligent acts, errors or omissions which may arise from Consultant's operations under this Agreement, whether such operations are conducted by the Consultant or by its employees, subcontractors, or sub-consultants. The amount of this insurance shall not be less than one million dollars ($1,000,000) on a claims-made annual aggregate basis, or a combined single-limit per occurrence basis.

b. *Endorsements.* Each general liability and automobile liability insurance policy shall be with insurers possessing a Best's rating of no less than A:VII and shall be endorsed with the following specific language:

i. The City, its elected or appointed officers, officials, employees, agents and volunteers are to be covered as additional insureds with respect to liability arising out of work performed by or on behalf of the Consultant, including materials, parts or equipment furnished in connection with such work or operations.

ii. This policy shall be considered primary insurance as respects the City, its elected or appointed officers, officials, employees, agents and volunteers. Any insurance maintained by the City, including any self-insured retention the City may have shall be considered excess insurance only and shall not contribute with it.

iii. This insurance shall act for each insured and additional insured as though a separate policy had been written for each, except with respect to the limits of liability of the insuring company.

iv. The insurer waives all rights of subrogation against the City, its elected or appointed officers, officials, employees or agents.

v. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its elected or appointed officers, officials, employees, agents or volunteers.

vi. The insurance provided by this policy shall not be suspended, voided, canceled, or reduced in coverage or in limits except after thirty (30) days written notice has been received by the City.

c. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions must be declared to and approved by the City. At the City's option, Consultant shall demonstrate financial capability for payment of such deductibles or self-insured retentions.

d. Certificates of Insurance. Consultant shall provide certificates of insurance with original endorsements to City as evidence of the insurance coverage required herein. Certificates of such insurance shall be filed with the City on or before commencement of performance of this Agreement. Current certification of

insurance shall be kept on file with the City at all times during the term of this Agreement.

16. Notices. Any notice required to be given under this Agreement shall be in writing and either served personally or sent prepaid, first class mail. Any such notice shall be addressed to the other party at the address set forth below. Notice shall be deemed communicated within 48 hours from the time of mailing if mailed as provided in this section.

If to City:

City of Ione
Attn: City Manager
P.O. Box 398
1 E. Main Street
Ione, CA 95640

If to Consultant:

17. *Entire Agreement.* This Agreement constitutes the complete and exclusive statement of Agreement between the City and Consultant. All prior written and oral communications, including correspondence, drafts, memoranda, and representations, are superseded in total by this Agreement.

18. *Amendments.* This Agreement may be modified or amended only by a written document executed by both Consultant and City and approved as to form by the City Attorney.

19. *Assignment and Subcontracting.* The parties recognize that a substantial inducement to City for entering into this Agreement is the professional reputation, experience and competence of Consultant. Except as described in the Scope of Services attached as Exhibit A hereto, assignments of any or all rights, duties or obligations of the Consultant under this Agreement will be permitted only with the express consent of the City. Except as described in the Scope of Services attached as Exhibit A hereto, Consultant shall not subcontract any portion of the work to be performed under this Agreement without the written authorization of the City. If City consents to such subcontract, Consultant shall be fully responsible to City for all acts or omissions of the subcontractor. Nothing in this Agreement shall create any contractual relationship between City and subcontractor nor shall it create any obligation on the part of the City to payor to see to the payment of any monies due to any such subcontractor other than as otherwise is required by law.

20. *Waiver.* Waiver of a breach or default under this Agreement shall not constitute a continuing waiver of a subsequent breach of the same or any other provision under this Agreement.

21. *Severability.* If any term or portion of this Agreement is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

22. *Controlling Law Venue.* This Agreement and all matters relating to it shall be governed by the laws of the State of California and any action brought relating to this Agreement shall be held exclusively in a State court in the County of Amador.

23. *Litigation Expenses and Attorneys' Fees.* If either party to this Agreement commences any legal action against the other party arising out of this Agreement, the prevailing party shall be entitled to recover its reasonable litigation expenses, including court costs, expert witness fees, discovery expenses, and attorneys' fees.

24. *Mediation.* The parties agree to make a good faith attempt to resolve any disputes arising out of this Agreement through mediation prior to commencing litigation. The parties shall mutually agree upon the mediator and shall divide the costs of mediation equally. If the parties are unable to agree upon a mediator, the dispute shall be submitted to JAMS/ENDISPUTE ("JAMS") or its successor in interest. JAMS shall provide the parties with the names of five qualified mediators. Each party shall have the option to strike two of the five mediators selected by JAMS and thereafter the mediator remaining shall hear the dispute. If the dispute remains unresolved after mediation, either party may commence litigation.

25. *Execution.* This Agreement may be executed in several counterparts, each of which shall constitute one and the same instrument and shall become binding upon the parties when at least one copy hereof shall have been signed by both parties hereto. In approving this Agreement, it shall not be necessary to produce or account for more than one such counterpart.

26. *Authority to Enter Agreement.* Consultant has all requisite power and authority to conduct its business and to execute, deliver, and perform the Agreement. Each party warrants that the individuals who have signed this Agreement have the legal power, right, and authority to make this Agreement and to bind each respective party.

27. *Prohibited Interests.* Consultant maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure this Agreement. Further, Consultant warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability .For the term of this Agreement, no member, officer or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

28. *Equal Opportunity Employment.* Consultant represents that it is an equal opportunity employer and it shall not discriminate against any subcontractor, employee or applicant for employment because of race, religion, color, national origin, handicap, ancestry, sex or age. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed on the date first written above.

CITY OF IONE:

By:_____
Mayor/City Manager

_____

CONSULTANT:

By: _____
Title:

Business License #_____

APPROVED AS TO FORM:

By: _____
City Attorney

Attachment:

Exhibit A -Scope of Services

EXHIBIT "B"

AGREEMENT FOR PROFESSIONAL SERVICES

This Agreement is made and entered into as of the __ day of _____, 2021, by and between the City of Ione, a municipal corporation ("City") and _____ ("Consultant").

RECITALS

A. Consultant is trained, experienced and competent to perform the special services which will be required by this Agreement; and

B. Consultant possesses the skill, experience, ability, background, certification and knowledge to provide the services described in this Agreement on the terms and conditions described herein.

C. City desires to retain Consultant to render professional services as set forth in this Agreement and as authorized by Government Code section 37103.

AGREEMENT

1. *Scope of Services.* Consultant shall perform the services described on Exhibit A which is attached hereto and incorporated herein by reference. Consultant shall provide said services at the time, place, and in the manner specified in Exhibit A, subject to the direction of the City through its staff that it may provide from time-to-time.

2. *Time of Performance.* The services of Consultant are to commence upon execution of this Agreement and shall continue until all authorized work is approved by the City. All such work shall be completed on a schedule to be directed by the City.

3. *Compensation.* Compensation to be paid to Consultant shall be in accordance with the Scope of Services, Project Budget and Fee Schedule set forth in Exhibit A and attachments thereto, which is attached hereto and incorporated herein by reference. In no event shall Consultant's compensation exceed $_____ without additional authorization from the City. Payment by City under this Agreement shall not be deemed a waiver of defects, even if such defects were known to the City at the time of payment.

4. *Method of Payment.* Consultant shall submit monthly billings to City describing the work performed during the preceding month. Consultant's bills shall include a brief description of the services performed, the date the services were performed, the number of hours spent and by whom, and a description of any reimbursable expenditures. City shall pay Consultant no later than thirty (30) days after approval of the monthly invoice by City staff. When payments made by City equal ninety percent (90%) of the maximum fee provided for in this Agreement, no further

payments shall be made until the final work under this Agreement has been accepted by City.

5. *Extra Work.* At any time during the term of this Agreement, City may request that Consultant perform Extra Work. As used herein, "Extra Work" means any work which is determined by City to be necessary for the proper completion of the Project, but which the parties did not reasonably anticipate would be necessary at the execution of this Agreement. Consultant shall not perform, nor be compensated for, Extra Work without written authorization from City.

6. *Termination.* This Agreement may be terminated by the City immediately for cause or by either party without cause upon fifteen (15) days' written notice of termination. Upon termination, Consultant shall be entitled to compensation for services performed up to the effective date of termination.

7. *Ownership of Documents.* All plans, studies, documents and other writings prepared by and for Consultant, its officers, employees and agents and subcontractors in the course of implementing this Agreement, except working notes and internal documents, shall become the property of the City upon payment to Consultant for such work, and the City shall have the sole right to use such materials in its discretion without further compensation to Consultant or to any other party. Consultant shall, at Consultant's expense, provide such reports, plans, studies, documents and other writings to City upon written request. [i]

8. *Consultant's Books and Records.*

a. Consultant shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services, or expenditures and disbursements charged to City for a minimum period of three (3) years, or for any longer period required by law, from the date of final payment to Consultant to this Agreement.

b. Consultant shall maintain all documents and records which demonstrate performance under this Agreement for a minimum period of three (3) years, or for any longer period required by law, from the date of termination or completion of this Agreement.

c. Any records or documents required to be maintained pursuant to this Agreement shall be made available for inspection or audit, at any time during regular business hours, upon written request by the City Manager, City Attorney, City Finance Director or a designated representative of these officers. Copies of such documents shall be provided to the City for inspection at City Hall when it is practical to do so. Otherwise, unless an alternative is mutually agreed upon, the records shall be available at Consultant's address indicated for receipt of notices in this Agreement.

d. Where City has reason to believe that such records or documents may be lost or discarded due to dissolution, disbandment or termination of Consultant's

business, City may, by written request by any of the above named officers, require that custody of the records be given to the City and that the records and documents be maintained in City Hall. Access to such records and documents shall be granted to any party authorized by Consultant, Consultant's representatives, or Consultant's successor-in-interest.

9. *Independent Contractor.* It is understood that Consultant, in the performance of the work and services agreed to be performed, shall act as and be an independent contractor and shall not act as an agent or employee of the City. Consultant shall obtain no rights to retirement benefits or other benefits which accrue to City's employees, and Consultant hereby expressly waives any claim it may have to any such rights.

10. *Interest of Consultant.* Consultant (including principals, associates and professional employees) covenants and represents that it does not now have any investment or interest in real property and shall not acquire any interest, direct or indirect, in the area covered by this Agreement or any other source of income, interest in real property or investment which would be affected in any manner or, degree by the performance of Consultant's services hereunder. Consultant further covenants and represents that in the performance of its duties hereunder no person having any such interest shall perform any services under this Agreement.

Consultant is not a designated employee within the meaning of the Political Reform Act because Consultant:

a. will conduct research and arrive at conclusions with respect to his/her rendition of information, advice, recommendation or counsel independent of the control and direction of the City or of any City official, other than normal agreement monitoring; and

b. possesses no authority with respect to any City decision beyond rendition of information, advice, recommendation or counsel. (FPPC Reg. 18701).

11. *Professional Ability of Consultant.* City has relied upon the professional training and ability of Consultant to perform the services hereunder as a material inducement to enter into this Agreement. Consultant shall therefore provide properly skilled professional and technical personnel to perform all services under this Agreement. All work performed by Consultant under this Agreement shall be in accordance with applicable legal requirements and shall meet the standard of care or quality that is expected of competent professionals in Consultant's field of expertise.

12. *Compliance with Laws.* Consultant shall use the standard of care in its profession to comply with all applicable federal, state and local laws, codes, ordinances and regulations.

13. *Licenses.* Consultant represents and warrants to City that it has all licenses, permits, qualifications, insurance and approvals of whatsoever nature which are

legally required of Consultant to practice its profession. Consultant represents and warrants to City that Consultant shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Agreement, any licenses, permits, insurance and approvals which are legally required of Consultant to practice its profession. Consultant shall maintain a City business license.

14. *Indemnity.* Consultant agrees to defend, indemnify, and hold harmless the City, its officers, officials, agents, employees and volunteers from and against claims, demands, actions, losses, damages, injuries, and liability, direct or indirect (including reasonable costs and expenses in connection therein), arising out of the negligent performance of this Agreement or its failure to comply with any of its obligations contained in this Agreement, or any reckless or willful misconduct of Consultant, except for any such claim arising out of the willful misconduct or active negligence of the City, its officers, agents, employees or volunteers.

15. *Insurance Requirements.*

a. Consultant, at Consultant's own cost and expense, shall procure and maintain, for the duration of the contract, the following insurance policies:

i. *Workers' Compensation Coverage.* Consultant shall maintain Workers' Compensation Insurance and Employer's Liability Insurance for his/her employees in accordance with the laws of the State of California. In addition, Consultant shall require each subcontractor to similarly maintain Workers' Compensation Insurance and Employer's Liability Insurance in accordance with the laws of the State of California for all of the subcontractor's employees. Any notice of cancellation or non-renewal of all Workers' Compensation policies must be received by the City at least thirty (30) days prior to such change. The insurer shall agree to waive all rights of subrogation against City, its officers, agents, employees and volunteers for losses arising from work performed by Consultant for City.

ii. *General Liability Coverage.* Consultant shall maintain commercial general liability insurance in an amount not less than one million dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage. If a commercial general liability insurance form or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the work to be performed under this Agreement or the general aggregate limit shall be at least twice the required occurrence limit.

iii. *Automobile Liability Coverage.* Consultant shall maintain automobile liability insurance covering bodily injury and property damage for all activities of the Consultant arising out of or in connection with the work to be performed under this Agreement, including coverage for owned, hired and non-owned vehicles, in an amount of not less than one million dollars ($1,000,000) combined single limit for each occurrence.

iv. *Professional Liability Coverage.* Consultant shall maintain

professional errors and omissions liability insurance for protection against claims alleging negligent acts, errors or omissions which may arise from Consultant's operations under this Agreement, whether such operations are conducted by the Consultant or by its employees, subcontractors, or sub-consultants. The amount of this insurance shall not be less than one million dollars ($1,000,000) on a claims-made annual aggregate basis, or a combined single-limit per occurrence basis.

b. *Endorsements.* Each general liability and automobile liability insurance policy shall be with insurers possessing a Best's rating of no less than A:VII and shall be endorsed with the following specific language:

i. The City, its elected or appointed officers, officials, employees, agents and volunteers are to be covered as additional insureds with respect to liability arising out of work performed by or on behalf of the Consultant, including materials, parts or equipment furnished in connection with such work or operations.

ii. This policy shall be considered primary insurance as respects the City, its elected or appointed officers, officials, employees, agents and volunteers. Any insurance maintained by the City, including any self-insured retention the City may have shall be considered excess insurance only and shall not contribute with it.

iii. This insurance shall act for each insured and additional insured as though a separate policy had been written for each, except with respect to the limits of liability of the insuring company.

iv. The insurer waives all rights of subrogation against the City, its elected or appointed officers, officials, employees or agents.

v. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its elected or appointed officers, officials, employees, agents or volunteers.

vi. The insurance provided by this policy shall not be suspended, voided, canceled, or reduced in coverage or in limits except after thirty (30) days written notice has been received by the City.

c. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions must be declared to and approved by the City. At the City's option, Consultant shall demonstrate financial capability for payment of such deductibles or self-insured retentions.

d. Certificates of Insurance. Consultant shall provide certificates of insurance with original endorsements to City as evidence of the insurance coverage required herein. Certificates of such insurance shall be filed with the City on or before commencement of performance of this Agreement. Current certification of

insurance shall be kept on file with the City at all times during the term of this Agreement.

16. Notices. Any notice required to be given under this Agreement shall be in writing and either served personally or sent prepaid, first class mail. Any such notice shall be addressed to the other party at the address set forth below. Notice shall be deemed communicated within 48 hours from the time of mailing if mailed as provided in this section.

If to City:	City of Ione Attn: City Manager P.O. Box 398 1 E. Main Street Ione, CA 95640

If to Consultant:

17. *Entire Agreement.* This Agreement constitutes the complete and exclusive statement of Agreement between the City and Consultant. All prior written and oral communications, including correspondence, drafts, memoranda, and representations, are superseded in total by this Agreement.

18. *Amendments.* This Agreement may be modified or amended only by a written document executed by both Consultant and City and approved as to form by the City Attorney.

19. *Assignment and Subcontracting.* The parties recognize that a substantial inducement to City for entering into this Agreement is the professional reputation, experience and competence of Consultant. Except as described in the Scope of Services attached as Exhibit A hereto, assignments of any or all rights, duties or obligations of the Consultant under this Agreement will be permitted only with the express consent of the City. Except as described in the Scope of Services attached as Exhibit A hereto, Consultant shall not subcontract any portion of the work to be performed under this Agreement without the written authorization of the City. If City consents to such subcontract, Consultant shall be fully responsible to City for all acts or omissions of the subcontractor. Nothing in this Agreement shall create any contractual relationship between City and subcontractor nor shall it create any obligation on the part of the City to payor to see to the payment of any monies due to any such subcontractor other than as otherwise is required by law.

20. *Waiver.* Waiver of a breach or default under this Agreement shall not constitute a continuing waiver of a subsequent breach of the same or any other provision under this Agreement.

21. *Severability.* If any term or portion of this Agreement is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

22. *Controlling Law Venue.* This Agreement and all matters relating to it shall be governed by the laws of the State of California and any action brought relating to this Agreement shall be held exclusively in a State court in the County of Amador.

23. *Litigation Expenses and Attorneys' Fees.* If either party to this Agreement commences any legal action against the other party arising out of this Agreement, the prevailing party shall be entitled to recover its reasonable litigation expenses, including court costs, expert witness fees, discovery expenses, and attorneys' fees.

24. *Mediation.* The parties agree to make a good faith attempt to resolve any disputes arising out of this Agreement through mediation prior to commencing litigation. The parties shall mutually agree upon the mediator and shall divide the costs of mediation equally. If the parties are unable to agree upon a mediator, the dispute shall be submitted to JAMS/ENDISPUTE ("JAMS") or its successor in interest. JAMS shall provide the parties with the names of five qualified mediators. Each party shall have the option to strike two of the five mediators selected by JAMS and thereafter the mediator remaining shall hear the dispute. If the dispute remains unresolved after mediation, either party may commence litigation.

25. *Execution.* This Agreement may be executed in several counterparts, each of which shall constitute one and the same instrument and shall become binding upon the parties when at least one copy hereof shall have been signed by both parties hereto. In approving this Agreement, it shall not be necessary to produce or account for more than one such counterpart.

26. *Authority to Enter Agreement.* Consultant has all requisite power and authority to conduct its business and to execute, deliver, and perform the Agreement. Each party warrants that the individuals who have signed this Agreement have the legal power, right, and authority to make this Agreement and to bind each respective party.

27. *Prohibited Interests.* Consultant maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Consultant, to solicit or secure this Agreement. Further, Consultant warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Consultant, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability .For the term of this Agreement, no member, officer or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

28. *Equal Opportunity Employment.* Consultant represents that it is an equal opportunity employer and it shall not discriminate against any subcontractor, employee or applicant for employment because of race, religion, color, national origin, handicap, ancestry, sex or age. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed on the date first written above.

CITY OF IONE:

By:_____
Mayor/City Manager

_____

CONSULTANT:

By: _____
Title:

Business License #_____

APPROVED AS TO FORM:

By: _____
City Attorney

Attachment:

Exhibit A -Scope of Services

EXHIBIT C

Water Balance Update and 2020 Capacity Expansion Completion Report

Prepared For:

City of Ione, CA

March 2021

COASTLAND

CIVIL ENGINEERING - CONSTRUCTION MANAGEMENT - BUILDING DEPARTMENT SERVICES

Santa Rosa
1400 Neotomas Avenue
Santa Rosa, CA 95405
Tel: 707.571.8005

Auburn
11641 Blocker Drive, Ste. 170
Auburn, CA 95603
Tel: 530.888.9929

Pleasant Hill
3478 Buskirk Avenue, Ste. 1000
Pleasant Hill, CA 94523
Tel: 925.233.5333

Fairfield
324 Campus Lane, Ste. A
Fairfield, CA 94534
Tel: 707.702.1961

www.coastlandcivil.com

INTRODUCTION

In 2016, the City of Ione retained Dexter Wilson Engineering, Inc. to prepare a report to fulfil the requirements of RWQCB Order R5-2014-0166 certifying that among other things, all improvements needed to provide sufficient treatment, storage and disposal capacity for projected flows through 2020 have been completed. This report, entitled "City of Ione 2020 Capacity Expansion Completion Report" was completed in December 2016 (hereafter referred to as the "2016 Wilson Report"). A copy of the 2016 Wilson Report is included in Appendix A.

In addition to fulfilling the requirements of Order R5-2014-0166, the 2016 Wilson Report also included flow projections and water balance performance for the proposed system through 2039. Since the completion of the 2016 Wilson Report, changes have taken place that impact the results as presented in that Report. These changes include:

- Discovery of increased pond depths of Ponds 1-4 during installation of the liners resulting in the need to modify storage quantities as presented in the 2016 Wilson Report.
- Changes to Amador Water Agency (AWA) flows into the WWTP (although changes were presented as estimated in the report, actual flow numbers are now available.)
- The proposed cessation of Amador Regional Sanitation Authority (ARSA) flows in 2022 (although some assumptions were made in the 2016 report, an official cessation date has been issued by the City of Ione to ARSA since the report was completed.)
- Since December 2016, a number of new homes have been occupied and flows into the WWTP need to be updated.
- The option to send some of the City's treated wastewater to Woodard Bottom is still an option to consider; however, California Department of Corrections has yet to secure the necessary permits from CVRWQCB to operate the facilities. Additional options need to be developed assuming Woodard Bottom may not be a possible option.

In addition to the changes to the background data used in the 2016 Wilson Report, there are also other recent factors affecting the capacity of the system that should also be evaluated. These are as follows:

- Ione has given ARSA written notice terminating their flows to the Ione system. With the cessation of ARSA flows in 2022, the City would like to explore the improvements needed and performance of the system if Ione was to pump treated wastewater to the Preston Reservoir for storage. Although this option was discussed in the 2016 Wilson Report, it doesn't appear that full considerations were made with respect to the viability of this option, as well as costs for installing a pump station, cleaning Preston Reservoir and other issues.
- Connection of the WWTP and the COWRP has been discussed in the past; however, a detailed look at what improvements would be needed has not been done.

- The 2016 Wilson Report did not present costs for many needed capital improvement projects including replacement of the existing headworks, installation of disinfection facilities, pump station costs for sending effluent to either the COWRP and/or Preston Reservoir and possible connections to the COWRP. These costs need to be included, as they may have an impact on rates and/or long-term capital project planning and financing. An overall capital improvement project strategy and cost forecasting is needed.
- The California Department of Corrections and Rehabilitation (CDCR) has filed a new Report of Waste Discharge (ROWD) for the Mule Creek State Prison (MCP) showing a substantially reduced average dry weather flow and reduced needs for treated effluent storage and disposal.
- We recently learned that ARSA executed a lease of State facilities including the use of Preston Reservoir in 2009[1] which appears to give ARSA exclusive rights to the use of Preston Reservoir through 2038. This may preclude the City's planned utilization of Preston Reservoir for storage.

The purpose of this update of the 2016 Wilson Report is to consider the effect of these changes to the storage and disposal capacity of the system. Water quality and treatment capacities were not reviewed or updated.

As this is an update to the 2016 Wilson Report, the body of this 2020 Update is organized in similar fashion with sections dedicated to updating the content of each of the 10 chapters of the 2016 Wilson Report. We have also added an overview to section 9 – Wet Weather Storage to highlight the inter-relationship between various elements of the current system to help inform decision makers in the future about how contemplated changes to the storage or disposal system may impact other elements and the overall performance of the system.

UPDATE SUMMARY

The updated water balance model shows that the system as currently configured has the capacity required to handle present-day 100-year wet season flows. This critical wet season scenario requires the joint use of percolation ponds 6 and 7 and assumes that the discharge to one of the percolation ponds is stopped no later than March 20th to provide for the semi-annual drying and disking which is critical to ensuring the long-term percolation capacity of these ponds.

Assuming no changes are made to the flows, the current system (i.e. ARSA flows do not cease), and the operation of the system as described above, the model predicts a storage deficit of up to 19 ac-ft for the 100-year wet season in 2039. Assuming ARSA flows to the system cease in 2022 as planned, the storage deficit drops to zero with the system operated as described above. Neither of these scenarios require the use of Preston Reservoir by the City.

[1] Ground Lease L-2070 between State of California and ARSA dated January 1, 2009 attached as Appendix A.

The planned cessation of ARSA flows will represent a significant change to the system. In order to provide for the irrigation needs of the golf course, the Ione WWTP system will have to be connected to the COWRP. Even with this connection and additional water supply from the Ione WWTP, there will not be enough water available during normal years in the months of June, July and August to meet the combined irrigation needs of the Golf Course and Town Field. If additional water is not available from CDCR (above their 350 ac-ft commitment), the installation of an irrigation well to supply the Town Field's needs would be required.

The use of Preston Reservoir by the City would only be potentially feasible if ARSA flows stopped and the City were able to acquire the rights to use it. During the preparation of this Update, we learned that ARSA executed a lease of State facilities including the use of Preston Reservoir in 2009[2]. This Agreement appears to give ARSA exclusive rights to the use of Preston Reservoir through 2038. Our modeling indicates that the use of Preston as a component of the storage/disposal system generally provides less flexibility for the City than the irrigation well described above. Provided the City is able to continue to use ponds 6 and 7 as percolation ponds, Preston Reservoir has little if any value to the City in the operation of their storage and disposal system.

The successful operation of the City's current storage and disposal system is highly dependent on the continued use of Ponds 6 and 7 for percolation. If the RWQCB requires these ponds to be lined, the system fails even in a current, normal year scenario. Assuming these ponds are lined and ARSA flows are eliminated, the current system would have a storage deficit of 193 ac-ft in a normal year and 306 ac-ft in a 100-year wet season. The same scenarios in 2039 would have a storage deficit of 472 ac-ft in a normal year and 589 ac-ft in a 100-year wet season. It should be noted as well that in the scenarios with Ponds 6 and 7 lined, the water balance model shows substantial volumes of carryover effluent still in storage going into the subsequent year. Although the system would meet permit requirements for the single year scenarios typically required to be run, it would likely fail in the subsequent year without additional disposal capacity. Carryover volumes for the 2019 100-year wet season were estimated to be 102 ac-ft and would increase to 542 ac-ft in 2039.

If Ponds 6 and 7 are required to be lined, it is clear that the City would need to purchase land and design and construct sufficient storage to meet its current 100-year wet season needs prior to the lining of the Ponds. The storage deficiency created by the lining of Ponds 6 and 7 would be 306 acre-feet (assuming ARSA flows cease) in the near term. The storage deficit under this scenario would increase to 589 ac-ft in the 2039. A sizeable portion of the short-term storage needs under this scenario could be met by the unrestricted use of Preston Reservoir by the City if available. However, Preston's 235 acre-feet capacity alone is insufficient to completely meet the City's current storage needs if Ponds 6 and 7 are lined. Pond 8 (converting the City Field to a storage reservoir) had been previously identified. However, our analysis has concluded that the small footprint available at the City Field would only accommodate a storage capacity of

[2] Ground Lease L-2070 between State of California and ARSA dated January 1, 2009 attached as Appendix B.

approximately 50 ac-ft for Pond 8 and the costs to convert the City Field to storage would be extremely high. It is therefore clear that the City would need to acquire a suitable site and construct a large amount of additional storage if Ponds 6 and 7 are required to be lined.

The requirement in the 2014 amendment of the WDRs to capture and recirculate all *storm water runoff* from the LAAs also created significant impacts on the water balance. Our modeling shows that this requirement adds approximately 100 ac-ft of water to storage and adds the same amount to the overall disposal needs. We are not aware of the background and reasoning for this requirement but based on our experience, it is very unusual.

RECOMMENDATIONS

Based on this update to the 2016 Wilson Report and analysis of the updated water balance model, we recommend the City pursue the following action items as soon as possible:

1. Pursue Amendment to WDRs to eliminate the requirement for recirculation of stormwater runoff from LAA's.
    a. In the event the City expects the WDR's requirement for recirculation of stormwater runoff from Town Field in winter months to remain in effect, construct the improvements required to send this tailwater to the storage ponds instead of the headworks. (See Table 10-1, CIP Project 9, "Town Field Tailwater Modifications")
2. The City earnestly pursue addressing any concerns from the RWQCB related to the use of percolation as a disposal method to ensure the long-term use of Ponds 6 and 7 for percolation.
3. Assuming ARSA flows will cease:
    a. Proceed with the design and construction of the infrastructure required to send effluent from the Ione WWTP to the COWRP as soon as possible to provide adequate supply for the Castle Oaks Golf Course prior to the cessation of ARSA flows (See Table 10-1, CIP Project 6, "Interconnection of the WWTP and COWRP and Effluent Pup Station"), and
    b. Install an irrigation well at a suitable location of the WWTP site to provide the supplemental water needed to meet the combined irrigation demands of the Castle Oaks Golf Course and Town Field in peak summer months (See Table 10-1, CIP Project 2, "Irrigation Well").
4. Pursue modification of the discharge agreement with CDCR to define their discharge period to the COWRP as June 1st through September 30th.
5. The City <u>not</u> pursue conversion of the City Field to storage due to the high cost, low storage volume, and corresponding loss of disposal capacity.

In the event Ponds 6 and 7 are required to be lined, the City will need to do both of the following:

1. Identify and secure a suitable site to construct additional storage. The current storage deficit for the 100-year wet season would be 306 ac-ft and would increase to 589 ac-ft of additional storage needed in 2039. (See Table 10-1, CIP Project 10, "Additional Storage"), and
2. Identify and secure a suitable site for additional disposal to eliminate wet season carryover storage in multiple year scenarios. Additional disposal volumes would be 102 ac-ft for the 2019 100-year wet season and increase to 542 ac-ft in 2039.

2016 WILSON REPORT UPDATE

CHAPTER 1: INTRODUCTION

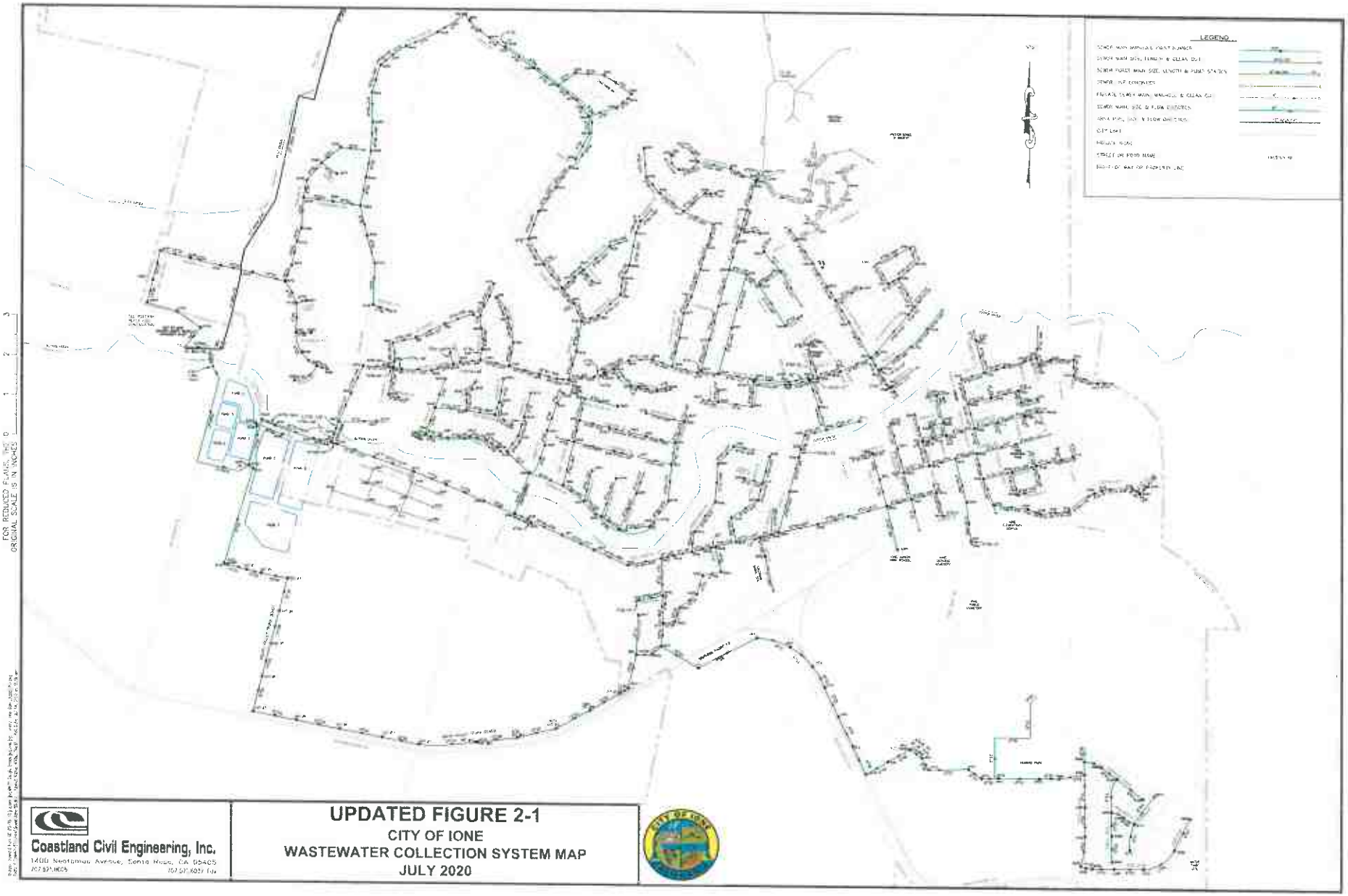
This 220 Update incorporates some minor changes to the BACKGROUND section of the 2016 Wilson Report. The 2016 Wilson Report was based on RWQCB Order R5-2014-0166. However, Order R5-2014-0166 included a significant change to the City's Waste Discharge Requirements WDRs) that the 2016 Wilson Report did not consider. Order R5-2014-0166 changed Specification F.4 effectively removing the provision allowing the discharge of stormwater from the LAAs and added a requirement to Water Recycling Specification G.11 requiring that "All storm water runoff from the LAAs shall be captured and recycled for irrigation or allowed to percolate within the use areas." The additional wet weather flows associated with this requirement were not included in the 2016 Wilson Report. This 2020 Update includes these additional flows, labeled elsewhere in this Report as "Town Field Tailwater Flows, or TFTW" in the water balance.

In this 2020 Update, we have also made slight reductions in the pan evaporation data to reflect evaporation rates expected in the 100-year wet season instead of using evaporation from an average year. Flow data has also been updated where additional information is now available to expand the data set and provide for more accurate estimates of current and projected flows. These changes are discussed in more detail in Chapter 6.

CHAPTER 2: EXISTING FACILITIES

Collection System

The 2016 Wilson Report lists the collection system as consisting of approximately 24 miles of gravity pipe, one mile of force main, and four lift stations. The City's sewer base maps were recently updated, and actual measurements made. The length of collection system gravity piping was 21.9 miles in 2019. Figure 2-1, which was a map of the collection system, has been updated and is shown below.



Coastland Civil Engineering, Inc.
1400 Neotomas Avenue, Santa Rosa, CA 95405
707.571.8005 707.571.8037 Fax

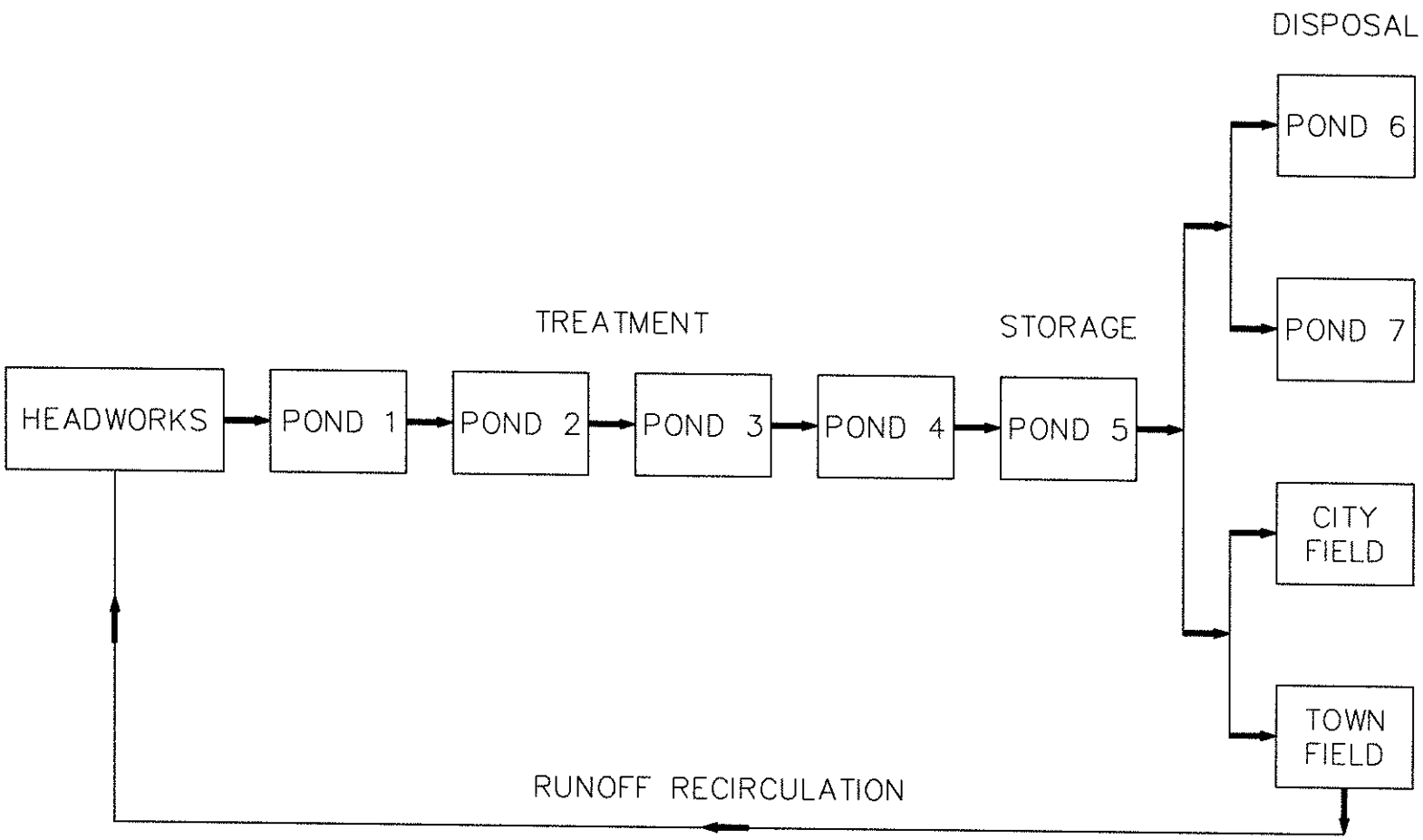
UPDATED FIGURE 2-1

CITY OF IONE
WASTEWATER COLLECTION SYSTEM MAP
JULY 2020

FOR REDUCED PLANS, THE 0 1 2 3 ORIGINAL SCALE IS IN INCHES

City of Ione Wastewater Treatment Plant

As discussed above, the WDRs as currently amended require the recirculation of all stormwater runoff year-round from the LAA's back to storage or percolation. Process Flow Diagram, Figure 2-2 has been updated to reflect this requirement. This would permit the TFTW flows to be routed to Pond 5. These flows however are currently routed to the headworks and contribute substantially to the wet weather capacity issues there.



REVISED FIGURE 2-2

IONE WWTP

PROCESS FLOW DIAGRAM

2020 CAPACITY EXPANSION COMPLETION REPORT

Since the completion of the 2016 Wilson Report, Treatment Ponds 1-4 were lined. During the pond lining project, surveying was completed of the as-built conditions of Ponds 1-5. All of these ponds were found to have slightly different capacities than what was shown in the 2016 Wilson Report. Of note, the 2016 Wilson report assumed side slop and depth assumptions based on known information from treatment plant operators and were not based on actual field surveys. The field surveys conducted with the pond lining project reflect actual as-built field conditions.. Accordingly, Table 2-1 has been updated to reflect the as-built capacity of these treatment ponds.

REVISED TABLE 2-1
TREATMENT PONDS

Pond	Depth[1]	Water Surface Area[1] (acres)	Volume[1] (MG)	Pond Bottom Elevation[1] (feet, msl)	Aeration Capacity, hp[2]
1	10.0	1.49	2.99	265	30.0
2	10.0	1.24	2.18	265	27.5
3	9.0	0.99	1.76	266	17.5
4	10.0	2.01	3.83	265	7.5
TOTAL			**10.76**		

[1] Depth, volume, area, and elevation info from Ponds 1-5 lining project as-built survey. Area and volume reported are assuming a maximum water surface elevation of 273' which provides 2-feet of freeboard from maximum water surface to the bank elevation of 275'.
[2] Aeration Capacity taken directly from Dexter Wilson report.

Pond 5 has also been lined since the completion of the 2016 Wilson Report. We have therefore updated Table 2-2 to show Pond 5 as a lined storage pond rather than a percolation pond. Based on the survey of the as-built conditions, Pond 5 was also found to have slightly different capacity than what was shown in the 2016 Dexter Wilson Report. Accordingly, we have updated Table 2-2 to reflect the as-built capacity for Pond 5.

REVISED TABLE 2-2
PERCOLATION PONDS

Pond	Depth	Water Surface Area, ac	Vol, MG	Vol, AF	Pond Bottom Elevation (feet, msl)
5 (storage)	10.0	4.2	13.6	41.7	263.0
6	7.3	3.9	8.2	25.18	266.7
7	5.3	5.3	8.4	25.78	265.7

CHAPTER 3: LAND APPLICATION AREAS

In our review of recent plant performance data and operational performance input from staff, we learned that the runoff rates for the City Field and Town Field were not identical. Although both fields have a tailwater recirculation system and similar crops/configurations, no runoff has been observed or measured from the City Field during winter storms. However, there is a significant amount of stormwater runoff from the Town Field during winter storm events. Due to the value of the crop on the Town Field and the damage caused by ponding water, the City has had to recirculate this stormwater runoff back to the WWTP during winter months. Tailwater from the Town Field is currently drained into the adjacent trunk main which serves the southeast section of the City. This combined flow is then pumped to the headworks.

The 2016 Wilson Report discusses Proposed Land Application Areas, including Woodard Bottom and Dry Creek. While these LAA's may still be viable options, it should be noted that these large areas were envisioned as assets to a Regional System to handle the combined flows of Ione, MCP and ARSA. Since ARSA flows are expected to cease in 2022 and the MCP has submitted a revised ROWD for substantially reduced flows, the need for additional disposal areas and the potential financial resources to procure them have been substantially reduced.

CHAPTER 4: WATER SUPPLY QUALITY DATA

No revisions to Chapter 4 of the 2016 Wilson Report were made.

CHAPTER 5: WASTEWATER QUALITY DATA

No revisions to Chapter 5 of the 2016 Wilson Report were made.

CHAPTER 6: FLOW PROJECTIONS

This chapter addresses all the flows that are run through the WWTP. ARSA, CDCR, Town Field tailwater and other irrigation sources are addressed in Chapter 8. Since the 2016 Wilson Report was written, changes have been made to flows or new data obtained for AWA Backwash, COWRP Backwash, and WWTP Influent flows. The flow data for these, as well as the calculated ADWF flows have been updated to reflect this additional information.

Wastewater Flow Projection

Table 6-1 has been expanded to include ADWF, PWWF, and calculated peaking factor for 2015 through 2019. This expands the data set from 3 years in the 2016 Wilson Report to 8 years in this 2020 Update and provides greater certainty for the accuracy of modeling and conclusions which are based on these numbers.

REVISED TABLE 6-1 HISTORICAL INFLUENT FLOW TO THE IONE WWTP NOT INCLUDING ARSA FLOWS			
Year[1]	ADWF[2], mgd	PWWF[3,4], mgd	Peak Day Peaking Factor
2012	0.390	0.813	2.1
2013	0.384	0.552	1.4
2014	0.394	0.860	2.2
2015	0.421	0.434	1.0
2016	0.392	0.474	1.2
2017	0.425	0.656	1.5
2018	0.365	0.609	1.7
2019	0.470	0.790	1.7

[1] Years 2013 through 2014 data taken directly from Dexter Wilson report. Years 2015 through 2019 calculated based on data provided by PERC.
[2] ADWF Calculated using average flow per day for the months May - October
[3] PWWF Calculated using maximum month flow divided by number of days in month.
[4] PWWF for 2017 through 2019 includes stormwater runoff from the Town Field tailwater system that was installed in 2016

Current Wastewater Flows

The City has grown since the data was collected for the 2016 Wilson Report. The 2016 Wilson Report used an estimated EDU count of 1,525 from 2012. The 2019 estimated EDU Count is approximately 2,047.

Tables 6-2 and 6-3 have been updated to show the Summary of Current Ione Wastewater Flows from 2019.

TABLE 6-2 SUMMARY OF CURRENT IONE WASTEWATER FLOWS FROM 2019		
Flow Component	Current Average Flow, mgd	Source
City Base Flows	0.321	-- [1]
AWA Backwash Flows	0.009	AWA
COWRP Backwash Flows	0.100	COWRP
Town Field Tailwater Recirculation (Estimate)	0.040	-- [2]
TOTAL	**0.470**	**Meter**

[1] Total flow minus AWA and COWRP backwash and Town Field Tailwater Recirculation.

[2] Estimated based on calculated rainfall, runoff, and percolation from Town Field.

REVISED TABLE 6-3
MONTHLY AVERAGE AND ANNUAL AVERAGE FLOWS, MGD

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.
Ione WWTP Influent Meter	0.480	0.805	0.790	0.462	0.546	0.470	0.355	0.447	0.517	0.486	0.530	0.430	0.526
COWRP Backwash to Secondary Plant[1]	0.000	0.000	0.000	0.000	0.071	0.102	0.134	0.126	0.125	0.095	0.050	0.000	0.100
AWA Backwash[2]	0.009	0.011	0.006	0.007	0.014	0.014	0.009	0.005	0.009	0.006	0.013	0.005	0.009
Town Field Tailwater Recirculation[3]	0.119	0.078	0.067	0.038	0.004	0.001	0.000	0.000	0.005	0.027	0.061	0.078	0.040
City Wastewater Flow	0.352	0.716	0.717	0.416	0.458	0.353	0.212	0.316	0.378	0.359	0.406	0.347	0.419

[1] 2018-2019 Average COWRP Backwash to Secondary Plant

[2] 2017-2019 Average AWA Backwash

[3] Approximate normal year runoff from Town Field recirculated to headworks.

AWA Flows

In the past, AWA backwash flows from the Ione Water Treatment Plant were discharged to the City's wastewater system. These historical flows were fairly significant. The 2016 Wilson Report noted that AWA had planned to upgrade their filter system and assumed that filter backwash flows would cease. AWA has completed their filter upgrade project, and while backwash flows have decreased substantially, they have not ceased. We have updated the water balance to account for the flows from AWA in 2017 through 2019 which averaged 8,930 gpd.

REVISED TABLE 6-4
AVERAGE ANNUAL AWA BACKWASH FLOWS

Year	Average Flow, gpd
2012	60,000
2013	65,000
2014	53,000
2015	53,500
2016	19,500
2017	8,000
2018	9,200
2019	9,600

COWRP

Backwash flows from the COWRP occur during summer months when the plant must be run to supply irrigation needed for the Castle Oaks Golf Course. The average daily backwash rate of 0.100 mgd used in this 2020 Update was calculated based on actual backwash flow data from 2018 and 2019. This represents a revision to the 2016 Dexter Wilson report, which assumed 10 percent of the COWRP influent flows. It should also be noted that backwash rates have been impacted in a positive way due to improvements completed by CDCR. CDCR completed improvements to their onsite piping system in 2017 that now allows CDCR effluent to be delivered directly to COWRP and not routed through the Preston Reservoir. This is expected to reduce the Total Suspended Solids (TSS) at COWRP and thereby reduces the frequency of backwashing that occurs at the COWRP. This, in turn, reduces the amount of backwash sent to the Ione WWTP. Since insufficient data is available to validate and quantify the effects of this change, the historical rates were used for this 2020 Update.

Ione Base Flows

Base flows for the City were reviewed as part of this 2020 Update. However, since the more recent flow data is comingled with tailwater flows from the Town Field, it is not possible to

calculate an updated base flow that results only from EDUs. The base flow of 179.7 gpd/EDU calculated in the 2016 Wilson Report was therefore used as the base flow in this 2020 Update.

Infiltration and Inflow (I/I)

The I&I rates used in the 2016 Wilson Report were applicable and used in this 2020 Update.

Projected Flows

The method for projecting flows utilized in the 2016 Wilson Report was also utilized in this 2020 Update. The 2016 Wilson Report reported an EDU count of 1,325 EDUs served for the year 2013 and projected an EDU count of 1,825 for the year 2016. The number of dwelling units occupied since 2016 was determined based on numbers provided by the City (222 EDUs) and was added to the projected 2016 EDU count to determine the 2019 EDU count. The growth rate of 100 EDU's per year was used to determine future EDU counts and the base flow of 179.7 gpd/EDU used to project the flow rates beyond 2019. The 2016 Wilson Report assumed AWA backwash flows would cease. Although AWA has upgraded their filtration system at their plant, backwash has not ceased as assumed in the 2016 Wilson Report and the upgraded backwash numbers are shown in Table 6-2.

Tables 6-6, 6-7 and 6-8 have been updated to show flows from 2019 through 2039 based on revised conditions and new flow data. A copy of these updated tables is included below:

REVISED TABLE 6-6
PROJECTED IONE WWTP FLOWS
2013 THROUGH 2040

Year	Number of EDUs Served[1]	City Flow[2]		COWRP Backwash for 100 Year Rain Event		Inflow and Infiltration for 100 Year Rain Event[3]		Flows	
				Peak Month (July)	Annual Average[3]	Peak Month (February)	Annual Average	Peak Month	Annual Average
		mgd	AF/Y	mgd	AF/Y	mgd	AF/Y	mgd	AF/Y
2013	1,525	0.274	306.9	0.156	39.6	0.141	77.6	0.571	346.5
2016	1,825	0.328	367.4	0.156	39.6	0.141	77.6	0.625	407.0
2019	2,047	0.368	412.1	0.156	39.6	0.141	77.6	0.665	451.7
2020	2,147	0.386	432.2	0.156	39.6	0.141	77.6	0.683	471.8
2022	2,347	0.422	472.5	0.156	39.6	0.141	77.6	0.719	512.1
2025	2,647	0.476	532.9	0.156	39.6	0.141	77.6	0.773	572.5
2030	3,147	0.566	633.5	0.156	39.6	0.141	77.6	0.863	673.1
2035	3,647	0.655	734.2	0.156	39.6	0.141	77.6	0.952	773.8
2040	4,147	0.745	834.8	0.156	39.6	0.141	77.6	1.0422	874.4

[1]Best estimate of current actual EDU's. Used Wilson's assumed EDU's for 2013 which projected EDU's for 2016, addition of occupied housing since 2016 to obtain 2019 EDU's and assumed growth rate of 100 EDU's/year from 2020 through 2040.

[2]Projected using 179.7 gpd/EDU from 2016 Wilson Report

[3]Numbers taken directly from Table 6-6 in 2016 Wilson Report

REVISED TABLE 6-7
100-YEAR RAIN EVENT MONTHLY COWRP BACKWASH AND INFLOW AND INFILTRATION, MGD

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
COWRP Backwash, mgd[1]	0.000	0.000	0.000	0.028	0.089	0.134	0.156	0.134	0.094	0.030	0.000	0.000
Inflow and Infiltration, mgd[2]	0.137	0.141	0.121	0.075	0.037	0.017	0.010	0.010	0.019	0.048	0.097	0.125
Total	**0.137**	**0.141**	**0.121**	**0.103**	**0.126**	**0.151**	**0.166**	**0.144**	**0.113**	**0.078**	**0.097**	**0.125**

[1] COWRP Backwash based on 10% reject at COWRP, where COWRP effluent is based on demand at Castle Oaks Golf Course for 100 Year Rain Event

[2] Inflow and Infiltration based on 100 Year Rain Event

REVISED TABLE 6-8 IONE WWTP DESIGN FLOWS			
YEAR	City Wastewater ADWF, mgd	Peak Month Non-City Flow, mgd[1]	Total Design Flow, mgd
2019	0.368	0.166	0.534
2024	0.458	0.166	0.624
2029	0.548	0.166	0.714
2034	0.637	0.166	0.803
2039	0.727	0.166	0.893

[1] Peak Month Non-City Flow is the maximum sum of COWRP Backwash and Inflow and Infiltration for any month during the 100 Year Rain Event

The 2016 Wilson Report did not include the recirculation of stormwater runoff from the Town Field. Although this runoff does not require treatment, the system is plumbed to route these stormwater flows back to the headworks, which is hydraulically undersized. Since the headworks is planned to be replaced in the near term, this report recommends that the tailwater from the Town Field be rerouted to the effluent storage ponds and not through the headworks as part of that project.

CHAPTER 7: TREATMENT

Analysis of treatment capacity was not included in the scope of this Update.

CHAPTER 8: EFFLUENT DISPOSAL AND STORAGE NEEDS

The Ione system remains similar to what was described and modeled in the 2016 Wilson Report. The only change is that Pond 5 has now been lined and is used for mixing/storage. Pond 5 is modeled as a storage pond in all water balance scenarios in this 2020 Update.

Since the 2016 Wilson Report, changes are envisioned for the CDCR and ARSA systems that could affect the Ione system. The City of Ione has written a letter to ARSA which will trigger the cessation of ARSA flows to the Ione WWTP in July 2022. Accordingly, this report models current and future conditions with and without ARSA flows. Without flows from ARSA, the City of Ione's system will not have sufficient water to meet the combined irrigation demands of the Castle Oaks Golf Course and the Town Field unless the City installs the necessary improvements to pump and store treated effluent in Preston reservoir in the winter. This is discussed in greater detail later in this 2020 Update, but the use of Preston Reservoir by the City is assumed to be a given in all scenarios where ARSA flows have ceased. However, during the preparation of this 2020 Update we learned that ARSA executed a lease of State facilities including the use of Preston Reservoir in 2009[3]. This Agreement appears to give ARSA exclusive rights to the use of Preston Reservoir

[3] Ground Lease L-2070 between State of California and ARSA dated January 1, 2009 attached as Appendix B.

through 2038. Further review of this 2009 Lease Agreement should be made to determine the feasibility of the City of Ione's use of Preston Reservoir if desired in the future.

In addition, CDCR has submitted a ROWD to the RWQCB dated June 1, 2020 which proposes, among other things, to revise their WDRs to reflect reduced flows in the future resulting from intensive water conservation efforts at their facilities. According to this newly submitted ROWD, total wet season water production from CDCR MCP is proposed to drop from 841 ac-ft to 685 ac-ft. CDCR had been the main influence in exploring disposal options at Woodard Bottom and Dry Creek. While these may still be options for the City to pursue, CDCR is not expected to be a partner in developing these facilities due to their reduced needs for effluent storage and disposal.

Effluent Sources

The footnotes in Table 8-1 have been expanded. In the 2016 Wilson Report, this table listed the contractual obligation by Ione for effluent disposal from ARSA and CDCR. As noted above, the ARSA flows are expected to cease in 2022. The reduced flows are noted in the footnotes.

REVISED TABLE 8-1
CONTRACTUAL OBLIGATION FOR EFFLUENT DISPOSAL FOR ARSA AND CDCR

Month	ARSA + CDCR[2] Flow per Month[1], AF
January	10.0
February	10.0
March	10.0
April	95.0
May	95.0
June	95.0
July	95.0
August	95.0
September	95.0
October	10.0
November	10.0
December	10.0
TOTAL	**630.0**

[1] Per Section 5 of the 2007 Agreement to Regulate use of Henderson/Preston Wastewater Disposal System. The Total Annual Flow to Preston will be reduced to 350 AF per year under the Agreement when ARSA flows are terminated in 2022. The monthly maximum flows will remain the same.
[2] CDCR has robust on-site storage which allows flow can be modified to be sent to Preston/COWRP at different times of the year depending on the City's needs. Contractual obligation of City to accept flow from CDCR is 350 AF/year.

Table 8-2 in the 2016 Wilson Report represented "CDCR Disposal Needs by Month". This Table has been completely revised to reflect the future needs of CDCR based on their ROWD filed with the RWQCB on June 1, 2020. Revisions include maximum allowable flows from CDCR assuming ARSA ceases discharging to the Ione Plant, actual discharges by CDCR for the prior two years, and CDCR planned flows as shown in their June 2020 ROWD.

REVISED TABLE 8-2
CDCR DISPOSAL NEEDS BY MONTH

Month	Expected Flow per Month[1], AF	2018 - 2019 Actual[2] Average Monthly Discharge to COWRP	CDCR Planned Monthly Discharge to COWRP[3]
January	5.5	0.0	0.0
February	5.5	0.0	0.0
March	5.5	0.0	0.0
April	15.0	0.0	58.3
May	40.0	0.0	58.3
June	65.0	0.0	58.3
July	95.0	1.4	58.3
August	95.0	115.3	58.3
September	23.5	91.4	58.3
October	0.0	65.2	0.0
November	0.0	29.0	0.0
December	0.0	3.2	0.0
TOTAL	**350.0**	**305.4**	**349.8**

[1] Flows represent reasonable worst case based on conversations with CDCR and recent practice. It should be noted that CDCR Agreement allows discharge of up to 10 AF/month in October through March and up to 95 AF/month in April through September.

[2] Historical data from CDCR ROWD Technical Report dated June 2020

[3] Assumptions stated in CDCR ROWD dated June 2020

Flow Adjustments

In the model setup and calibration used for this 2020 Update, it was discovered that there were two model parameters that needed adjustment. We determined that the I&I for normal year conditions was already imbedded in the data set for "City base flow." Therefore, our model was set up to add only the additional amount of I&I associated with larger events (i.e. 100-year storm.) This was calculated using the equation from Figure 6-1. The model also escalated the I&I based on EDU count, so each year the I&I increases.

This 2020 Update also used revised evaporation projections for the treatment and storage ponds. The evaporation figures used in the 2016 Wilson Report were for normal years. Since critical wet season modeling is the primary focus of this Update, we reduced the evaporation amounts listed

in the 2016 Wilson Report by 30% to account for reduced evaporation during the wet year scenarios.

Disposal

Rainfall and evaporation for ponds 1 through 5 do not appear to have been considered in the 2016 Wilson Report. These were added to the water balance model in this 2020 Update. In addition, pan evaporation values used in the 2016 Wilson Report were for average conditions. In this Update, evaporation was reduced by 30% to account for less evaporation during the wet year scenario.

Percolation Ponds 6 and 7

The assumptions and percolation rates for Percolation Ponds 6 and 7 contained in the 2016 Wilson Report were used in this update. As noted in the 2016 Wilson Report, rotating and "resting" percolation ponds to allow periodic aerobic remediation of anaerobic areas combined with annual disking is key to maintaining high percolation rates and dependable, long-term performance. Interviews with staff confirm that this is understood, and a practice implemented to rotate between ponds 6 and 7 each year and to disk the bottom of each pond when it is dried. Therefore, the assumptions in the 2016 Report appear to be reliable for modeling of the long-term performance of these ponds.

City Field

No changes were made to the assumptions related to the City Field. However, it does appear that the actual disposal capacity of the City Field is higher than those assumed in the 2016 Wilson Report. Operations staff reported that no runoff has ever been observed from the City Field. An examination of the tailwater ditch and field inlet appeared to confirm that they do not receive any measurable runoff, even during winter storm events. Since the City Field is small and not irrigated during the winter, no changes to the 2016 Wilson Report assumptions with respect to the City Field were made.

Town Field

The disposal capacity of treated effluent on the Town Field described in the 2016 Wilson Report appears to be representative of current conditions; however, there are significant issues with respect to collection of storm water runoff collected in the tailwater ditch that the 2016 Wilson Report does not account for.

As mentioned earlier, the WDR's as amended in 2014 prohibit stormwater runoff from this and all other LAA's on a year-round basis. Experience has shown that the rainwater does not completely percolate into the Town Field as it does on the City Field. Since ponding water is harmful to the alfalfa crop, the Town Field was intentionally graded to prevent ponding water. The original design of the irrigation and tailwater system for the Town Field allowed collection and recirculation of runoff irrigation if the field was over irrigated, but it also allowed for

stormwater runoff to bypass the tailwater ditch in the wintertime when no spray irrigation was being used. The wintertime runoff would bypass the tailwater collection system and make its way to natural drainage courses downstream of the Town Field. Due to the requirements in the current WDR's, all stormwater (year-round) is now required to be collected and recirculated. Under the existing scenario, as stormwater runoff collects in the tailwater ditches, the stormwater runoff is collected and sent back to the WWTP. The current recirculation system discharges tailwater to the adjacent trunk sewer which is then pumped to the headworks without separate metering. This represents a significant increase in influent flows to the headworks during the winter that was not accounted for in the 2016 Wilson Report.

The requirement to recirculate stormwater during the wintertime when the field is not being spray irrigated is an unusual requirement in our experience. It could also have significant negative impacts on the treatment system. Accordingly, it is recommended that the City pursue getting the WDRs amended to remove the requirement of year-round tailwater from being recirculated and allow for stormwater to bypass the tailwater system during the winter when no spray irrigation is applied to the field. If the City is unsuccessful in getting this requirement changed in the WDRs, it is recommended that the City pursue a project to reroute these flows to the storage/treatment ponds (Ponds 6 or 7) rather than the headworks, as tailwater flows do not require treatment and can create loading issue for the overall treatment system.

The recirculation of runoff has been included into the water balance model developed with this 2020 Update. Since the recirculation system is un-metered, stormwater runoff from the Town Field has been estimated using a stormwater model. This model shows that as much as 90-acre-feet of additional water is added to the system as a result of this latest permit requirement to capture stormwater from the land application areas.

Castle Oaks Golf Course

No revisions to the projected wet weather irrigation demand of the Castle Oaks Golf Course were made in this Update.

Woodard Bottom and Dry Creek

Woodard Bottom and Dry Creek were disposal options which were included in the 2016 Wilson Report largely due to the expected needs of CDCR and ARSA for additional disposal capacity. Based on the planned cessation of ARSA flows and the decreased disposal needs of CDCR outlined in their updated ROWD, these options do not appear to be attractive and viable without the combined needs and resources of these other entities. They were therefore not explored in this Update.

Disposal and Storage Capacity

For this 2020 Update we have identified several scenarios where the previously noted changes and/or updated data could affect the capacity of the facilities to handle projected flows. The scenario runs are described in detail below.

Near-Term Conditions (2019):

Near-Term Conditions Model Run Summary					
	Run 1	**Run 2**	**Run 3**	**Run 4**	**Run 4A**
Year	2019	2019	2019	2019	2019
Rainfall Event	100	100	100	100	100
Assumed Carryover Water	0	0	0	0	0
Inflow					
ARSA Contractual (400 ac-ft per 2007 Agreement)	X		X		
CDCR Contractual (350 ac-ft per 2007 Agreement)	X	X	X	X	X
Town Field Tailwater Recirculation (100 ac-ft)	X	X	X	X	X
Disposal/Storage					
Town Field (Disposal)	X	X	X	X	X
City Field (Disposal)	X	X	X	X	X
Pond 6 Percolation	X	X			
Pond 7 Percolation	X	X			
Preston Available (No ARSA flows – 235 ac-ft)					X

Future Conditions (2039):

Future Conditions Model Run Summary					
	Run 5	Run 6	Run 7	Run 8	Run 8A
Year	2039	2039	2039	2039	2039
Rainfall Event	100	100	100	100	100
Assumed Carryover Water	0	0	0	0	0
Inflow					
ARSA Contractual (400 ac-ft per 2007 Agreement)	X		X		
CDCR Contractual (350 ac-ft per 2007 Agreement)	X	X	X	X	X
Town Field Tailwater Recirculation (100 ac-ft)	X	X	X	X	X
Disposal/Storage					
Town Field (Disposal)	X	X	X	X	X
City Field (Disposal)	X	X	X	X	X
Pond 6 Percolation	X	X			
Pond 7 Percolation	X	X			
Preston Available (No ARSA flows – 235 ac-ft)					X

Water Balance Summary

Below are tables summarizing the results of the various model runs.

The first group of tables are for 2019. The results for Runs 1 and 2 show that the existing system performs within permit limits with or without ARSA flows and without the use of Preston Reservoir. The results of Runs 3 and 4 show that in the event Ponds 6 and 7 are required to be lined, the City will face large storage and disposal deficiencies immediately. These storage deficiencies are in excess of what could potentially be available from Preston Reservoir.

TABLE 8-12: MODEL RUN 1 EXISTING CONDITIONS: 100-YEAR WET SEASON, 2019 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES			
Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	280	0	280
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	412	0	412
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	39	0	39
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	797	-797
Sent to COWRP for Tertiary Treatment	0	441	-441
Town Field (LAA)	0	22	-22
City Field (LAA)	0	1	-1
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1311	1311	0
PEAK STORAGE NEED	5		
VOLUME STORED IN PONDS 5, 6, & 7	5		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	0		
CARRYOVER WATER	0		

TABLE 8-13: MODEL RUN 2

100-YEAR WET SEASON, 2019 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND *NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	412	0	412
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	39	0	39
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	735	-735
Sent to COWRP for Tertiary Treatment	0	247	-247
Town Field (LAA)	0	0	0
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1031	1031	0
PEAK STORAGE NEED	0		
VOLUME STORED IN PONDS 5, 6, & 7	0		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	0		
CARRYOVER WATER	0		

TABLE 8-14: MODEL RUN 3 100-YEAR WET SEASON, 2019 FLOW, ***PONDS 6 AND 7 ARE LINED***, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ***ARSA FLOW CONTINUES***			
Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	280	0	280
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	412	0	412
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	39	0	39
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1311	929	381
PEAK STORAGE NEED	513		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	421		
CARRYOVER WATER	381		

TABLE 8-15: MODEL RUN 4

100-YEAR WET SEASON, 2019 FLOW, *PONDS 6 AND 7 ARE LINED*. LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND *NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	412	0	412
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	39	0	39
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1031	929	101
PEAK STORAGE NEED	399		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	306		
CARRYOVER WATER	101		

TABLE 8-16: MODEL RUN 4A

100-YEAR WET SEASON, 2019 FLOW, *PONDS 6 AND 7 ARE LINED*. LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, *USE OF PRESTON. AND NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	412	0	412
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	39	0	39
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1031	929	101
PEAK STORAGE NEED	399		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	235		
STORAGE DEFICIENCY	71		
CARRYOVER WATER	101		

The results of Run 5 shows that there is a slight storage deficit in the system in 2039 if ARSA flows remain. The results of Run 6 shows that the existing system continues to perform within permit limits in 2039 without ARSA flows. Under this scenario the City does not need the use of Preston Reservoir to meet its water balance needs.

Runs 7, 8, and 8A assume that ponds 6 and 7 are lined and show varying levels of failure with unmet storage needs ranging from 354 ac-ft in Run 8A to 729 ac-ft in Run 7.

TABLE 8-17: MODEL RUN 5
100-YEAR WET SEASON, 2039 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	280	0	280
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	815	0	815
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	77	0	77
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	956	-956
Sent to COWRP for Tertiary Treatment	0	596	-596
Town Field (LAA)	0	129	-129
City Field (LAA)	0	12	-12
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1751	1742	9
PEAK STORAGE NEED	112		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	19		
CARRYOVER WATER	9		

TABLE 8-18: MODEL RUN 6

100-YEAR WET SEASON, 2039 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, *AND NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	815	0	815
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	77	0	77
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	942	-942
Sent to COWRP for Tertiary Treatment	0	459	-459
Town Field (LAA)	0	20	-20
City Field (LAA)	0	1	-1
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1471	1471	0
PEAK STORAGE NEED	29		
VOLUME STORED IN PONDS 5, 6, & 7	29		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	0		
CARRYOVER WATER	0		

TABLE 8-19: MODEL RUN 7

100-YEAR WET SEASON, 2039 FLOW, *PONDS 6 AND 7 ARE LINED*, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND *ARSA FLOW CONTINUES*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	280	0	280
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	815	0	815
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	77	0	77
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1751	929	822
PEAK STORAGE NEED	822		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	729		
CARRYOVER WATER	822		

TABLE 8-20: MODEL RUN 8

100-YEAR WET SEASON, 2039 FLOW, *PONDS 6 AND 7 ARE LINED*, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND *NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	815	0	815
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	77	0	77
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1471	929	542
PEAK STORAGE NEED	682		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	0		
STORAGE DEFICIENCY	589		
CARRYOVER WATER	542		

TABLE 8-21: MODEL RUN 8A

100-YEAR WET SEASON, 2039 FLOW, *PONDS 6 AND 7 ARE LINED*. LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, *USE OF PRESTON. AND NO ARSA FLOW*

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	TOTAL AF/Y
ARSA	0	0	0
CDCR	350	0	350
City Base Flow (Includes normal year I&I)	815	0	815
Rainfall Gain Ponds 1 through 7 (100-year)	69	0	69
Runoff From Town Field Sent Back to Storage	89	0	89
Inflow / Infiltration (100 year)	77	0	77
Backwash from COWRP to Secondary Treatment	62	0	62
AWA Backwash	10	0	10
Actual Evaporation (Ponds 5, 6, & 7)	0	49	-49
Actual Percolation (Ponds 6 & 7)	0	0	0
Sent to COWRP for Tertiary Treatment	0	625	-625
Town Field (LAA)	0	232	-232
City Field (LAA)	0	24	-24
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	1471	929	542
PEAK STORAGE NEED	682		
VOLUME STORED IN PONDS 5, 6, & 7	93		
PEAK VOLUME STORED IN PRESTON	235		
STORAGE DEFICIENCY	354		
CARRYOVER WATER	542		

CHAPTER 9: WET WEATHER STORAGE

As indicated in the 2016 Wilson Report, the City will need additional wet weather storage under certain scenarios. Although the quantities needed have been revised, this 2020 Update confirms that finding. As mentioned earlier, the amount of storage needed increases dramatically in the event ponds 6 and 7 are lined and can be as high as 822 acre-feet in the worst-case 2039 scenario as shown in the summary table 9-2 below.

Existing Storage

Table 9-1 in the 2016 Wilson Report shows the volumes of existing available storage. As previously mentioned, pond 5 was found to have slightly more capacity than previously assumed. We have therefore updated Table 9-1 to reflect the current capacity. Pond 5 has an actual capacity of 41.7 acre-feet. Ponds 6 and 7 have not changed since the 2016 Wilson Report so the descriptions of Ponds 6 and 7 do not required revisions.

REVISED TABLE 9-1
EXISTING AVAILABLE STORAGE

Description	AF
Pond 5	41.7
Pond 6	25.2
Pond 7	25.8
Subtotal	92.7
Preston Reservoir	235.0
Total	327.7

Table 9-2 in the 2016 Wilson report presented wet weather storage needs. We have updated and expanded Table 9-2 to include the additional storage needs for each model run completed as outlined in Chapter 8.

Preston Reservoir

Preston Reservoir has been used exclusively by ARSA and CDCR in the past and has not been available to the City. However, CDCR is no longer using Preston and has indicated through their June 2020 ROWD that they do not foresee a need to use it in the future. If ARSA flows cease, the entire 235 ac-ft reservoir is potentially available to the City for use. However, it appears as though Preston has been leased by ARSA for its exclusive use through 2038, per the 2009 Lease Agreement attached as Appendix B. Therefore, Preston may not be available to the City of Ione.

REVISED TABLE 9-2 IONE WET WEATHER STORAGE NEEDS					
Model Run	Year	Peak Storage Need	Storage Available in Existing Ponds 5, 6, and 7 (AF)	Storage Available in Preston Reservoir[1] (AF)	Additional Storage Needed (AF)
1	2019	5	92.7	0.0	0.0
2	2019	0	92.7	0.0	0.0
3	2019	513	92.7	0.0	420.7
4	2019	399	92.7	0.0	306.0
4A	2019	399	92.7	235.0	71.0
5	2039	112	92.7	0.0	19.2
6	2039	29	92.7	0.0	0.0
7	2039	822	92.7	0.0	729.2
8	2039	682	92.7	0.0	589.3
8A	2039	682	92.7	235.0	354.0

[1] Storage in Preston Reservoir was only considered available for certain scenarios where ARSA flows have ceased.

City Field Reservoir (Pond 8)

In the 2016 Wilson Report, Pond 8 would only be necessary in the event that Ponds 6 and/or 7 were lined. In that instance, it is assumed that Pond 8 would likewise be required to be a lined storage pond. The 2016 Wilson Report showed this as a 221.2 ac-ft storage reservoir. However, based on the footprint available and assuming that geologic parameters are similar to that of the other storage ponds, Pond 8 would have a depth of approximately 8-feet and the storage volume would be limited to approximately 50 ac-ft. It does not appear possible to construct a storage reservoir of 221 ac-ft on the City Field site. A large site suitable for construction of additional storage may therefore be required under certain conditions.

CHAPTER 10: CAPITAL IMPROVEMENT PROGRAM

A number of the CIP projects listed in the 2016 Wilson Report have been completed. Other new projects have been identified and the scope of several others has changed. We have therefore included an updated list of CIP projects related to the City's current and anticipated needs. A summary of the projects and estimated design and construction costs is listed in Table 10-1 below. Estimated costs include construction cost, design cost, administration costs, and contingency.

Projects 1 through 5 in the list below are high priority projects the City should consider pursuing in the near term. Projects 6 through 10 are contingent projects which may be required in the

event changes to the WDRs or other factors require the lining of Ponds 6 and 7 or effluent disinfection.

REVISED TABLE 10-1 CIP COST ESTIMATES		
Priority Projects		
Project	Estimated Cost	
1. Irrigation Well[1]	$	296,000
2. Replacement of Existing Headworks at the WWTP	$	1,905,120
3. COWRP Plant Rehabilitation	$	1,584,225
4. Interconnection of the WWTP and COWRP and Effluent Pump Station	$	295,000
5. Town Field Tailwater Modifications	$	857,000
Subtotal Priority Projects	**$**	**4,937,345**
Contingent Projects		
Project	Estimated Cost	
6. Lining Ponds 6 and 7	$	2,297,000
7. City Field Reservoir (Pond 8 @ 50 ac-ft)	$	5,045,000
8. Effluent Disinfection	$	864,000
9. Preston Reservoir Connection to WWTP	$	6,101,000
10. Additional Storage[2] (589 ac-ft)	$	22,264,000
Subtotal Contingent Projects	**$**	**36,571,000**

[1] The 2016 Wilson Report provided an estimated cost for this project. The estimated cost from the 2016 Wilson Report was updated using ENR Construction Cost Index from 2013 to 2020. Therefore, no detailed cost estimate is provided in the appendix for the Irrigation Well project.

[2] This estimate is only for the construction of the additional storage pond. The estimated cost does not include land acquisition, pipeline, or easement costs.

Detailed cost estimates for each project are located in Appendix D.

CIP PROJECT DESCRIPTIONS

1. Irrigation Well

This project would provide the City with an alternative irrigation water source to be used in a dry year, when not enough effluent is produced to meet the City's irrigation demand. The well would only be used during dry seasons and months where water produced from the treatment plants can not sufficiently cover the irrigation demand. This estimated cost for this project is $296,000.

2. Replacement of Existing Headworks at the WWTP

The existing headworks at the Ione Wastewater Treatment Plant is aged and hydraulically undersized. Staff has stated that the headworks is overloaded during the wet season and bypass pumping is needed in some cases. This project will increase the capacity of the headworks to handle wet weather flows and future influent to the treatment plant. This project should be prioritized as it is costing the City significantly in aerator repair and debris removal. Improvements should include a rehabilitated flume channel and grinder pump station, vertical screen, influent pumps, screen wet well, pump wet well, and updates to instrumentation and controls. This estimated cost for this project is $1.9M.

3. COWRP Plant Rehabilitation

This project will provide miscellaneous upgrades to the Castle Oaks Water Reclamation Plant (COWRP), which still has many of its original components. The project will include rehabilitation of the sewage lift station and headworks, replacement of the hypochlorite tank, installation of new chemical metering pumps, upgrades to the sand filter control system, piping and valve replacement in the chlorine contact basin, new effluent pumps, replacement of the filter backwash clarifier control valves, addition of a new sludge drying bed, and overall upgrades to electrical, SCADA, and control systems across the entire plant. The estimated cost for this project is $1.6M.

The City has space reserved on the plant site for adding Dissolved Air Flotation in the future if algae could not be filtered. The DAF system could be added to the COWRP rehabilitation project or added as a separate project at a later date. The dissolved air flotation project would add approximately $2M in design and construction costs.

4. Interconnection of the WWTP and COWRP and Effluent Pump Station

This project will allow stored, secondary treated effluent to be pumped to Castle Oaks WTP for tertiary treatment. This provides redundancy and the ability to treat secondary effluent from the Ione WWTP at the COWRP to be used as irrigation water for the golf course during dry seasons. This estimate assumes that the effluent pump station provides adequate pumping capacity to send effluent to the COWRP. The estimated cost for this project is $295,000.

5. Town Filed Tailwater Modifications

This project would involve the installation of a wet well, pumps and piping to allow the Town Field tailwater to be recirculated to Pond 5 instead of the headworks. This will greatly reduce the size needed for the headworks. Furthermore, it will provide for additional detention time and improved treatment for the wastewater flows. The estimated cost for this project is $857,000.

6. Lining Ponds 6 and 7

The City currently has two percolation ponds that are being used for the disposal of secondary treated wastewater. This project will involve the lining of existing percolation ponds 6 (4.2 ac) and 7 (5.5 ac) so that they can be used as storage ponds for the secondary treated wastewater. This estimated cost for this project is $2.3M.

7. City Field Reservoir (Pond 8)

The City needs to explore other storage options to meet the needs of the 20-year buildout, wet-year scenario whether or not Preston Reservoir is available. Pond 8 would be constructed on the existing WWTP field and would only provide an additional 50 ac-ft of storage. Based on the need for 221 ac-ft overall, besides the City Field, the City would need to identify at least 22 acres of land (assuming a pond depth of 8 feet) for, purchase and construction of a pond that could store the additional 171 ac-ft (in addition to the City Field if 2 ponds were used for storage) or one large pond (needing at least 28 acres of land.) The estimated cost for this project is $5.05M, which equates to $101,000 per acre-foot.

8. Effluent Disinfection

This project will provide disinfection of pond water to a secondary 23-MPN standard. The existing 30-inch pipe from pond 4 to ponds 5 and 6 was intentionally designed to provide adequate chlorine contact. The project would involve sodium hypochlorite storage and feed facilities. It is assumed that dechlorination will not be needed as disinfected effluent will be discharged to a spray field or impoundment. The existing 30-inch pipe with added equipment will be able to provide 80-minutes of chlorine contact time for future PWWF (1.04 mgd), 126-minutes of chlorine contact time for the current PWWF (0.665 mgd), and 160-minutes of chlorine contact time for the current ADWF (0.524 mgd). The estimated cost for this project is $864,000.

It should be noted that the City has requested this project be evaluated and included in the CIP update, but there is no regulatory requirement to disinfect secondary effluent, nor do we anticipate a regulatory change will occur to initiate a requirement for effluent disinfection.

9. Preston Reservoir Connection to WWTP

The City plans to use Preston Reservoir to store treated wastewater during peak months until it can be disposed. There is an existing 12" PVC (7,200 LF) and 24" (2,500 LF) ACP gravity pipeline from Preston Reservoir which feeds the Castle Oaks Water Reclamation Plant. This project will repurpose the existing 12"PVC and replace the 24" ACP with 12" PVC and use it to pump effluent from the Ione Wastewater Treatment Plant to Preston Reservoir when additional storage is needed. The project includes pipe replacement, installation of a new pump station, and additional piping between the Ione WWTP and the existing 12" PVC main that connects to COWRP. It is assumed that no land acquisition or easements will be required to replace the existing pipeline on CDCR property. It is also assumed that the pump station will be located on

City property near the treatment plant site and that the existing 7,200 linear feet of existing 12" PVC between COWRP and the 24" ACP is in sound condition and does not need to be replaced. The estimated cost for this project is $6.1M.

10. Additional Storage

As discussed above, the previously envisioned Pond 8 is not a desirable option since its small capacity (approximately 50 ac-ft) would make it extremely costly on a per-ac-ft basis. In addition, the City Field has proven to be one of the most effective land application areas the City has.

If the City needs to build new storage, land will need to be acquired. Assuming suitable land can be obtained that is relatively flat and square, a large basin could be expected to provide roughly 4 to 5 ac-ft of storage per acre of land. A large earthen storage basin could be expected to cost approximately $33,000 per ac-ft of storage (excluding land costs).

Based on our updated Water Balance Model, the City will not need additional storage through 2039 even assuming ARSA flows cease and Ponds 6 and 7 continue to be maintained properly and used as percolation ponds. However, the loss of Ponds 6 and 7 as percolation ponds even assuming 2019 flows would require the construction of 306 acre-feet of storage (421 ac-ft if ARSA flows continue) immediately just to handle the current wet weather needs of the system. The same scenarios in 2039 would drive the storage needs to 589 Acre-feet (729 ac-ft if ARSA flows continue). Assuming a cost of $33,000 per acre foot to design and construct storage facilities, a 589 acre-feet storage facility would require the purchase of at least 70 suitable acres and an additional $22.5 million in construction and site development costs.

Appendix

Appendix A.....2016 Dexter Wilson Capacity Expansion Completion Report

Appendix B.....2009 Ground Lease Agreement

Appendix C.....Detailed Water Balance Model Runs

Appendix D.....Detailed CIP Cost Estimates

Appendix A

2016 Dexter Wilson Capacity Expansion Completion Report

DEXTER WILSON ENGINEERING, INC.

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CITY OF IONE
2020 CAPACITY EXPANSION
COMPLETION REPORT
R5-2013-022-001

December 2016

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CITY OF IONE
2020 CAPACITY EXPANSION
COMPLETION REPORT
R5-2013-022-001

December 2016

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
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Job No. 145-001

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CHAPTER 1

INTRODUCTION

The City of Ione operates the Ione Wastewater Treatment Facility. This facility is regulated by waste discharge requirement Order R5-2013-022-001 as amended by Order R5-2014-0166, adopted by the California Regional Water Quality Control Board, Central Valley Region. This report is submitted to comply with Section I, Provisions 1C of the amended order. It also is submitted to comply with Section 6B of the 2014 Cease and Desist Order.

STUDY AREA

The City of Ione is located in Amador County, California, approximately 35 miles southwest of the state capital, Sacramento, at the base of the western side of the Sierra Nevada mountain range.

The focus of the study is on the City of Ione Wastewater Treatment Plant (WWTP). Figure 1-1 shows a vicinity map of the WWTP. The WWTP receives flows from the residential population, commercial customers and other water and wastewater treatment facilities in the vicinity. The WWTP discharges treated water through disposal in percolation ponds and Land Application Areas (LAAs).

The WWTP, shown on Figure 1-2, is located directly southeast of the corner of Dave Brubreck Road and West Marlette Street. The WWTP is neighbored by agriculture to the east and south, residential to the west, and the Castle Oaks Golf Club to the north. To the northwest of the WWTP is the Castle Oaks Water Reclamation Plant which produces tertiary recycled water for the irrigation of the Castle Oaks Golf Club and nearby crops.

To the north of the site approximately 100 feet away, Sutter Creek flows from east to west.

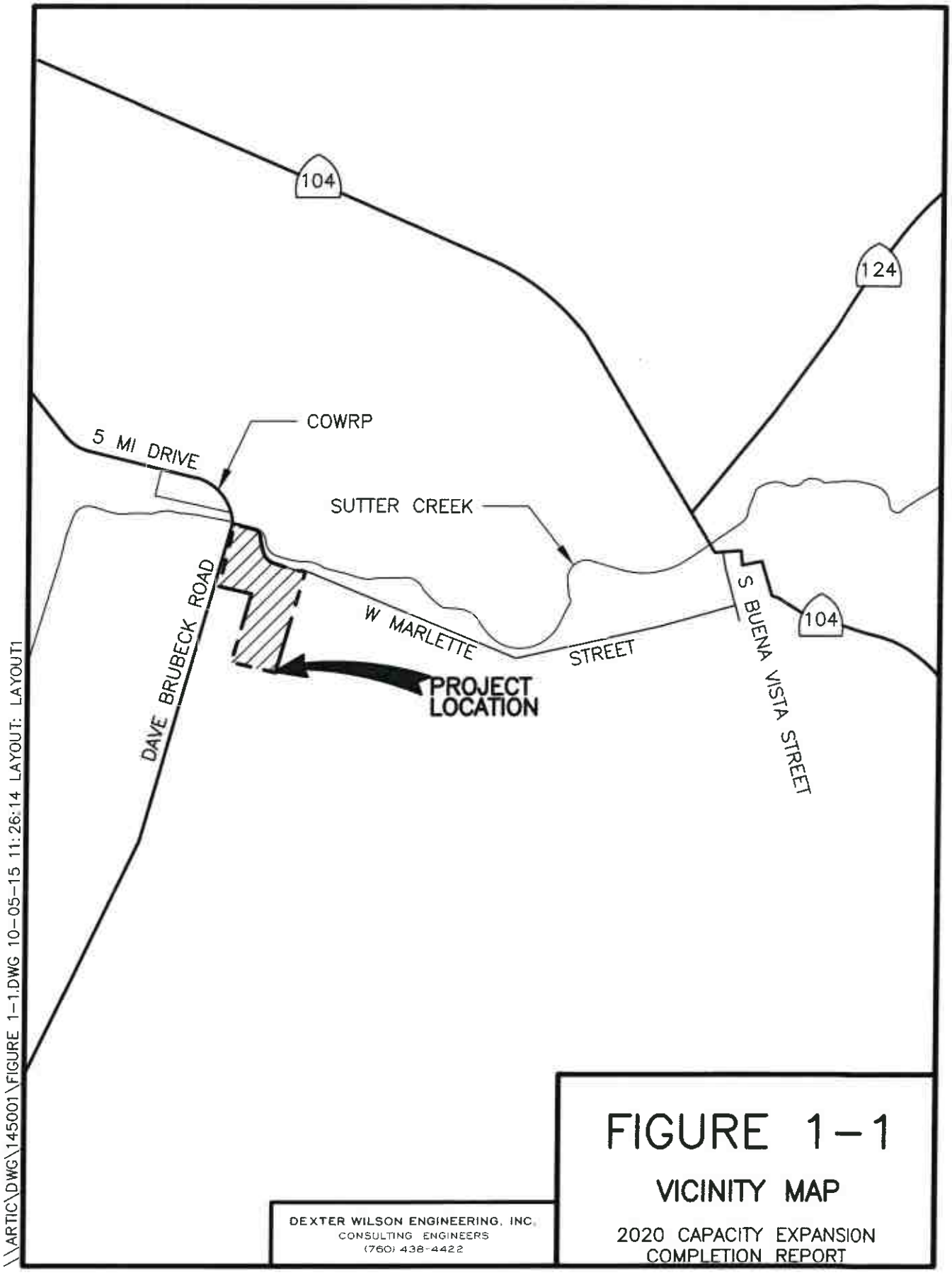
104
124
COWRP
5 MI DRIVE
SUTTER CREEK
DAVE BRUBECK ROAD
W MARLETTE STREET
S BUENA VISTA STREET
104
PROJECT LOCATION
\\ARTIC\DWG\145001\FIGURE 1-1.DWG 10-05-15 11:26:14 LAYOUT: LAYOUT1
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FIGURE 1-1
VICINITY MAP
2020 CAPACITY EXPANSION
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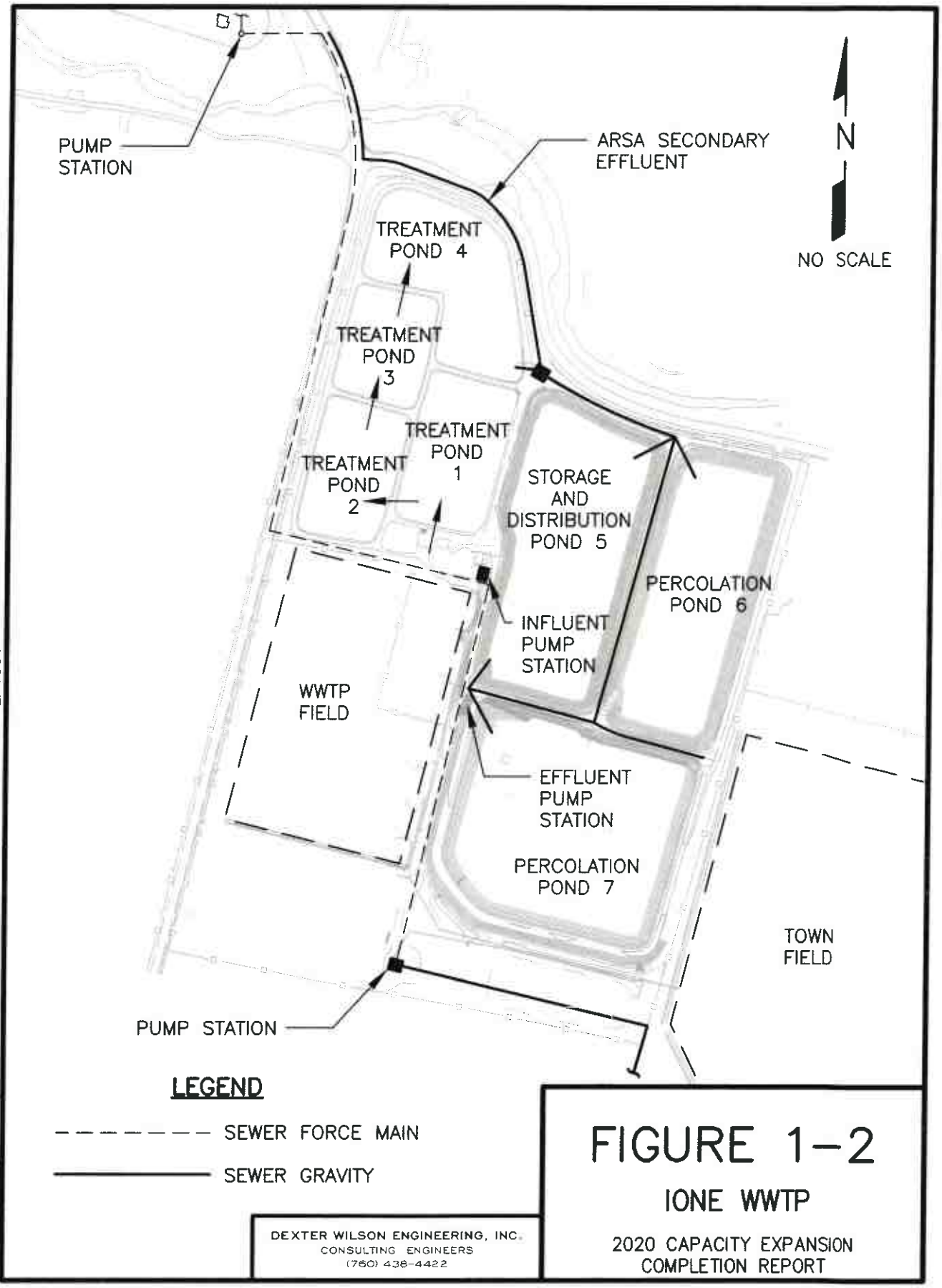
PUMP STATION
ARSA SECONDARY EFFLUENT
N
NO SCALE
TREATMENT POND 4
TREATMENT POND 3
TREATMENT POND 1
TREATMENT POND 2
STORAGE AND DISTRIBUTION POND 5
PERCOLATION POND 6
INFLUENT PUMP STATION
WWTP FIELD
EFFLUENT PUMP STATION
PERCOLATION POND 7
TOWN FIELD
PUMP STATION
LEGEND
SEWER FORCE MAIN
SEWER GRAVITY
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FIGURE 1-2
IONE WWTP
2020 CAPACITY EXPANSION COMPLETION REPORT
\\ARTIC\DWG\145001\FIGURE 1-2.DWG 12-09-16 09:04:47 LAYOUT: LAYOUT

BACKGROUND

In September of 2000, staff from the Central Valley Regional Water Board ("Board") observed seepage entering Sutter Creek to the north of the Ione WWTP during an onsite visit. It was suspected that this seepage was a result of discharge occurring at the plant; however, analyses at the time did not produce any conclusive evidence.

One year later, in September of 2001, Board staff observed the construction of a seventh percolation pond. This pond, if operated, would violate the then-current Waste Discharge Requirements (WDRs), WDRs Order 95-125 (1995 WDRs). The Board staff advised the City to submit a new Report of Waste Discharge (RWD) in order to properly permit the new pond.

On October 9, 2001, the Executive Officer of the Board issued an order pursuant to Water Code 13267 requiring the City of Ione to submit a work plan for groundwater monitoring, a groundwater well installation report and a new RWD to account for the seventh unpermitted percolation pond. Groundwater monitoring wells were installed and a report titled Hydrogeologic and Geotechnical Report was submitted documenting the installation of such wells, but there was no new submission of a RWD.

In July of 2003, the Board issued Cease and Desist Order CDO R5-2003-0108 (2003 CDO), requiring the City to stop unpermitted discharge. The 2003 CDO was issued due to three main issues: concerns regarding discharge of polluted groundwater to Sutter Creek; unauthorized degradation of groundwater quality below the WWTP; and failure to submit a RWD.

2003 Cease and Desist Order

The 2003 CDO required that the City comply with Discharge Prohibition A.1 and groundwater limitations of the 1995 WDRs by December 30, 2005. Prohibition A.1 forbids the discharge of waste to surface waters. In addition to the requirement of compliance by the aforementioned date, the 2003 CDO called for a schedule of technical reports to be submitted by the city of Ione.

2005 Report of Waste Discharge

The technical studies submitted in accordance with the 2003 CDO demonstrated that the use of percolation ponds caused groundwater to mound beneath the wastewater treatment plant, which would then cause groundwater to flow towards Sutter Creek. If flows in the creek were low, groundwater could seep into the creek. Furthermore, the studies reported elevated concentrations of iron and manganese down gradient of the wastewater treatment facility. The cause of the increased concentrations is reported to be secondarily related to the WWTP as a result of certain conditions created by the use of the percolation ponds. The findings of the 2014 CDO states that "iron and manganese are not present in WWTP effluent at high concentrations. The presence of degradable organic matter in the wastewater depletes oxygen, which creates reduction conditions in the groundwater mound beneath the WWTP ponds. Reducing conditions promote dissolution of iron and manganese, which are naturally present in the soil beneath the ponds."

2011 Cease and Desist Order

In April 2011, CDO R5-2011-0019 was ordered in order to adopt a new timeline for compliance. Among other items the 2011 CDO required the City of Ione to address the groundwater pollution resulting from the dissolution of manganese and iron beneath the WWTP and address the construction of two unpermitted effluent disposal ponds through the submittal of a new RWD. The 2011 CDO also ordered the submittal of the "Seepage Discharge Compliance Plan" by January 20, 2012, and to construct improvements that would stop the mobilization of iron and manganese. In addition the City was ordered to follow one of two options: Either to stop any indirect seepage into the creek through constructed improvements, or obtain a National Pollutant Discharge Elimination System (NPDES) permit.

2012 Report of Waste Discharge

The City opted to go with the option to construct improvements that would eliminate the seepage of degraded groundwater to Sutter Creek. This required the City to submit a RWD by May 30, 2012, and to certify that facility upgrades had been completed by October 30, 2013.

The City of Ione submitted the RWD July 30, 2012, violating the CDO deadline of May 30, 2012. In addition, the RWD did not meet the criteria of the 2011 CDO. As a result of this violation, the Board issued an Administrative Civil Liability Complaint, which resulted in the City being assessed a civil liability of $123,818.

2013 Cease and Desist Order and Waste Discharge Requirements

During the year of 2012, the City submitted multiple RWDs. None of the RWDs the City submitted would have been capable of complying with the timeline of the 2011 CDO. Thus, the Board ordered the 2013 CDO in order to provide a new timeline for compliance as well as new Waste Discharge Requirements. A large factor in both the 2013 CDO and the WDR is a series of improvements proposed by the City. A summary of these improvements as they appear in the 2013 WDR can be seen in Table 1-1. The Phase I improvements were to be completed by October 30, 2012 and the Phase II improvements were to be completed in 2015.

TABLE 1-1
PROPOSED WWTP IMPROVEMENTS IN 2013 WDR

Phase I	a. Constructing new water recycling land application areas (LAAs) on land owned by the Dischargers, including the 11-acre WWTF Field and the 67-acre Town Field (shown on Attachment B(of the 2013 WDRs)); b. Installing a specific number of additional aerators with specific horsepower in treatment Ponds 1 through 4 to consistently maintain high dissolved oxygen throughout the treatment process; c. Installing a mixing unit in Pond 5 to reduce the anoxic conditions in the pond (which already has been installed); d. Installing a new disinfection system utilizing sodium hypochlorite injection and a contact chamber; and e. Sludge removal from Ponds 5 and 6.
Phase II	a. Constructing Pond 8 on the location of the 11-acre WWTF Field. Pond 8 will be clay lined with a capacity of 17 million gallons. It will be used to store un-disinfected effluent during the non-irrigation season; and b. Adding additional water recycling LAAs totaling 56 acres: the 40-acre Greenrock LAA and the 16-acre COWRP Field.

Phase I Improvements

The Phase 1 improvement listed in Table 1-1 were split into a Phase 1A and 1B. By December 2013 all of the Phase 1A improvements had been completed with the exception of installing a sodium hypochlorite disinfection system. The City received a temporary exemption to this requirement in June 2013 and the current WDR Order R5-2013-0022-001 has been modified to remove the requirement for disinfection. Phase 1B was completed in April 2016.

2013 and 2014 Plant Operational Changes

As a result of the Phase 1 improvement installed in 2013 and 2014 the Percolation Ponds 5, 6 and 7 were emptied through use of the LAAs. Prior to this time all three ponds had been in continual use for percolation and storage for years and the bottoms of the pond had been continuously under water. Thus the bottoms of the ponds had not been disced or in direct contact with the atmosphere for a number of years.

In 2013 a new operational plan for Ponds 5, 6 and 7 was implemented. This plan utilizes Pond 5 as the delivery point for water from Pond 4. Ponds 6 and 7 are dedicated percolation ponds. From October 2013 through July 2015, a period of 20 months, Pond 6 received water for 7 months and Pond 7 for 3 months. The operation plan directs all water from Pond 5 to the LAA's from April to September. This allows Ponds 6 and 7 to be disced and to have the bottoms dry out and aerate. This operational plan has greatly increased the percolation rate.

During the 2014-15 winter all discharge was directed to Pond 6, and Pond 7 was not needed. With all water directed to Pond 6 the pond level never reached one (1) foot in water depth. Thus the new operational plan is to alternate use of the ponds each winter so the pond that is not in use will have an 18-month rest period. This should also allow the ground under the ponds to dry out and aerate. This will help to decrease iron and manganese level in the groundwater.

Regional Study

Since 2013 Ione has been working with the Amador Regional Sanitation Authority and the Mule Creek State Prison on a Regional Study for consolidated treatment, disposal and

beneficial reuse of wastewater. A draft of this report was completed in 2016. The results of this study could lead to changes in how Ione handles wastewater treatment and disposal.

2014 Cease and Desist Order for Waste Discharge Requirements

The 2014 Cease and Desist order provided the City of Ione with feasibility on how to achieve groundwater compliance with iron and manganese requirements. The 2014 CDO requires the City to prepare a plan for compliance in lieu of requiring lining of ponds. The 2014 Waste Discharge Requirements allow irrigation with un-disinfected secondary effluent.

2015/2016 Improvements

In 2016 the City of Ione completed construction of Phase 1B improvements at the wastewater treatment plant. These improvement enhanced reliability by upgrading the alarms, instrumentation and electrical equipment. The project also installed dedicated pumps for the Town field and City field irrigation. These pumps will allow for greater operational flexibility for effluent reuse and disposal.

Purpose of Study

The purpose of this study is to comply with the requirements of the Waste Discharge Requirements as amended in 2014, the 2013 CDO as amended in 2014 and provide a treatment and disposal capacity plan for the City of Ione.

The Waste Discharge Requirements outline the following:

By 30 October 2015, the City shall submit a 2020 Capacity Expansion Completion Report that certifies that the construction and start-up testing of all improvements needed to provide sufficient treatment, storage and disposal capacity for projected flows through 2020 has been completed, and that the WWTP can comply with the applicable effluent limitations. The report shall include as-built drawings of the WWTP and recycling site and/or other improvements and a detailed water balance model that provides the following hydraulic capacity information:

1. Average daily dry weather flow for the months of July through September, inclusive;

2. Maximum monthly average flow based on a reasonable allowance for sewer system I/I during the 100-year, 365-day precipitation event; and
3. Total annual flow volume.

The water balance shall include documentation of, and technical support for, all data inputs used and shall consider at least the following.

1. The as-built geometry of all ponds and effluent recycling/disposal areas;

2. A minimum of two feet of freeboard in each pond at all times;

3. Historical local pan evaporation data (monthly average values) used to estimate pond evaporation rates;

4. Local precipitation data (for the 100-year 365-day event distributed in accordance with mean monthly precipitation patterns) applied as direct precipitation onto all ponds and effluent recycling areas;

5. Projected wastewater generation rates based on historical flows and expected new development to be served by the expansion, distributed monthly in accordance with expected seasonal variations;

6. Estimated I/I flows for the 100-year 365-day event based on historical flows, new development, and age and type of sewer pipes;

7. Recycling area crop evapotranspiration rates, including consideration of the required setbacks; and

8. Projected long-term percolation rates based on documented percolation test results (including consideration of percolation from unlined ponds and the effects of solids plugging on all ponds).

The 2014 Cease and Desist Order requires a Facilities Improvements Design Report and a Report of Waste Discharge if groundwater objectives are not achieved. This report will provide recommended improvements or additional improvements to reduce the possible impact of the treatment plant from iron and manganese levels in groundwater. These improvements will include lining of all ponds with a geosynthetic liner.

This report will address the long term wastewater treatment and disposal needs of the City of Ione to assure adequate capacity for the general plan buildout.

CHAPTER 2

EXISTING FACILITIES

This chapter provides a description of the existing wastewater facilities.

COLLECTION SYSTEM

The City collection system serves areas that are within its incorporated area. The system comprises approximately 24 miles of gravity sewer lines, approximately one mile of pressure sewer lines and four (4) pump stations each of which has a backup generator. All flows within the City limits are discharged at the City WWTP.

The collection system can be divided into an older portion and a newer portion. The older portion is generally south of Sutter Creek; the newer portion is the Castle Oaks Subdivision. The main trunk sewer in the old portion of the system runs through Marlette Street where it ends at a pump station that pumps directly to the WWTP. Flow from the Castle Oaks Subdivision is collected and pumped across Sutter Creek via utility bridges. The collection system is shown in Figure 2-1.

CITY OF IONE WASTEWATER TREATMENT PLANT

The City of Ione WWTP is a secondary treatment facility. The facility produces un-disinfected secondary wastewater that is discharged through the use of percolation/evaporation ponds as well as land application areas (LAAs). Figure 2-2 shows a process flow diagram of the WWTP.

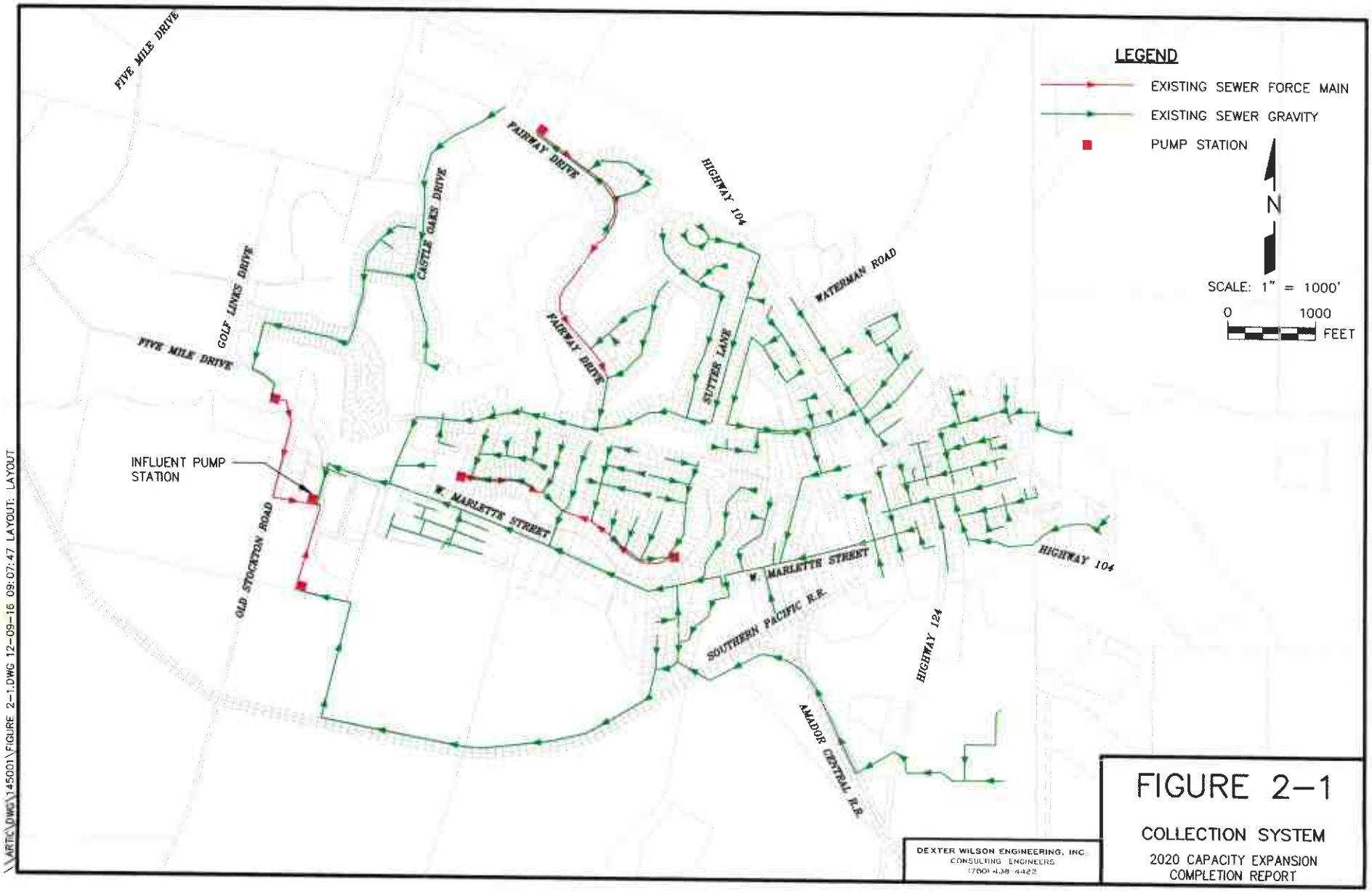

FIGURE 2–1

COLLECTION SYSTEM

2020 CAPACITY EXPANSION COMPLETION REPORT

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\\ARTIC\DWG\145001\FIGURE 2-2.DWG 09-06-16 15:08:10 LAYOUT: LAYOUT1

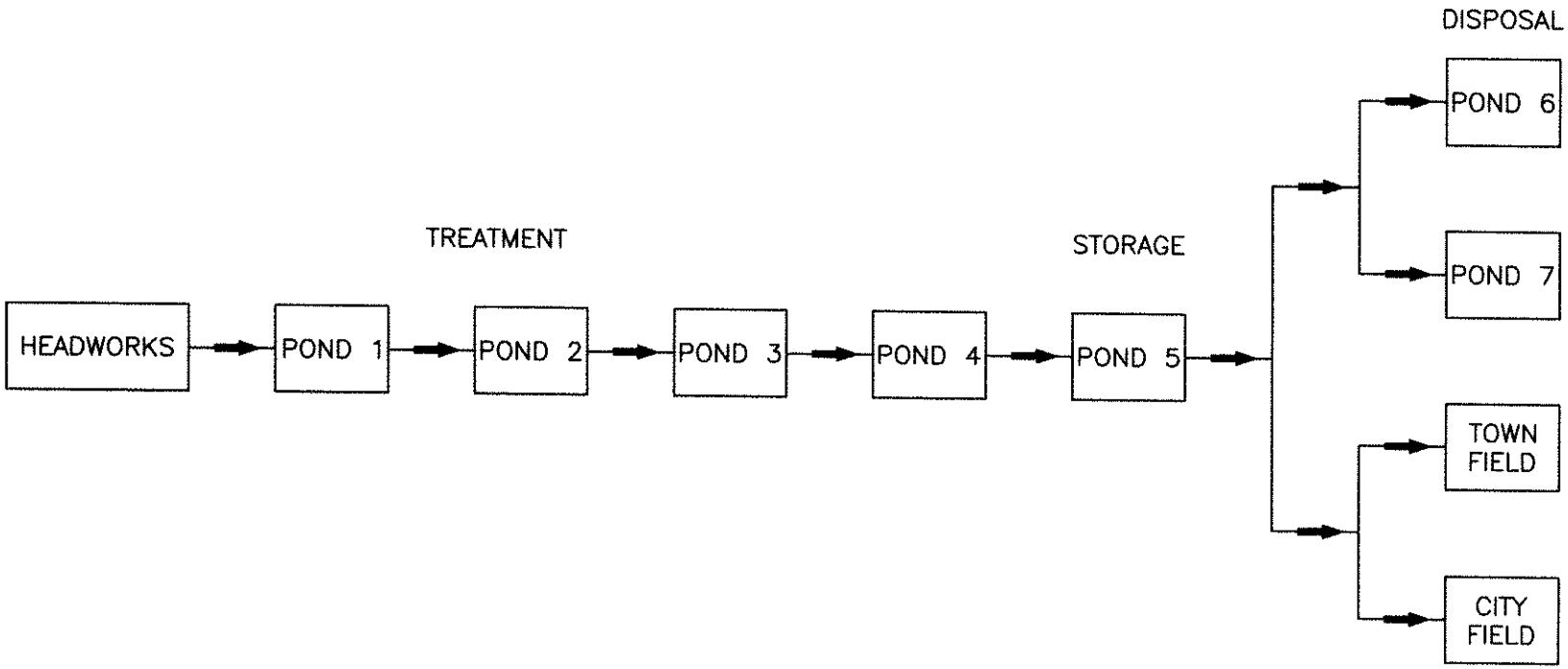

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FIGURE 2-2

IONE WWTP PROCESS FLOW DIAGRAM

2020 CAPACITY EXPANSION COMPLETION REPORT

Headworks

Flow enters the WWTP at the headworks where it flows into one of two concrete open channels. The channels utilize gravel traps to remove a portion of the sand and gravel.

Comminutor

The Comminutor is used to grind solids prior to flow entering the treatment ponds.

Treatment Ponds

The WWTP includes four secondary treatment ponds. The ponds provide treatment through combined aeration and settling. Table 2-1 lists pertinent information regarding the treatment ponds. The four ponds operate in series and all flow goes through all four ponds.

TABLE 2-1
TREATMENT PONDS

Pond	Depth	Water Surface Area (acres)	Volume (MG)	Pond Bottom Elevation (feet, msl)	Aeration Capacity, hp
1	6.1	1.62	3.1	269.9	30
2	5.9	1.39	2.5	270.1	27.5
3	5.7	1.14	2.0	270.3	17.5
4	5.5	2.15	3.7	270.5	7.5
TOTAL	—	—	**11.3**	—	—

Percolation Ponds

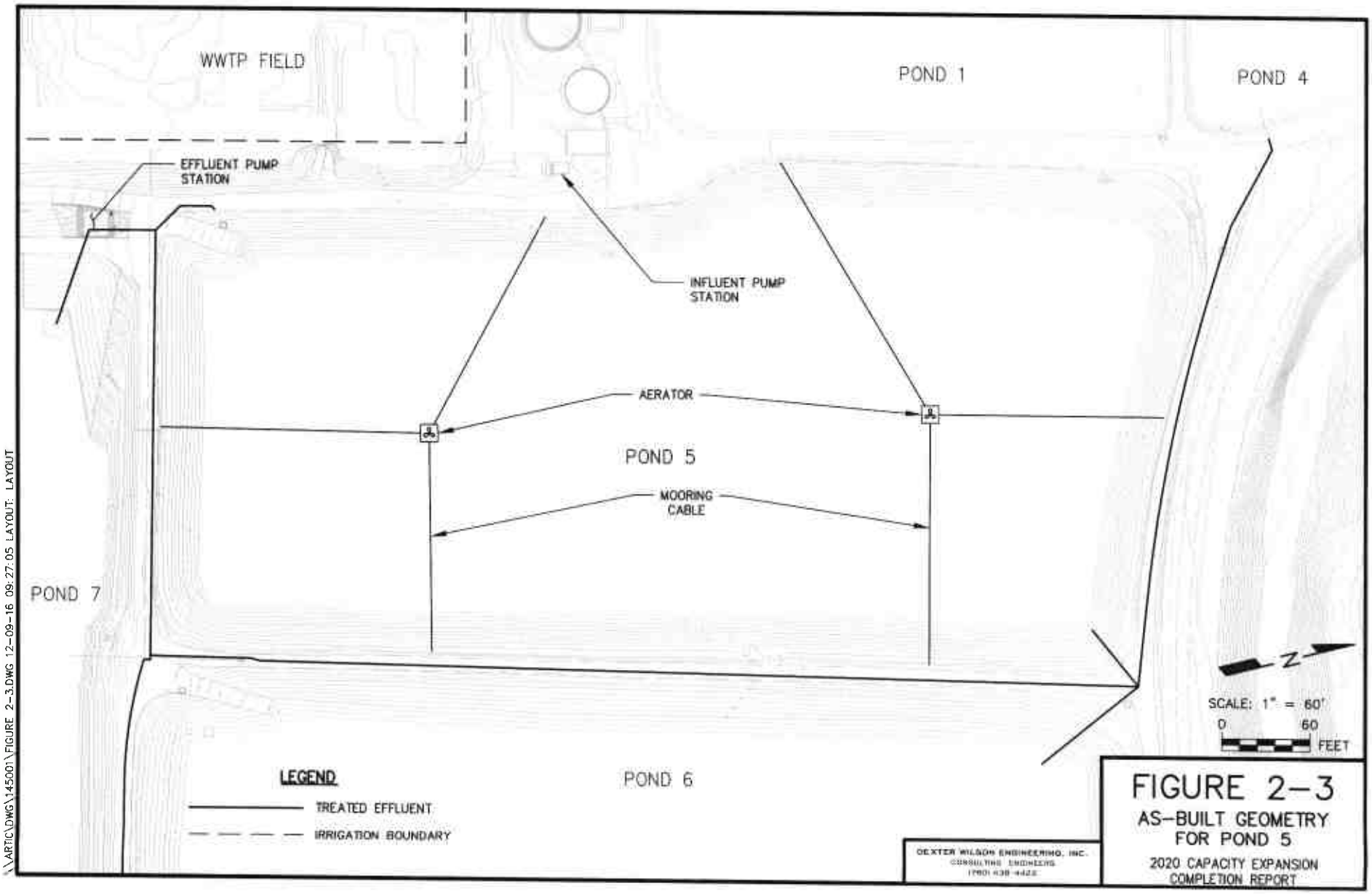
Downstream of the treatment ponds are three percolation ponds. Table 2-2 lists pertinent information regarding Ponds 5, 6 and 7.

TABLE 2-2 PERCOLATION PONDS				
Pond	**Depth[1]**	**Water Surface Area (acres)**	**Volume (MG)**	**Pond Bottom Elevation (feet. msl)**
5	8.7	4.7	12	265.3
6	7.3	4.0	8.2	266.7
7	5.3	5.3	8.4	265.7

1. Based on two feet of freeboard.

Figure 2-3 provides as-built geometry for Pond 5 as well as showing the aeration equipment and piping. Figures 2-4 and 2-5 show the as-built geometry and piping for Pond 6 and 7 respectively. Currently Pond 5 is used for storage and distribution of treated effluent. Until additional storage is constructed or obtained by the City of Ione Ponds 6 and 7 will be used as percolation ponds in the disposal calculations in this report. Pond 5 will only be used as storage for calculations in the report. After Ponds 5, 6 and 7 are lined all three will be used as storage.

Evaporation will be considered from all ponds. LAAs will be used as much as possible to reuse and dispose of effluent. Percolation Pond 6 and 7 will only be used as required when the LAAs are not able to take water.



\\ARTIC\DWG\145001\FIGURE 2-3.DWG 12-09-16 09:27:05 LAYOUT: LAYOUT

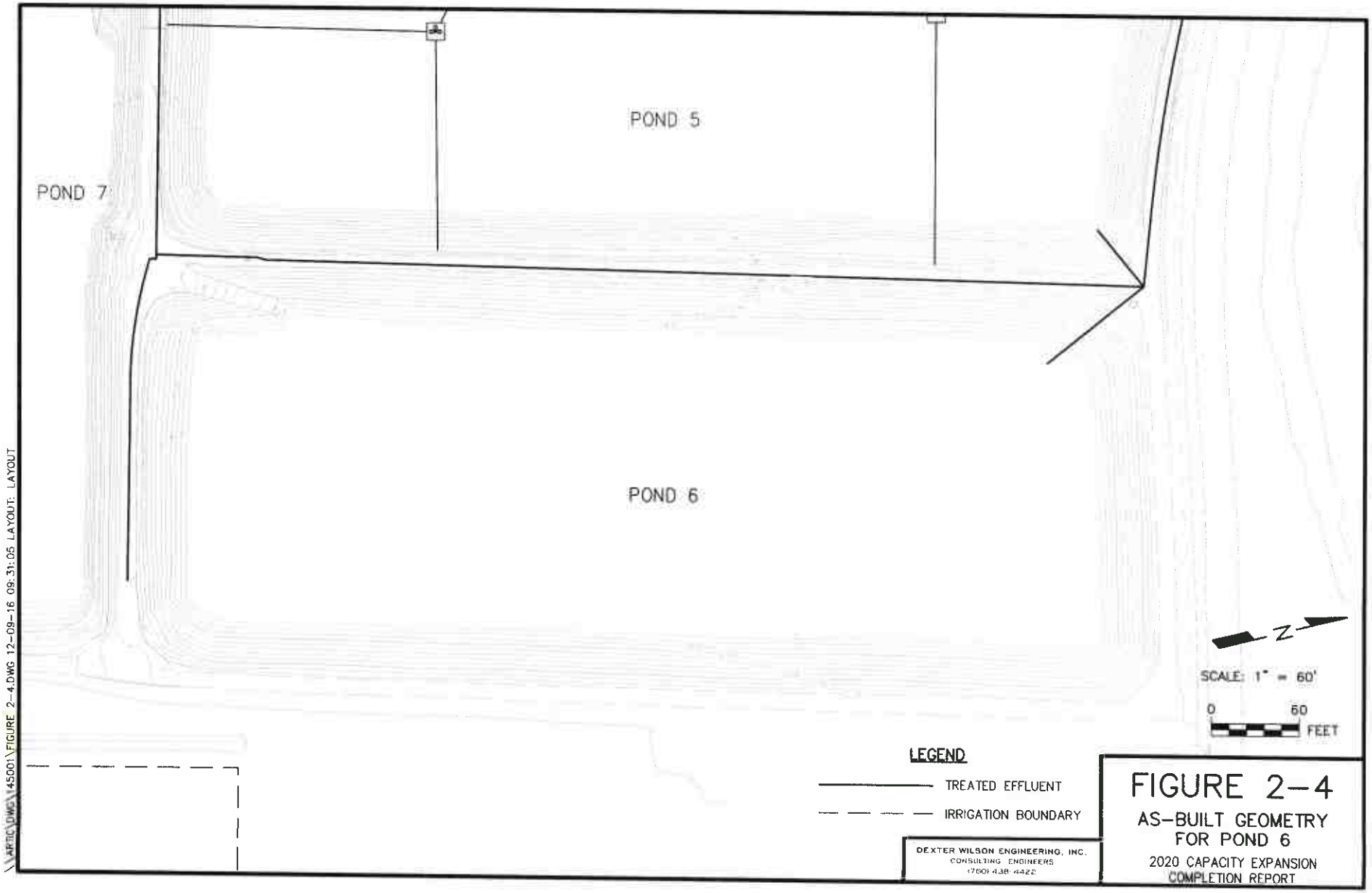

POND 5
POND 7
POND 6
N
SCALE: 1" = 60'
0
60
FEET
LEGEND
TREATED EFFLUENT
IRRIGATION BOUNDARY
DEXTER WILSON ENGINEERING, INC.
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FIGURE 2-4
AS-BUILT GEOMETRY
FOR POND 6
2020 CAPACITY EXPANSION
COMPLETION REPORT
\ARTIC\DWG\145001\FIGURE 2-4.DWG 12-09-16 09:31:05 LAYOUT: LAYOUT

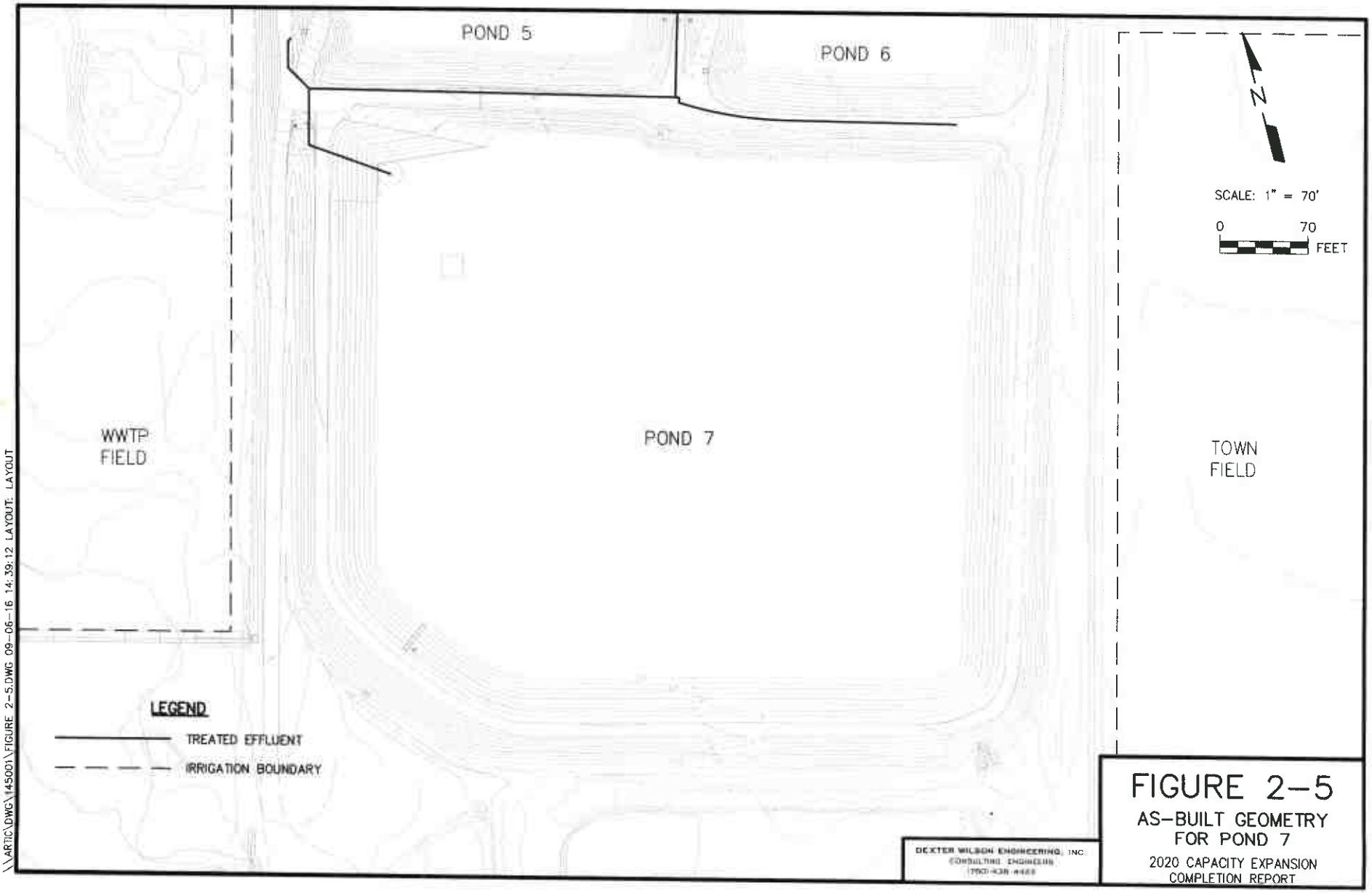


FIGURE 2-5
AS-BUILT GEOMETRY FOR POND 7
2020 CAPACITY EXPANSION COMPLETION REPORT

\\ARTIC\DWG\145001\FIGURE 2-5.DWG 09-06-16 14:39:12 LAYOUT: LAYOUT

CHAPTER 3

LAND APPLICATION AREAS

The purpose of this chapter is to discuss the land application areas, both existing and proposed, which are used to dispose of effluent.

The Ione WWTP currently utilizes two LAAs to dispose of un-disinfected secondary treated water. Both areas are used for growth of fodder crops. The two sites are nearly adjacent, one located within the WWTP site and the other directly east of the WWTP. Future disposal areas include Woodard Bottom and Dry Creek. Figure 3-1 shows the location of the existing and proposed LAAs.

Existing Land Application Areas

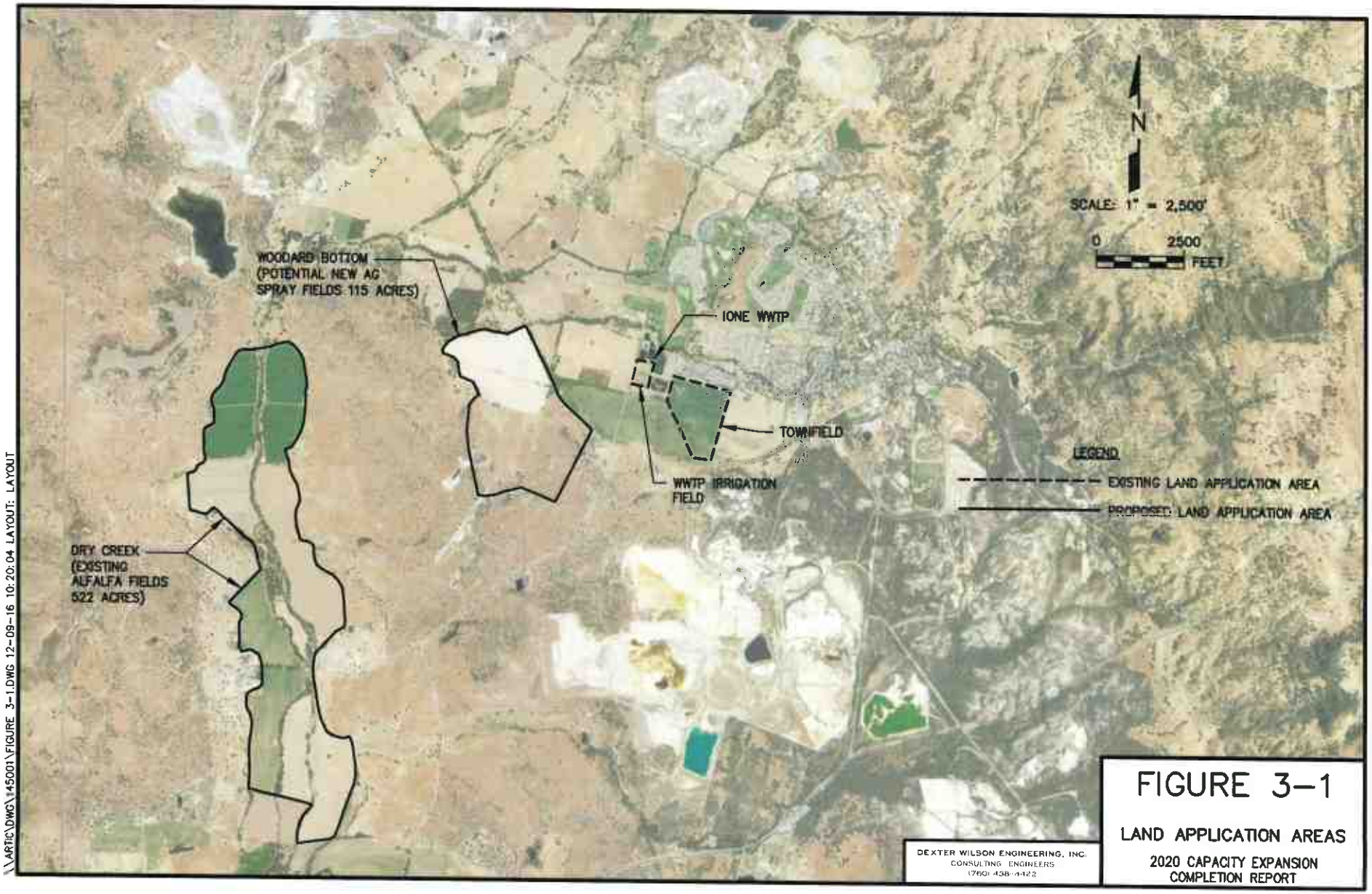
The current waste discharge permit allows disposal of effluent, year round, on two sites. These sites are described below.

WWTP Field

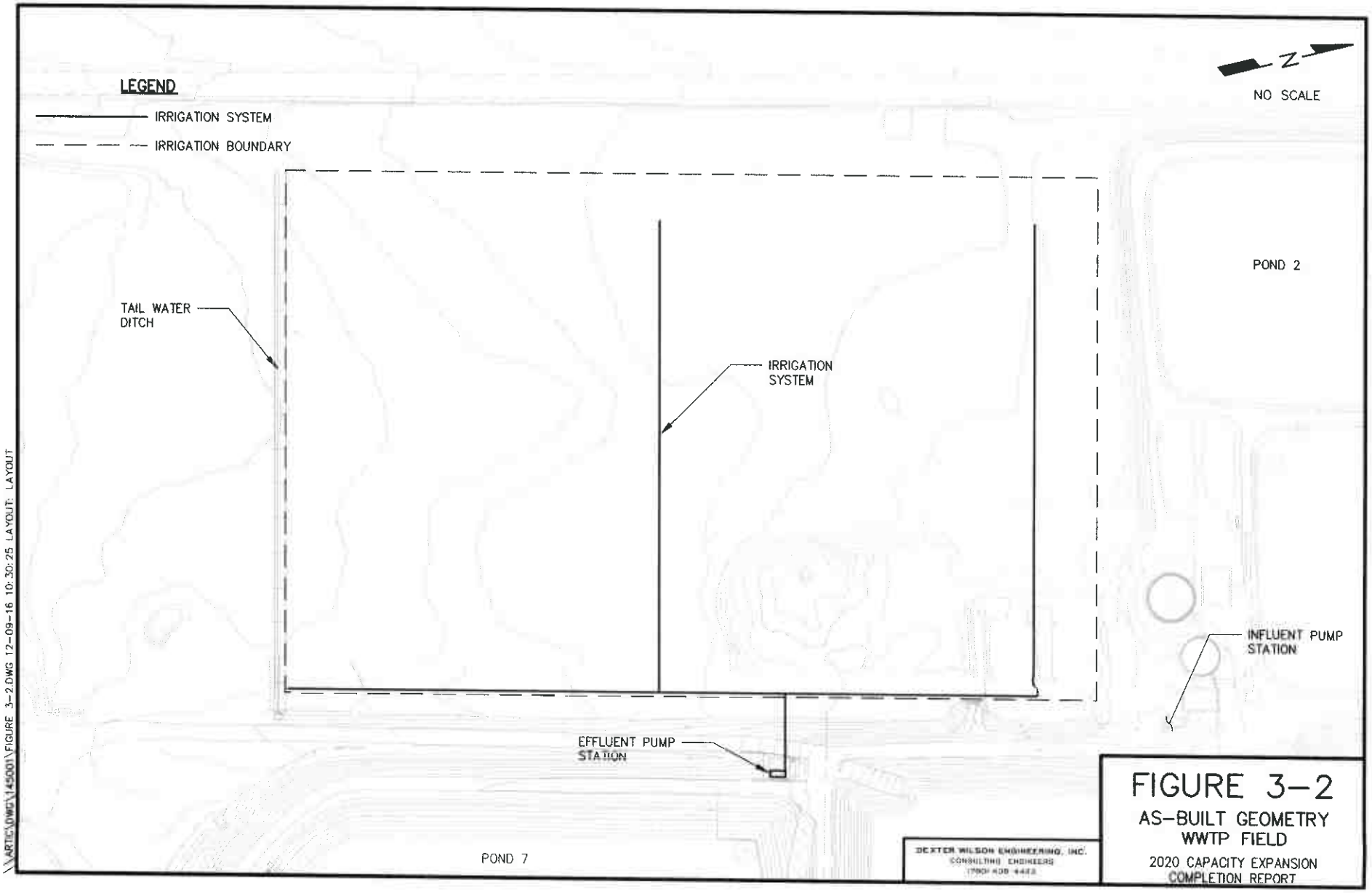
The WWTP Field is located on the WWTP property and owned by the City. Directly east of the WWTP Field are Ponds 5 and 7 and directly north are Ponds 1 and 2. Figure 3-2 shows as-built geometry and piping for the site.

The site has a 50-foot setback from the agricultural property to the west and a 150-foot setback from the artificial wetlands to the south. Accounting for setbacks the site has 5.6 acres of available area for irrigation.

Tailwater is collected in a ditch and drains to the existing wastewater collection system.



\\ARTIC\DWG\145001\FIGURE 3-1.DWG 12-09-16 10:20:04 LAYOUT: LAYOUT


LEGEND
IRRIGATION SYSTEM
IRRIGATION BOUNDARY
N
NO SCALE
POND 2
TAIL WATER DITCH
IRRIGATION SYSTEM
INFLUENT PUMP STATION
EFFLUENT PUMP STATION
POND 7
DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
FIGURE 3-2
AS-BUILT GEOMETRY
WWTP FIELD
2020 CAPACITY EXPANSION
COMPLETION REPORT
\\ARTIC\DWG\145001\FIGURE 3-2.DWG 12-09-16 10:30:25 LAYOUT: LAYOUT

Town Field

The Town Field is a 65-acre site owned by Green Rock Ranch LLC. The Town Field site borders agriculture to the east south, and southwest, the WWTP to the west, and Castle Village Mobile Home Park to the north. Figure 3-3 provides as-built geometry and piping for this site.

The site has a 50-foot setback from the southern, eastern and west property lines and a 150-foot setback from the north property line. With setbacks there are 57.1 acres of area to be irrigated.

Tailwater is collected on the western site of the field and is returned via gravity to the City collection system. During the 2015/16 winter rainwater ponded on the field. This caused the alfalfa crop to be inundated on portions of the field and to die.

PROPOSED LAND APPLICATION AREAS

The City proposes to use two additional Land Application Areas, Woodard Bottom and Dry Creek. The proposed LAAs are shown in Figure 3-1. Woodard Bottom and Dry Creek have available disposal areas of 115 acres and 522 acres, respectively. Both LAAs are part of the Rancho Arroyo Seco, a local ranch land, and would be used to raise fodder crops. The use of Dry Creek will not be analyzed in this report but will be considered part of the Regional System. Woodard Bottom will be a Phased Improvement in this report.

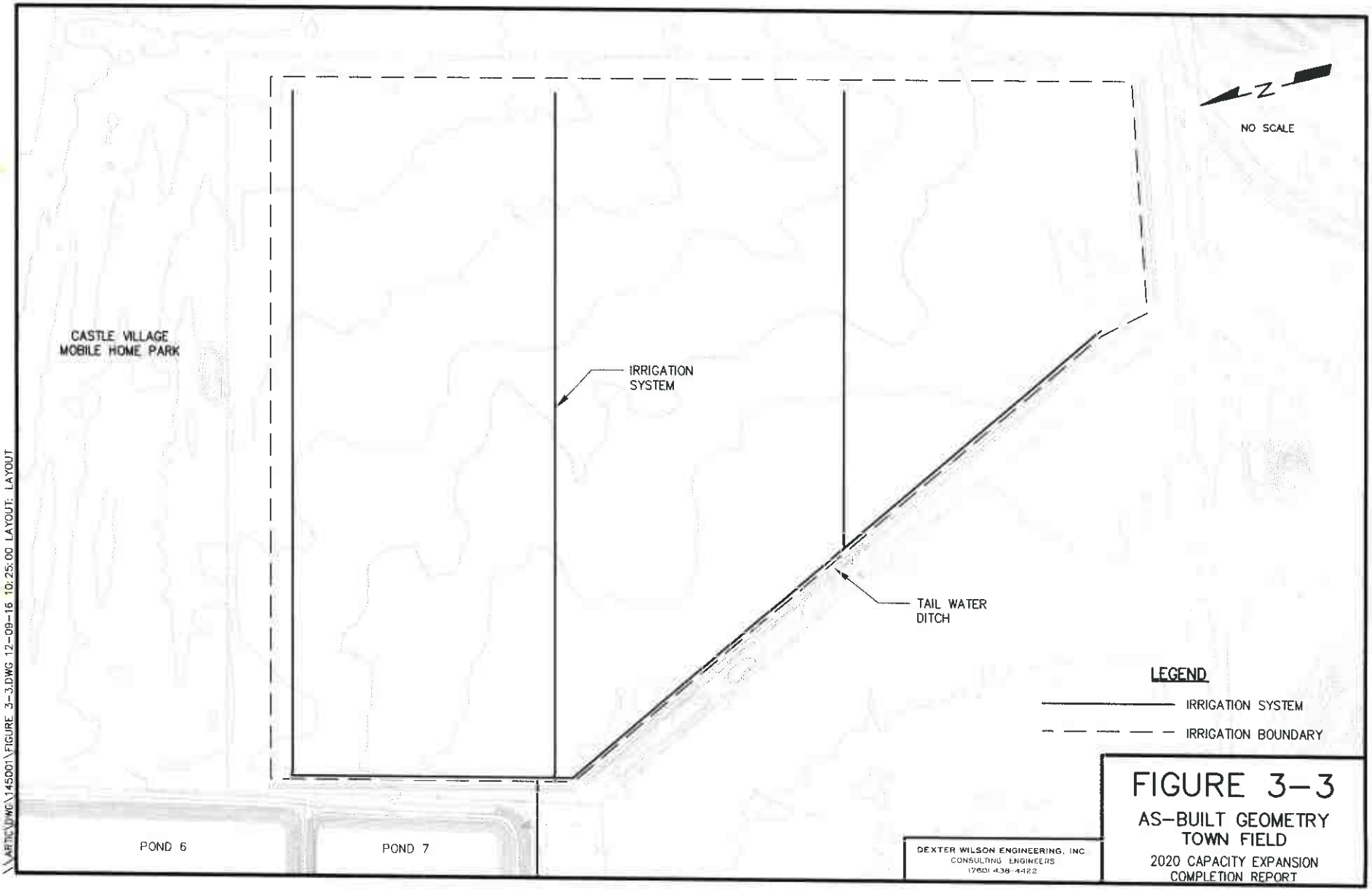

CASTLE VILLAGE
MOBILE HOME PARK
IRRIGATION
SYSTEM
TAIL WATER
DITCH
POND 6
POND 7
N
NO SCALE
LEGEND
IRRIGATION SYSTEM
IRRIGATION BOUNDARY
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FIGURE 3-3
AS-BUILT GEOMETRY
TOWN FIELD
2020 CAPACITY EXPANSION
COMPLETION REPORT
\\ARTIC\DWG\145001\FIGURE 3-3.DWG 12-09-16 10:25:00 LAYOUT: LAYOUT

CHAPTER 4

WATER SUPPLY QUALITY DATA

This section provides the domestic water quality for the City of Ione. All City water is provided by the Ione WTP. The WTP is operated by the Amador Water Agency (AWA). Table 3-1 lists constituents to be included in a RWD and the values that were listed in the 2014 AWA Annual Consumer Confidence Report.

TABLE 4-1
AMADOR WATER AGENCY WATER QUALITY

Constituent	Value	Units
Nitrate Nitrogen as N	<50	mg/L
pH	7.2	pH Units
Alkalinity	20	mg/L
Hardness	24	mg/L
Calcium	9.6	mg/L
Sodium	2.9	mg/L
Sulfate	2	mg/L
Arsenic	ND	ug/L
Iron	110	ug/L
Manganese	ND	ug/L

CHAPTER 5

WASTEWATER QUALITY DATA

This chapter will outline the influent and effluent wastewater quality data for the Ione WWTP. Table 5-1 shows the annual averages for influent flow and BOD as well as several effluent quality parameters for 2012 to 2014. The reported nitrogen data changed mid-2013 from reporting Nitrate as Nitrogen and Total Kjeldahl Nitrogen to reporting Total Nitrogen.

TABLE 5-1
AVERAGE ANNUAL WASTEWATER QUALITY DATA

Year	Influent BOD_5, mg/L	Effluent						
		BOD_5, mg/L	TDS, mg/L	EC, µmhos/cm	NO_3-N, mg/L	TKN, mg/L	Total Nitrogen	pH
2012[1]	237.8	23.7	226.9	458.0	3.9	20.5	--	7.3
2013[2]	263.6	25.4	239.3	429.0	10.2	18.8	18.1	7.3
2014	184.7	25.4	246.2	449.8	--	--	20.5	7.3

[1] Data based on April 2012 to December 2012

[2] Nitrogen monitoring switched from NO_3-N and TKN to Total Nitrogen in June 2013. No Nitrogen data from May 2013

CHAPTER 6

WASTEWATER FLOW PROJECTION

The purpose of this section is to identify and quantify each component of the various flows contributing to the overall flow into the WWTP and the percolation ponds, and to project future flows. A summary of historical flows at the Ione WWTP for 2012 to 2014 are shown in Table 6-1.

TABLE 6-1
HISTORICAL INFLUENT FLOW TO THE IONE WWTP

Year	ADWF, mgd	PWWF, mgd	Peak Day Peaking Factory
2012	0.390	0.813	2.1
2013	0.384	0.552	1.4
2014	0.394	0.860	2.2

These flows include Ione residential and commercial flows, Castle Oaks Water Reclamation Backwash Flows, and Amador Water Agency Backwash Flows. The Amador Water Agency Backwash Flows ceased discharging in 2016.

CURRENT WASTEWATER FLOWS

The service area for the City WWTP is composed of residential and commercial customers. The 2012 estimated EDU count was approximately 1,525.

Flow projections have been developed based on a review of historic flow. Components of the current and projected flow are summarized in Table 6-2 and discussed in detail below. Table 6-3 shows average monthly wastewater flows.

TABLE 6-2
SUMMARY OF CURRENT IONE
WASTEWATER FLOWS FROM 2013

Flow Component	Current Average Flow, mgd	Source
City Base Flows	0.274	--[1]
AWA Backwash Flows	0.065	AWA
COWRP Backwash Flows	0.045	COWRP
TOTAL	**0.384**	**Meter**

[1] Total flow minus AWA and COWRP backwash.

Influent flows to the Ione WWTP are measured at the influent flow meter and can be subdivided into three components: domestic wastewater from the City; backwash water from the Ione WTP; backwash and reject from COWRP. AWA and COWRP backwash flows are also metered. There is no meter that directly measures the residential and commercial flows from the City (City Base Flow). The City Base Flow is determined by subtracting the metered AWA and COWRP backwash flows from the Ione WWTP influent meter.

Each of these major flow components will now be discussed.

TABLE 6-3
2013 MONTHLY AVERAGE AND ANNUAL AVERAGE FLOWS, MGD

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.
Ione WWTP Influent Meter	0.356	0.324	0.324	0.372	0.339	0.340	0.416	0.486	0.476	0.454	0.399	0.325	0.384
COWRF Backwash to Secondary Plant	--	--	--	--	--	--	0.078	0.132	0.128	0.135	0.069	--	0.045
AWA Backwash Meter	0.051	0.051	0.051	0.054	0.069	0.068	0.089	0.095	0.085	0.067	0.053	0.051	0.065
City Wastewater Flow	0.305	0.272	0.273	0.318	0.270	0.272	0.250	0.259	0.263	0.252	0.278	0.273	0.274

AWA Flows

AWA operates the Ione Water Treatment Plant to produce potable water. This plant discharged backwash water from the plant's filters to the city sanitary sewer system until 2016. Backwash flows from the Ione WTP were measured at the WTP and reported as monthly totals to the City of Ione. Table 6-4 shows the average daily backwash flow rate for 2012 to 2014. In 2016 AWA completed a capital improvement project and therefore no longer discharges backwash flows to the city sanitary sewer system. Thus, AWA backwash flows will be removed from all future wastewater flow projections. AWA backwash flows are included in this discussion so proper accounting can be done on the estimated historical Ione WWTP flows.

TABLE 6-4
AVERAGE ANNUAL AWA BACKWASH FLOWS

Year	Average Flow, gpd
2012	60,000
2013	65,000
2014	53,000

Castle Oaks Water Reclamation Plant

Backwash flows from the COWRP are, at times, discharged to the Ione WWTP. The COWRP only operates in the summer to provide irrigation water to the Castle Oaks Golf Course. When the plant is operating the staff can send the backwash to the backwash treatment system, recycle it to the headworks or send it to the secondary plant. When trying to maximize recycle water production the operators send backwash to the secondary plant.

COWRP bacwashes can e discharged to the secondary plant from April to November. As shown in Table 6-3 the backwash in 2013 was only discharged in the months of July through Novemer. The peak discharge was 0.135 mgd or approximately 10 percent of the COWRP capacity. For the purpose of future flow projection for this report the COWRP backwash will be estimated as 10 percent of the influent flow to the COWRP.

This flow only occurs during the summer months and does not coincide with peak wet weather flows. Thus the COWRP backwash flows will not be added to wet weather flows for peak month computations. The average yearly flow of 0.045 mgd will be added to the yearly average.

It should also be noted that the COWRP does not send backwash water to the secondary plant at all times. When it is operating, the COWRP Operator can choose to send it to the secondary plant or not. Thus this discharge must be estimated on a daily basis considering where the Operator has directed the flow.

The City is continuing efforts to reduce the COWRP backwash flows to the wastewater plant. Additional sludge drying beds will be considered at the COWRP to reduce backwash flows to the secondary plant.

Ione Base Flows

The "base" flow for the City's system has been developed by subtracting the AWA and COWRP flows from the WWTP influent flow meter readings. This yields a result of 0.274 mgd. This flow is from 1,525 EDUs. These EDUs are primarily single family residences but include some multi-family and commercial (retail and office) connections. Dividing the "base" flow by the number of EDUs yields an average flow of 179.7 gpd per EDU.

Infiltration and Inflow

Table 6-5 provides a monthly summary of estimated infiltration and inflow (I/I) to the Ione WTP from 2007 to 2014. In order to project future I/I a graph showing monthly rainfall versus monthly I/I was developed. This graph is shown in Figure 6-1. A line was drawn through the points and this line will be used to project future I/I. The equation for the line is:

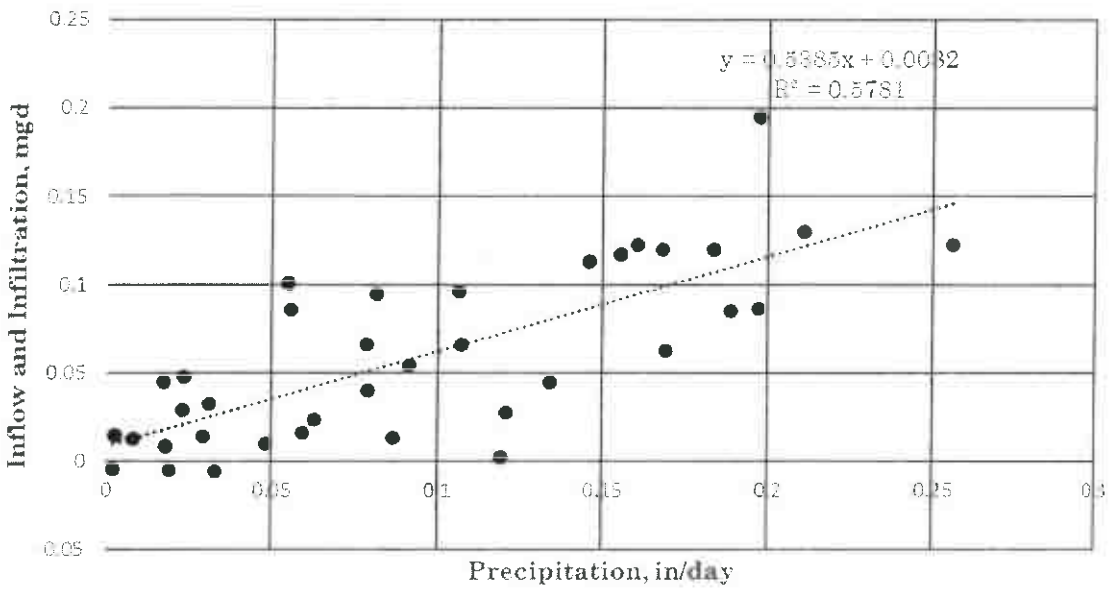
I + I MGD per month = 0.5385 x rainfall in inches per day for a month + 0.0082

This equation shows a constant inflow that is dependent on rainfall quantity so this equation will be used for all months including dry months. The information to support Table 6-5 and Figure 6-1 is shown in Appendix A.

TABLE 6-5
MONTHLY ESTIMATED INFILTRATION AND INFLOW

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	0.029	--	0.047	0.023	--	--	--	--	--	--	-0.006	0.002
2008	0.085	0.040	--	0.015	--	--	--	--	--	--	--	--
2009	--	0.117	0.054	0.032	--	--	--	--	--	--	-0.005	0.027
2010	0.120	0.096	0.094	0.122	--	--	--	--	--	--	0.045	0.130
2011	0.066	0.120	0.195	0.045	--	--	--	--	--	--	0.014	-0.005
2012	0.013	0.010	0.087	0.113	--	--	--	--	--	--	0.024	0.106
2013	0.044	0.011	0.012	0.057	--	--	--	--	--	--	0.085	0.012
2014	0.008	0.063	0.066	0.101	--	--	--	--	--	--	0.016	0.122

FIGURE 6-1
INFLOW AND INFILTRATION VERSUS PRECIPITATION



PROJECTED FLOWS

Projected flows are developed utilizing an assumed growth rate of 100 EDUs per year and the average flow per EDU, 179.7 gpd/EDU. As previously mentioned, AWA backwash flows are no longer discharged to the Ione WWTP. Thus, projected flows will not include AWA backwash flows. It is assumed that COWRP capacity will not increase in the future. It is also assumed that the inflow and infiltration rate will remain constant.

Table 6-6 shows the projected flows from 2016 to 2036. The table includes peak month and annual average flows estimated for COWRP Backwash and Inflow and Infiltration. Infiltration and Inflow is associated with wet weather, while COWRP Backwash is associated with dry weather. Thus, their peak flows will occur during different times of the year. A monthly analysis was conducted to determine when the peak of the combined flows is expected occur, and is shown in Table 6-7. The peak month combined Inflow and Infiltration and COWRP Backwash is during the month of July with flows of 0.156 mgd and 0.010 mgd, respectively. This combined peak flow of 0.166 mgd is expected to remain constant into the future.

Table 6-8 provides a summary of the required plant capacity for 2016 through 2036 based on the expected increase in City Wastewater and the projected peak month flow for COWRP backwash and Inflow and Infiltration.

TABLE 6-6
PROJECTED IONE WWTP FLOWS
2013 THROUGH 2036

Year	Number of EDUs Served	City Flow		COWRF Backwash for 100 Year Rain Event		Inflow and Infiltration for 100 Year Rain Event		TOTAL ADWF	
				Peak Month	Annual Average	Peak Month	Annual Average	Peak Month	Annual Average
		mgd	AF/Y	mgd	AF/Y	mgd	AF/Y	mgd	AF/Y
2013	1,525	0.274	307.0	0.156	39.6	0.141	77.6	0.571	346.6
2016	1,825	0.328	367.4	0.156	39.6	0.141	77.6	0.625	407.0
2021	2,325	0.418	468.0	0.156	39.6	0.141	77.6	0.715	507.6
2026	2,825	0.508	568.7	0.156	39.6	0.141	77.6	0.805	608.3
2031	3,325	0.598	669.3	0.156	39.6	0.141	77.6	0.895	708.9
2036	3,825	0.687	770.0	0.156	39.6	0.141	77.6	0.984	809.6

TABLE 6-7
100 YEAR RAIN EVENT MONTHLY COWRP BACKWASH AND INFLOW AND INFILTRATION

Flow Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
COWRP Backwash, mgd[1]	0.000	0.000	0.000	0.028	0.089	0.134	0.156	0.134	0.094	0.030	0.000	0.000
Inflow and Infiltration, mgd[2]	0.137	0.141	0.121	0.075	0.037	0.017	0.010	0.010	0.019	0.048	0.097	0.125
Total	**0.137**	**0.141**	**0.121**	**0.103**	**0.126**	**0.150**	**0.166**	**0.144**	**0.113**	**0.078**	**0.097**	**0.125**

[1] COWRP Backwash based on 10% reject at COWRP, where COWRP effluent is based on demand at Castle Oaks Golf Course for 100 Year Rain Event

[2] Inflow and Infiltration based on 100 Year Rain Event

TABLE 6-8
IONE WWTP DESIGN FLOW

Year	City Wastewater ADWF, mgd	Peak Month Non-City Flow, mgd[1]	Total Design Flow, mgd
2016	0.328	0.166	**0.494**
2021	0.418	0.166	**0.584**
2026	0.508	0.166	**0.674**
2031	0.598	0.166	**0.764**
2036	0.687	0.166	**0.853**

[1] Peak Month Non-City Flow is the maximum sum of COWRP Backwash and Inflow and Infiltration for any month during the 100 Year Rain Event

CHAPTER 7

TREATMENT CAPACITY

The purpose of this chapter is to analyze the treatment capacity for each unit operation of the Ione WWTP.

IONE WASTEWATER TREATMENT PLANT BIOCHEMICAL OXYGEN DEMAND

Table 7-1 shows the average yearly influent and effluent Biochemical Oxygen Demand (BOD). The table also shows average yearly overall percent removal of BOD.

TABLE 7-1
AVERAGE ANNUAL BOD AND PERCENT REMOVAL

Year	Influent	Effluent	% Removal
2012	237.8	23.7	90.0
2013	263.6	25.4	90.4
2014	184.7	25.4	86.2
Average	**231.7**	**25.6**	**88.87**

METHODOLOGY

In order to determine the treatment capacity of the WWTP, it is assumed that BOD removal is a first-order mechanism. The treatment is then assessed for ponds in series. The overall first-order removal-rate constant, k, is assumed to be 0.276 per day according to the EPA publication "Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers" from August 2011. Table 7-2 shows the BOD removal capacity of each pond as well as the cumulative capacity in series for a wastewater flowrate of 0.7 mgd. From the table it can be seen that at 0.7 mgd, 95 percent removal of BOD is achieved.

TABLE 7-2 PERCENT BOD REMOVAL AT 0.7 MGD			
Pond	**Volume, MG**	**Percent BOD Removal per Pond**	**Cumulative Percent BOD Removal**
1	3.1	55	55
2	2.5	50	77
3	2.0	44	87
4	3.7	59	**95**

Winter BOD Removal

The first-order removal-rate constant used for Table 7-1 is based on an influent temperature of 20-degrees Celsius. Table 7-3 presents the removal rates for 0.7 mgd after adjusting temperature for winter conditions. The constant is adjusted to match winter temperatures based on a treatment water temperature of 15.6-degrees Celsius. This treatment temperature is based on the influent temperature of Pond 5 which was calculated using Pond 5 temperature data from December 19, 2014 and the Mancini and Barnhart Equation from Metcalf and Eddy 4th Edition. It is assumed that the influent temperature of Pond 5 is the treatment temperature for all upstream ponds which is a conservative assumption.

TABLE 7-3 PERCENT BOD REMOVAL AT 0.7 MGD, WINTER			
Pond	**Volume, MG**	**Percent BOD Removal per Pond**	**Cumulative Percent BOD Removal**
1	3.1	51	51
2	2.5	46	73
3	2.0	40	84
4	3.7	55	93

Summary

The existing four ponds meet the City needs for wastewater treatment for BOD removal for the projected 2036 City flow of 0.687 mgd. The I&I and COWRP backwash flow will not increase the BOD load to the plant significantly so the four ponds will also treat the 2036 peak flows.

CHAPTER 8

EFFLUENT DISPOSAL AND STORAGE NEEDS

Until recently, the City of Ione relied on the Castle Oaks Golf Course and three percolation ponds for effluent disposal. While Pond 5 is technically still a percolation pond because it is not lined, this pond will not be considered as a percolation pond for the purposes of this study. The long-term plan is to line Pond 5 and turn it in to a mixing pond to direct effluent to a variety of disposal options. Pond 6 and Pond 7 also will be used as percolation ponds until they are lined and then they will be used only for storage. We will also discuss Town Field, City Field and Castle Oaks as existing spray disposal fields. The future spray disposal fields, Woodard Bottom and Dry Creek, will also be described.

Contractual obligations for effluent disposal are also described in this chapter. Ione has a contractual obligation to dispose of effluent from ARSA and CDCR. Future disposal will be considered with and without ARSA flows. The Regional Study describes the option for joint disposal of ARSA flows.

EFFLUENT SOURCES

The effluent sources which must be disposed of by the City of Ione are their own secondary effluent, ARSA effluent, and CDCR effluent. Table 8-1 shows the monthly contractual obligations that Ione has with ARSA and CDCR for effluent disposal. There is a discrepancy between the yearly obligation and the monthly obligation. Since Ione has limited storage we will use the monthly requirements for effluent disposal for options which include ARSA. The Castle Oaks Golf Course will be dedicated for disposal of tertiary effluent. We have also included the additional disposal needs for CDCR at Woodard Bottom in the disposal calculations. Table 8-2 shows CDCR flows used in future runs to determine CDCR disposal needs.

TABLE 8-1
CONTRACTUAL OBLIGATION FOR EFFLUENT DISPOSAL FOR ARSA AND CDCR

Month	Flow per Month[1], AF
January	10
February	10
March	10
April	95
May	95
June	95
July	95
August	95
September	95
October	10
November	10
December	10
TOTAL	**630**

[1] Per section 5 of the 2007 Agreement to Regulate use of Henderson/ Preston Wastewater Disposal System.

TABLE 8-2
CDCR DISPOSAL NEEDS BY MONTH

Month	Flow per Month, AF		
	2007 Agreement	Woodard Bottom Agreement	Total
January	5.5	0	5.5
February	5.5	0	5.5
March	5.5	0	5.5
April	13.2	9.2	22.4
May	39.6	24.6	64.2
June	42.0	46.0	88.0
July	52.8	46.0	98.8
August	52.8	46.0	98.8
September	13.2	0	13.2
October	0	0	0
November	0	0	0
December	0	0	0
Total	**230.1**	**171.8**	**401.9**

Disposal

The disposal calculations will rely on three mechanisms. The first mechanism is evaporation and this will be considered for any pond which has water in it. The two other mechanisms are percolation and irrigation. Percolation Ponds 6 and 7 as well as City Field, Town Field, Castle Oaks, Woodard Bottom and Dry Creek are discussed in the section.

Percolation Pond 6

Table 8-3 provides information on the recent percolation rates in Pond 6. As can be seen in this chart the estimated percolation rate for Pond 6 is a minimum of 0.430 mgd. Any percolation rate data prior to 2013 is invalid. This is due to the fact that the pond had not been given a rest in years. The bottom of the pond had become impervious. Percolation ponds need to have extended rest periods in order for the soil beneath the pond to aerate and regain its percolation rate. The current operational plan for the percolation ponds has each pond with a minimum yearly rest of six months. With a minimum yearly rest period of six months the long-term percolation rates should be equal to or greater than those shown in Table 8-3.

TABLE 8-3
POND 6 PERCOLATION RATES

Month	Average Flow Rate, mgd	Freeboard, ft[1]	Percolation Rate, mgd	Percolation Rate, in/day
Nov. 2014	0.322	NM	≥ 0.322	≥ 3.96
Dec. 2014	0.430	NM	≥ 0.430	≥ 5.29
Jan. 2015	0.329	NM	≥ 0.329	≥ 4.05
Feb. 2015	0.408	NM	≥ 0.408	≥ 5.02
Mar. 2015	0.339	NM	≥ 0.339	≥ 4.17
Apr. 2015	0.359	8.8	≥ 0.359	≥ 4.41
May 2015	0.367	NM	≥ 0.367	≥ 4.51

[1] NM, Not Measurable

Percolation Pond 7

Table 8-4 shows the historic percolation rate for Pond 7. The estimated historic percolation rate for Pond 7 is 0.101 mgd. At the time the percolation rates were occurring in Table 8-4, the pond had not been properly dried and disced. Based on the percolation rates that occurred in Pond 6 after being rested and disced it is expected that the percolation rate will increase. This report assumes that after discing the percolation rate of Pond 7 will be equal to that of Pond 6 on a per area basis. Table 8-5 shows the projected percolation rate for Pond 7. Pond 7 will be lined and converted to a storage pond after City Field is converted to storage. This will be the last of the storage ponds.

TABLE 8-4
POND 7 HISTORIC PERCOLATION RATES

Freeboard, ft		Date		Number of Days	Estimated Volume Percolated, mgd	Percolation Rate, mgd	Percolation Rate, in/day
Start	End	Start	End				
2.0	3.0	11/23/2013	12/1/2013	8	1.301	0.163	1.3
3.0	4.0	12/1/2013	12/12/2013	11	1.390	0.126	1.0
4.0	5.0	12/12/2013	12/30/2013	18	1.135	0.063	0.5
5.0	5.8	12/30/2013	1/12/2014	13	0.925	0.071	0.6
2.0	3.0	2/11/2014	2/27/2014	16	1.330	0.083	0.7
AVERAGE						**0.101**	**0.75**

TABLE 8-5

PROJECTED PERCOLATION RATE FOR POND 7

Pond 6 Percolation Rate, in/day	Pond 7 Area, Acres	Pond 7 Percolation Rate, mgd
≥ 5.29	4.52	≥ 0.649

City Field

City Field is approximately 5.8 acres. Table 8-6 shows the estimated monthly disposal available on City Field. This field is currently planted with alfalfa. It is the intent to plant this field with alfalfa for the foreseeable future. The City field is permitted for disposal of undisinfected secondary effluent. After Woodard Bottom is put in service this spray field will be converted to a storage area.

TABLE 8-6
CITY FIELD
ESTIMATED MONTHLY DISPOSAL
DURING WET YEAR

Month	Irrigation Demand, AF[1]
January	0.0
February	0.0
March	0.0
April	1.33
May	3.24
June	4.51
July	5.40
August	4.63
September	3.20
October	1.29
November	0.0
December	0.0
Total	**23.59**

[1] See Appendix B for derivation of these numbers.

Town Field

Town field is approximately 57.1 acres. Table 8-7 provides an estimate of the monthly disposal capacity on this field. Town Field is also planted with the alfalfa and is the intent to keep this field planted with alfalfa. The Town Field is permitted for disposal of undisinfected secondary effluent.

TABLE 8-7
TOWN FIELD
ESTIMATED MONTHLY DISPOSAL
DURING WET YEAR

Month	Irrigation Demand, AF[1]
January	0.0
February	0.0
March	0.0
April	13.06
May	31.86
June	44.38
July	53.15
August	45.61
September	31.48
October	12.68
November	0.0
December	0.0
Total	**232.22**

[1] See Appendix B for derivation of these numbers.

Castle Oaks Golf Course

The Castle Oaks Golf Course utilizes tertiary effluent from the Castle Oaks Water Reclamation Plant for irrigation. Table 8-8 provides an estimate of the monthly irrigation needs of the golf course.

TABLE 8-8
CASTLE OAKS GOLF COURSE
MONTHLY IRRIGATION NEEDS
DURING WET YEAR

Month	Irrigation Demand, AF[1]
January	0.0
February	0.0
March	0.0
April	23.16
May	76.03
June	110.64
July	133.83
August	114.72
September	77.87
October	26.04
November	0.0
December	0.0
Total	**562.29**

[1] See Appendix B for derivation of these numbers.

Woodard Bottom

It is assumed that Woodard Bottom will have a minimum effluent quality of disinfected secondary effluent. Woodard Bottom is approximately 115 acres. This area has been described in past reports to the Regional Board as an effluent disposal area. Table 8-9 provides an estimate of the available effluent disposal by month for Woodard Bottom. CDCR and the City of Ione are in discussions to put this field in service at this time. The purpose of putting the field in service would be to allow for beneficial reuse of effluent from CDCR in lieu of using their spray disposal fields. When this field is put in service it will be planted with Sudan grass so a firm supply of water would not be needed. Water would be delivered to this field as long as effluent was available and then irrigation would cease and the Sudan grass would be harvested. It is assumed that Ione effluent will not be discharged to Woodard Bottom until disinfection is added to the Ione WWTP process stream.

TABLE 8-9
WOODARD BOTTOM
ESTIMATE OF AVAILABLE EFFLUENT DISPOSAL BY MONTH DURING WET YEAR

Month	Irrigation Demand, AF[1]
January	0.0
February	0.0
March	0.0
April	26.30
May	64.17
June	89.37
July	107.04
August	91.86
September	63.41
October	25.55
November	0.0
December	0.0
Total	**467.70**

[1] See Appendix B for derivation of these numbers.

Dry Creek

The Dry Creek area has approximately 522 acres. This acreage is being considered as a long-term effluent disposal site. It is not needed to meet City of Ione disposal requirements. Table 8-10 shows the available effluent disposal capacity on Dry Creek by month. This disposal area would only be put in service if a regional disposal solution with ARSA is considered.

TABLE 8-10
DRY CREEK
AVAILABLE EFFLUENT DISPOSAL CAPACITY DURING WET YEAR

Month	Irrigation Demand, AF[1]
January	0.0
February	0.0
March	0.0
April	119.36
May	291.28
June	405.68
July	585.88
August	416.98
September	287.81
October	115.96
November	0.0
December	0.0
Total	**2,122.94**

[1] See Appendix B for derivation of these numbers.

DISPOSAL AND STORAGE CAPACITY

A detailed water balance model was created to account for all of the flow contributions to Ione and all of the disposal available to Ione. The model also accounts for evaporation and precipitation for all storage and disposal areas. A detailed explanation and all model outputs are in Appendix B. Nine model runs are included in this report. They are broken into four groups. Each of the groups represents a year. The model runs are described below. Table 8-11 provides a summary of the model runs.

TABLE 8-11
NOVEMBER 2016 WATER BALANCING SUMMARY OF IONE WWTP

Run	Flow Year	ARSA	CDCR	Percolation	Land Application Areas (Spray Fields)		Required Additional Storage	Total Storage
1	2016	Yes (650 AF[1])		Pond 6 & 7 (435 AF)	Town (99 AF)		0 AF	51 AF
2A	2018	Yes (650 AF)[1]		Pond 6 & 7 (466 AF)	Town (109 AF)		0 AF	51 AF
2B	2018	No	Yes (402 AF)	Pond 7 (282 AF	Town (45 AF)		0 AF	32 AF
2C	2018	No	Yes (402 AF)	None	Town (232 AF)	Woodard (95 AF)	158 AF	245 AF
2D	2018	No	Yes (402 AF)	None	Town (232 AF)	Woodard (95 AF)	158 AF	245 AF
3A	2020	No	Yes (402 AF)	None	Town (232 AF)	Woodard (155 AF)	222 AF	309 AF
3B	2020	No	Yes (402 AF)	None	Town (232 AF)	Woodard (155 AF)	222 AF	309 AF
4A	2036	No	Yes (402 AF)	None	Town (232 AF)	Woodard (457 AF)	330 AF	417 AF
4B	2036	No	Yes (402 AF)	None	Town (232 AF)	Woodard (457 AF)	330 AF	417 AF

[1] This is a discrepancy in the agreement (at one point 650 AF was used instead of 630 AF).

Current Conditions – Run 1

This run assumes Ione receives the flows it is contractually obligated to take from CDCR and ARSA. This condition will continue until additional storage is constructed. The following assumptions are used for Run 1.

1. Percolation is allowed in Pond 6 and Pond 7.

2. Only Castle Oaks, City Field and Town Field are available for disposal.

This run shows no additional improvements are needed to store and dispose of effluent. Table 8-12 summarizes this run.

TABLE 8-12
RUN 1 CURRENT CONDITIONS - IONE 2016 FLOW, ARSA & CDCR CONTRACTUAL FLOWS, AND 100 YEAR RAIN EVENT WITHOUT WOODARD BOTTOM

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	650	0	650
CDCR			
Ione	367	0	367
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	435	-435
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	99	-99
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	**1,144**	**1,144**	**0**
TOTAL STORAGE REQUIRED (AF)			**51**

2018- Run 2A, 2B, 2C and 2D

Runs 2A, 2B, 2C and 2D reflect different conditions as the Ione percolation ponds are taken out of service. Run 2A shows 2018 flows with ARSA flows included and the percolation ponds in service. For Run 2B the ARSA flows have been removed, the CDCR flows have been reduced per the Woodard Bottom Agreement, and Woodard Bottom has been put in service. For this run Ponds 5 and 6 are assumed to be lined and City Field has been taken out of service. Pond 7 in still in use as a percolation pond. For runs 2C and 2D Pond 7 has been lined and additional storage has been built or acquired. For run 2C additional storage has been an acquired in Preston Reservoir and four runs 2D. City Field has been taken out of service and additional storage has been built on City Field. Tables 8-13, 8-14, 8-15 and 8-16 provide summaries of these four runs. These runs have been completed to assure that adequate disposal capacity is available to Ione during all stages of construction.

TABLE 8-13
RUN 2A - IONE 2018 FLOW, ARSA & CDCR CONTRACTUAL FLOWS, AND 100 YEAR RAIN EVENT WITHOUT WOODARD BOTTOM

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	650	0	650
CDCR			
Ione	408	0	408
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	466	-466
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	109	-109
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	**1,185**	**1,185**	**0**
TOTAL STORAGE REQUIRED (AF)			**51**

TABLE 8-14
RUN 2B- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, PERCOLATION POND 7 ONLY, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	408	0	408
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	282	-282
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	45	-45
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	0	0
Dry Creek (LAA)	0	0	0
TOTAL	**937**	**937**	**0**
TOTAL STORAGE REQUIRED (AF)			**32**

TABLE 8-15
RUN 2C- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	408	0	408
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	95	-95
Dry Creek (LAA)	0	0	0
TOTAL	**937**	**937**	**0**
TOTAL STORAGE REQUIRED (AF)			**245**

TABLE 8-16
RUN 2D- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	408	0	408
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	95	-95
Dry Creek (LAA)	0	0	0
TOTAL	**937**	**937**	**0**
TOTAL STORAGE REQUIRED (AF)			**245**

2020 Run 3A and 3B

Run 3A and 3B summarize disposal and storage options in the year 2020. These runs assume that no percolation ponds are available and all effluent is disposed of through irrigation. Run 3A assumes storage has been acquired in Preston Reservoir and run 3B assumes City Field has been converted to storage. Tables 8-17 and 8-18 summarize these runs.

TABLE 8-17
RUN 3A- IONE 2020 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	468	0	468
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	155	-155
Dry Creek (LAA)	0	0	0
TOTAL	**997**	**997**	**0**
TOTAL STORAGE REQUIRED (AF)			**309**

TABLE 8-18
RUN 3B- IONE 2020 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	468	0	468
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	155	-155
Dry Creek (LAA)	0	0	0
TOTAL	**997**	**997**	**0**
TOTAL STORAGE REQUIRED (AF)			**309**

2036 Run 4A and 4B

Runs 4A and 4B are summarized in Tables 8-19 and 8-20. These runs use 2036 Ione flows and assume no percolation ponds are in service. For Run 4A it is assumed additional storage is acquired in Preston Reservoir and for Run 4B City Field has been converted to storage.

TABLE 8-19
RUN 4A- IONE 2036 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	770	0	770
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	457	-457
Dry Creek (LAA)	0	0	0
TOTAL	**1,299**	**1,299**	**0**
TOTAL STORAGE REQUIRED (AF)			**417**

TABLE 8-20
RUN 4B- IONE 2036 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Parameter	Water In, AF/Y (+)	Water Out, AF/Y (-)	Total, AF/Y
ARSA	0	0	0
CDCR	402	0	402
Ione	770	0	770
Rainfall (Ponds 5, 6, & 7)	49	0	49
Inflow/Infiltration	78	0	78
Percolation (Ponds 6 & 7)	0	0	0
Evaporation (Ponds 5, 6, & 7)	0	48	-48
Castle Oaks Golf Course Irrigation	0	562	-562
Town Field (LAA)	0	232	-232
City Field (LAA)	0	0	0
Woodard Bottom (LAA)	0	457	-457
Dry Creek (LAA)	0	0	0
TOTAL	**1,299**	**1,299**	**0**
TOTAL STORAGE REQUIRED (AF)			**417**

CHAPTER 9

WET WEATHER STORAGE

In order to eliminate percolation ponds the City of Ione will need additional storage to retain treated wastewater over the winter. Currently only Ponds 5, 6 and 7 are available for storage but even these ponds would need to be lined. It may be possible for the City of Ione to obtain storage in Preston Reservoir. If sufficient storage could be obtained in Preston Reservoir, a new storage reservoir would not have to be built. This chapter discusses the available storage capacity and existing reservoirs and contemplates a new storage reservoir on City Field if storage cannot be obtained in Preston Reservoir.

EXISTING STORAGE

Table 9-1 shows the storage available in existing reservoirs. Table 9-2 shows the additional needed storage under various scenarios.

TABLE 9-1
EXISTING AVAILABLE STORAGE

Description	AF
Pond 5	36.8
Pond 6	25.3
Pond 7	25.7
Subtotal	**87.8**
Preston Reservoir	**235.0**
TOTAL	**322.8**

TABLE 9-2 IONE WET WEATHER STORAGE NEEDS ALL NUMBERS IN ACRE-FEET					
Year	Total Need	Existing Ponds 5, 6 & 7	Preston Reservoir	Additional Storage Needed	
				With Preston Reservoir	Without Preston Reservoir
2018	245	87.8	235.0	0	157.2
2020	309	87.8	235.0	0	221.2
2036	417	87.8	235.0	94.2	329.2

Pond 5

Pond 5 has an existing storage capacity of 36.8 acre-feet. Recent improvements to Pond 5 have added pumps to supply water to Town Field or City Field. An aerator was also added. Future improvements associated with Pond 5 include a liner and chlorination system. This will allow Pond 5 to be the central receiving and distribution pond for the Ione secondary effluent.

Pond 6

Pond 6 has an existing storage capacity of 25.3 acre-feet. This pond would also need to be lined and taken out of use as a percolation pond. It may be possible to increase the storage in this pond by slightly adding to the walls or deepening the pond. This should be looked at during the lining process for the pond.

Pond 7

Pond 7 has an existing storage capacity of 25.7 acre-feet. This pond also needs to be lined and taken out of use as a percolation pond. It also may be possible to slightly increase the storage in this pond by adding to the walls or deepening the pond. This should also be looked at during the lending process for the pond

Preston Reservoir

Preston Reservoir has an existing capacity of 235 acre-feet. This storage capacity is currently being used by ARSA though the reservoir is owned by CDCR. If ARSA finds a wastewater solution without coming down to Preston Reservoir this reservoir would be available for use by the City of Ione. The piping being contemplated by CDCR would allow Ione to pump back through the piping system and to make use of the reservoir. Prior to construction of a new reservoir use of this reservoir should be thoroughly vetted.

Future Storage

If capacity can not be obtained in Preston Reservoir one or more new reservoirs will have to be built. The reservoir could be constructed to serve Ione or could be part of a regional solution. Under either alternative Ione would need 329.2 acre-feet of additional storage by the year 2036. The regional storage solution has not been considered in this report. This section will deal with a new reservoir on the site of the existing City Field serving only Ione.

City Field Reservoir. The City Field Reservoir would be constructed by taking the existing spray disposal area out of service. Figure 9-1 shows a concept plan of the reservoir. The reservoir would need to be 221.2 acre-feet in order to serve the City of Ione's needs through the year 2020. This storage option will only be implemented if the regional solution is not pursued and if ARSA continues to use the Preston Reservoir.

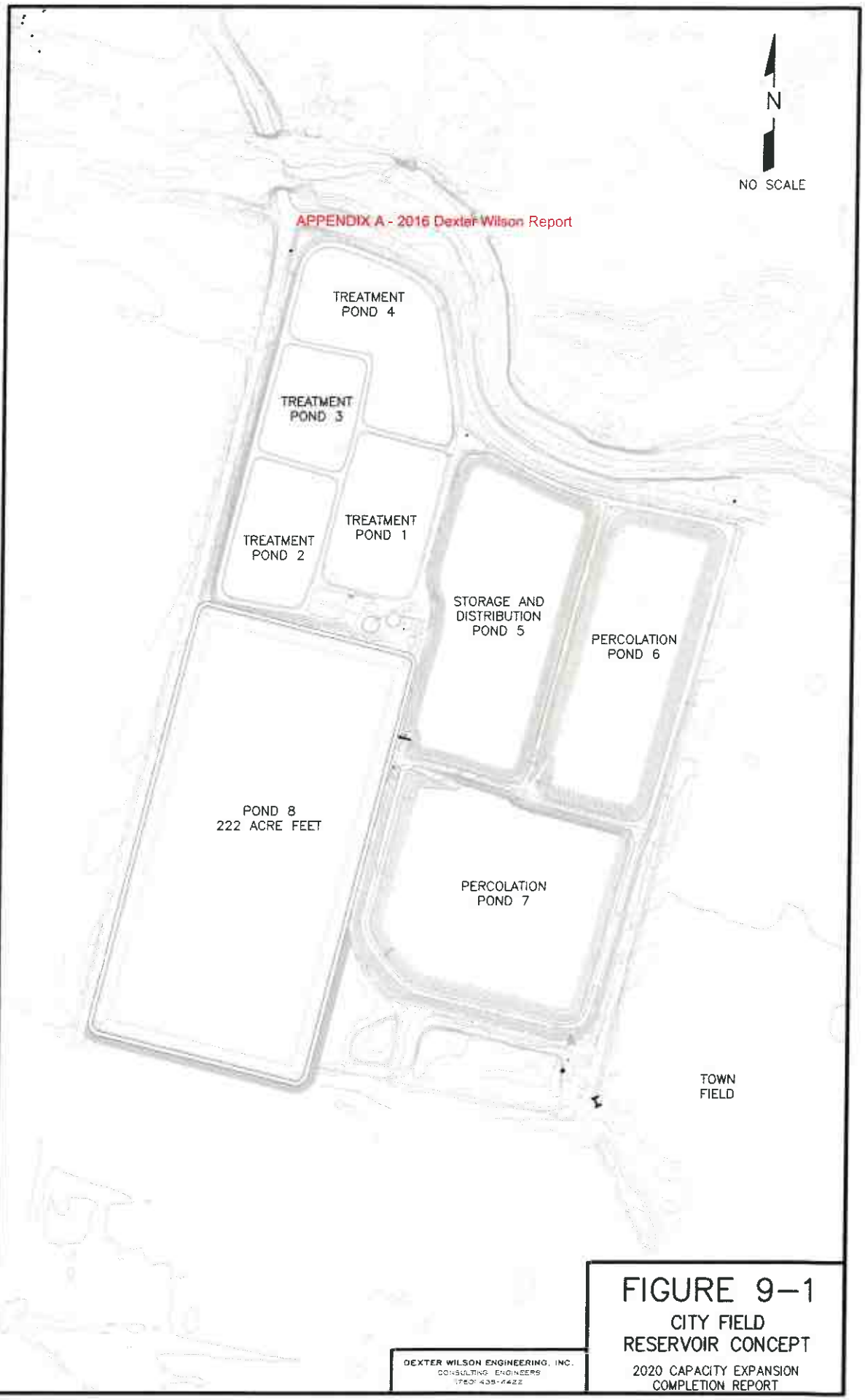


FIGURE 9–1

CITY FIELD
RESERVOIR CONCEPT

2020 CAPACITY EXPANSION
COMPLETION REPORT

CHAPTER 10

CAPITAL IMPROVEMENT PROGRAM

The City of Ione is currently in a contractual Wastewater Disposal Agreement with CDCR and ARSA. The three partners have completed a Regional Water Recycling Facility Study. If all three partners remain in the contractual Wastewater Disposal Agreement, the Regional Study will outline some of the improvements needed in the future. Capital improvements in this chapter are intended to comply with the Regional Water Quality Control Board requirements in the 2014 Cease and Desist order as well as provide improvements needed for City of Ione growth and improvements to the secondary treatment plant.

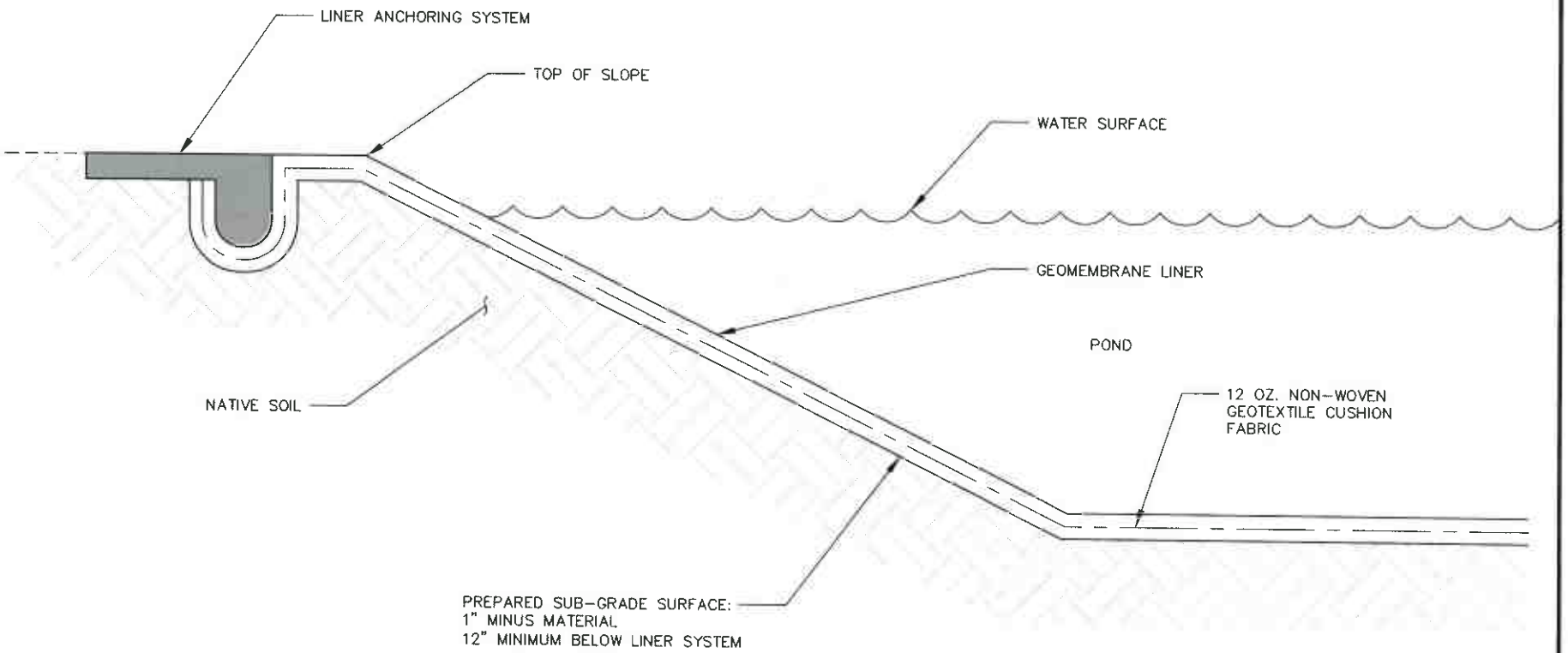
Treatment Plant Upgrades

The City of Ione Secondary Treatment Plant needs chlorination improvements and Ponds 1-4 need to be lined. Pond 5 also needs to be lined. These improvements are discussed below.

Lining Ponds 1 through 4

The City utilizes Ponds 1 through 4 for secondary treatment of wastewater. These ponds will be lined with a geosynthetics material. While these ponds are aerated, sludge accumulates on the bottom of these ponds so the bottom of these ponds are anaerobic. Since the bottom of these ponds are anaerobic, there is currently no contact between the atmosphere and the area beneath the ponds.

To remedy this a gravel or porous mat will be constructed underneath the geosynthetics liner to allow air to reach the area beneath the ponds. This should allow for the area beneath the ponds to be aerated and provide another mechanism to reduce iron and manganese levels in the groundwater beneath the ponds. In order to keep the plant in operation it is planned to line the ponds one at a time. Figure 10-1 shows the cross section of the pond lining system.



NO SCALE

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

FIGURE 10-1

TYPICAL LINER DETAIL

2020 CAPACITY EXPANSION
COMPLETION REPORT

\ARTIST\DWG\145001\FIGURE 10-1.DWG 12-09-16 11:55:23 LAYOUT: LAYOUT

Lining of Pond 5 and Chlorination

The future planned use of Pond 5 is as a mixing, storage and effluent distribution pond. All water from Pond 4 will be directed to Pond 5. From Pond 5 water will be directed to City Town Field, Woodard Bottom, other disposal areas or to storage. Pond 5 will be lined. The liner will be a geosynthetic material to prevent seepage of stored effluent into the groundwater. This liner will include a gravel layer or porous mat beneath the geosynthetic material to be sure the atmosphere is in contact with the ground under the pond. Pumps will also be added to Pond 5 to allow for effluent disposal to Woodard Bottom. As part of the pond lining project a chlorination system will be added.

A storage tank for sodium hypochlorite and a feed system will be constructed. The chlorine will be added at the Pond 4 discharge. A 30" PVC pipe was installed with Phase 1B improvements to provide 90 minutes of detention time from Pond 4 to Pond 5. The pond liner would be as shown in Figure 10-1

Lining Pond 6 and 7

Ponds 6 and 7 will be lined as soon as additional disposal options are available. The liner would be as shown in Figure 10-1.

Irrigation Well

An irrigation well is proposed in the treatment plant area. The purpose of this well is to provide a supplemental source of water when needed to meet peak irrigation needs of the City Field, Town Field and Castle Oaks Golf Course. An additional benefit of this well is it will provide for more flushing of the high iron and manganese groundwater beneath the ponds. When this water is replaced with upstream water sources having higher oxygen levels, the iron and manganese levels in the groundwater should decrease.

Woodard Bottom

In order to dispose of future effluent Woodard Bottom will be placed in service as an effluent disposal site. All of the current effluent disposal sites require continuous irrigation during the summer to maintain the grass or crop. Sudan grass will be planted on Woodard Bottom since it is an annual. Sudan grass can be harvested at any time during the summer. Thus this field can have a variable water demand based on effluent availability and allow for the City to have some flexibility in irrigation needs between dry and wet years. This project will be done in partnership with CDCR. CDCR is funding this project so the costs are not included in the cost estimate for the proposed capital improvement program.

City Field Reservoir

The cost for City Field Reservoir is included in the cost estimates, in case capacity cannot be obtained in Preston Reservoir. This reservoir will need to be 222 acre-feet to meet 2020 needs.

CAPITAL IMPROVEMENT PROJECTS COSTS

Table 10-1 provides a cost estimate for the projects described above.

TABLE 10-1
COST ESTIMATES

Project	Estimated Cost
Liner Pond 1-4	$540,000
Irrigation Well	$250,000
Liner Pond 5 and Chlorination	$400,000
Liner Pond 6	$300,000
Liner Pond 7	$440,000
City Field Reservoir	$7,233,000
TOTAL	**$9,163,000**

APPENDIX A

INFLOW AND INFILTRATION CALCULATIONS

APPENDIX A

INFLOW AND INFILTRATION CALCULATIONS

Inflow and Infiltration (I&I) is estimated for each month of the wet season by comparing the monthly City Base Flow to the average dry weather City Base Flow. For the purposes of estimating I&I, the monthly average City Base Flows for the months of May through October 2013 were used to determine the average dry weather City Base Flow. These flows are shown in Table A-1. The average of these flows is 0.261 mgd.

TABLE A-1
2013 CITY BASE FLOWS – MAY TO OCTOBER, mgd

May	Jun	Jul	Aug	Sep	Oct	Avg
0.270	0.272	0.250	0.259	0.263	0.252	0.261

Backwash from COWRP was not considered in the determination of I&I because the COWRP does not operate during the wet season. Thus, the basis of comparison to the average dry weather flow is the average monthly flow to the Ione WWTP minus AWA backwash flows. Table A-2 shows average monthly WWTP flows, AWA flows, WWTP minus AWA flows, and estimated I&I.

To predict future I&I, average monthly I&I was plotted versus the average day precipitation for each month. Table A-3 shows each estimated monthly I&I, monthly precipitation, and average day precipitation for the month. Figure 6-1 shows the resulting scatter plot and linear regression of the data.

TABLE A-2
INFLOW AND INFILTRATION ESTIMATE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007												
WWTP Meter, mgd	0.371		0.391	0.370	0.386	0.392	0.378	0.335	0.334	0.307	0.320	0.334
AWA Meter, mgd	0.081	0.084	0.083	0.085	0.094	0.099	0.096	0.095	0.076	0.064	0.065	0.071
WWTP Meter - AWA Meter, mgd	0.290		0.308	0.284	0.293	0.293	0.281	0.240	0.258	0.243	0.255	0.263
I & I, mgd	**0.029**	**–**	**0.047**	**0.023**	**–**	**–**	**–**	**–**	**–**	**–**	**-0.006**	**0.002**
2008												
WWTP Meter, mgd	0.412	0.356		0.326	0.338	0.338	0.363	0.344	0.345			
AWA Meter, mgd	0.066	0.055	0.052	0.051	0.057	0.066	0.065	0.063	0.067	0.052	0.051	0.047
WWTP Meter - AWA Meter, mgd	0.346	0.301		0.276	0.279	0.269	0.268	0.280	0.278			
I & I, mgd	**0.085**	**0.040**	**–**	**0.015**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
2009												
WWTP Meter, mgd		0.423	0.359	0.340		0.318	0.315	0.322	0.317	0.476	0.314	0.339
AWA Meter, mgd	0.045	0.045	0.045	0.047	0.048	0.056	0.060	0.062	0.060	0.059	0.059	0.051
WWTP Meter - AWA Meter, mgd		0.378	0.315	0.293		0.262	0.255	0.260	0.257	0.417	0.256	0.288
I & I, mgd	**–**	**0.117**	**0.054**	**0.032**	**–**	**–**	**–**	**–**	**–**	**–**	**-0.005**	**0.027**
2010												
WWTP Meter, mgd	0.434	0.407	0.405	0.432	0.343	0.386	0.378	0.344		0.393	0.360	0.447
AWA Meter, mgd	0.053	0.050	0.049	0.049	0.055	0.059	0.085	0.079	0.066	0.060	0.055	0.056
WWTP Meter - AWA Meter, mgd	0.381	0.357	0.355	0.383	0.288	0.328	0.293	0.264		0.333	0.306	0.391
I & I, mgd	**0.120**	**0.096**	**0.094**	**0.122**	**–**	**–**	**–**	**–**	**–**	**–**	**0.045**	**0.130**
2011												
WWTP Meter, mgd	0.381	0.435	0.512	0.359	0.487	0.489	0.478	0.456	0.404	0.325	0.326	0.310
AWA Meter, mgd	0.055	0.054	0.056	0.053	0.073	0.067	0.068	0.069	0.068	0.055	0.051	0.054
WWTP Meter - AWA Meter, mgd	0.327	0.381	0.456	0.306	0.414	0.423	0.410	0.387	0.336	0.271	0.275	0.256
I & I, mgd	**0.066**	**0.120**	**0.195**	**0.045**	**–**	**–**	**–**	**–**	**–**	**–**	**0.014**	**-0.005**
2012												
WWTP Meter, mgd	0.324	0.322	0.399	0.431	0.392	0.364	0.341	0.456	0.489	0.400	0.338	0.419
AWA Meter, mgd	0.050	0.051	0.051	0.057	0.064	0.068	0.071	0.074	0.066	0.067	0.053	0.051
WWTP Meter - AWA Meter, mgd	0.274	0.271	0.348	0.374	0.328	0.295	0.270	0.382	0.423	0.334	0.285	0.367
I & I, mgd	**0.013**	**0.010**	**0.087**	**0.113**	**–**	**–**	**–**	**–**	**–**	**–**	**0.024**	**0.106**
2013												
WWTP Meter, mgd	0.356	0.324	0.324	0.372	0.339	0.340	0.416	0.486	0.476	0.454	0.399	0.325
AWA Meter, mgd	0.051	0.051	0.051	0.054	0.069	0.068	0.089	0.095	0.085	0.067	0.053	0.051
WWTP Meter - AWA Meter, mgd	0.305	0.272	0.273	0.318	0.270	0.272	0.328	0.392	0.391	0.387	0.346	0.273
I & I, mgd	**0.044**	**0.011**	**0.012**	**0.057**	**–**	**–**	**–**	**–**	**–**	**–**	**0.085**	**0.012**
2014												
WWTP Meter, mgd	0.326	0.373	0.374	0.407	0.350	0.440	0.388	0.436	0.458	0.418	0.322	0.430
AWA Meter, mgd	0.057	0.049	0.047	0.046	0.048	0.060	0.067	0.063	0.056	0.050	0.045	0.047
WWTP Meter - AWA Meter, mgd	0.269	0.324	0.327	0.362	0.303	0.380	0.321	0.372	0.402	0.368	0.277	0.383
I & I, mgd	**0.008**	**0.063**	**0.066**	**0.101**	**–**	**–**	**–**	**–**	**–**	**–**	**0.016**	**0.122**

APPENDIX A - 2016 Dexter Wilson Report

TABLE A-3
ESTIMATED I&I AND HISTORICAL PRECIPITATION

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007												
I & I, mgd	0.029	--	0.047	0.023	--	--	--	--	--	--	-0.006	0.002
Monthly Precipitation, in/mo	0.71	5.59	0.72	1.89	0.39	0.00	0.01	0.00	0.14	1.00	0.98	3.68
Daily Precipitation, in/day	0.023	0.200	0.023	0.063	0.013	0.000	0.000	0.000	0.005	0.032	0.033	0.119
2008												
I & I, mgd	0.085	0.040	--	0.015	--	--	--	--	--	--	--	--
Monthly Precipitation, in/mo	5.84	2.21	0.09	0.08	0.53	0.00	0.00	0.00	0.00	0.56	1.79	2.37
Daily Precipitation, in/day	0.188	0.079	0.003	0.003	0.017	0.000	0.000	0.000	0.000	0.018	0.060	0.076
2009												
I & I, mgd	--	0.117	0.054	0.032	--	--	--	--	--	--	-0.005	0.027
Monthly Precipitation, in/mo	5.84	4.34	2.83	0.93	1.52	0.17	0.00	0.00	0.13	1.55	0.57	3.73
Daily Precipitation, in/day	0.188	0.155	0.091	0.031	0.049	0.006	0.000	0.000	0.004	0.050	0.019	0.120
2010												
I & I, mgd	0.120	0.096	0.094	0.122	--	--	--	--	--	--	0.045	0.130
Monthly Precipitation, in/mo	5.68	2.97	2.52	4.80	1.52	0.03	0.00	0.00	0.00	2.46	4.01	6.53
Daily Precipitation, in/day	0.183	0.106	0.081	0.160	0.049	0.001	0.000	0.000	0.000	0.079	0.134	0.211
2011												
I & I, mgd	0.066	0.120	0.195	0.045	--	--	--	--	--	--	0.014	-0.005
Monthly Precipitation, in/mo	2.43	4.70	6.11	0.51	1.81	1.65	0.01	0.00	0.34	2.08	0.87	0.06
Daily Precipitation, in/day	0.078	0.168	0.197	0.017	0.058	0.055	0.000	0.000	0.011	0.067	0.029	0.002
2012												
I & I, mgd	0.013	0.010	0.087	0.113	--	--	--	--	--	--	0.024	0.106
Monthly Precipitation, in/mo	2.68	1.34	6.10	4.37	0.07	0.31	0.03	0.00	0.13	0.62	--	--
Daily Precipitation, in/day	0.086	0.048	0.197	0.146	0.002	0.010	0.001	0.000	0.004	0.020	--	--
2013												
I & I, mgd	0.044	0.011	0.012	0.057	--	--	--	--	--	--	0.085	0.012
Monthly Precipitation, in/mo	--	--	--	--	--	--	--	0.00	0.82	0.00	1.67	0.25
Daily Precipitation, in/day	--	--	--	--	--	--	--	0.000	0.027	0.000	0.056	0.008
2014												
I & I, mgd	0.008	0.063	0.066	0.101	--	--	--	--	--	--	0.016	0.122
Monthly Precipitation, in/mo	0.55	4.73	3.31	1.65	0.11	0.00	0.00	0.00	0.32	0.94	1.78	7.93
Daily Precipitation, in/day	0.018	0.169	0.107	0.055	0.004	0.000	0.000	0.000	0.011	0.030	0.059	0.256

APPENDIX B

WATER BALANCE MODEL

TABLE B-1
AVERAGE MONTHLY TOTAL PRECIPITATION
1926 TO 2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Average Monthly Total	3.83	3.55	3.36	1.92	0.85	0.25	0.04	0.06	0.3	1.17	2.55	3.47	**21.35**
Percentage of Annual Total	17.9%	16.6%	15.7%	9.0%	4.0%	1.2%	0.2%	0.3%	1.4%	5.5%	11.9%	16.3%	**100.0%**
100 Year Rain Event	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	2.27	4.94	6.73	**41.38**

RUN 1 CURRENT CONDITIONS - IONE 2016 FLOW, ARSA & CDCR CONTRACTUAL FLOWS, AND 100 YEAR RAIN EVENT WITHOUT WOODARD BOTTOM

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.

Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.

Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

An Additional 0.00 Acre-Ft of Storarage is Required

Percolation Ponds 6&7
- (●) Perc Year Round
- ( ) Perc in Winter
- ( ) No Perc

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	in	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	in	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	in	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	●	in	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		in	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.52

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
ARSA Contractual														
CDCR Contractual	AF	10.00	10.00	10.00	10.00	20.00	20.00	95.00	95.00	95.00	95.00	95.00	95.00	650.00
COWRP														
COWRP Influent	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course	AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.29
Effluent from Preston (ARSA & CDCR)	AF	10.00	10.00	10.00	10.00	20.00	20.00	95.00	95.00	95.00	95.00	95.00	95.00	650.00
Ione														
Days in Month	Days	31.00	30.00	31.00	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	
Base City Flow	AF	31.20	30.20	31.20	31.20	28.18	31.20	30.20	31.20	30.20	31.20	31.20	30.20	367.38
Inflow and Infiltration	AF	4.53	8.92	11.90	13.05	12.08	11.54	6.91	3.50	1.56	0.91	0.97	1.72	77.57
Total to Effluent Disposal	AF	22.59	49.12	53.10	54.25	60.26	62.75	111.52	62.13	28.40	8.15	25.20	57.70	595.14
Existing LAAs														
Water Available for Application	AF	22.59	49.12	53.10	54.25	60.26	62.75	111.52	62.13	28.40	8.15	25.20	57.70	595.14
Needed Applied Water at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.58
Total Need	AF	13.97	0.00	0.00	0.00	0.00	0.00	14.38	35.10	48.88	58.55	50.25	34.68	255.81
Water Remaining after Irrigation	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.26
Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Proposed LAA														
Water Available to Proposed LAA	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.26
Needed Applied Water at Woodard Bottom	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining Afer Proposed Irrigation	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.26
Remaining Irrigation Need at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Percolation Pond 6														
Rainfall Gain	AF	0.80	1.74	2.37	2.62	2.43	2.30	1.31	0.58	0.17	0.03	0.04	0.20	14.55
Percolation Loss	AF	40.91	39.59	40.91	40.91	36.95	40.91	39.59	40.91	39.59	40.91	40.91	39.59	481.65
Evaporation Loss	AF	0.87	0.32	0.17	0.17	0.26	0.54	0.97	1.63	2.18	2.58	2.20	1.51	13.39
Percolation Pond 7														
Rainfall Gain	AF	1.04	2.26	3.08	3.40	3.15	2.98	1.70	0.75	0.22	0.04	0.05	0.27	18.93
Percolation Loss	AF	61.75	59.76	61.75	61.75	55.77	61.75	59.76	61.75	59.76	61.75	61.75	59.76	727.02
Evaporation Loss	AF	1.22	0.45	0.23	0.23	0.36	0.75	1.35	2.27	3.04	3.60	3.06	2.10	18.66
Percolation Ponds 6 and 7														
Combined Pond Volume	AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.26
Applied Water to Perc Ponds	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.26
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Summative Ponds Percolation Rate	AF	102.66	99.35	102.66	102.66	92.72	102.66	99.35	102.66	99.35	102.66	102.66	99.35	1208.72
Summative Ponds Evaporation Loss	AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains	AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
End of Month Water Remaining	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Extra Effluent to Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Pond 5 Storage														
Pond 5 Volume	AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Influent from Ponds 6 and 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discharge to Needed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Needed Storage														
Influent from Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields														
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	[illegible]
Remaining after Prposed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	[illegible]
Remaining after Pond 5 (Make Up Water Needed)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93

APPENDIX A - 2016 Dexter Wilson Report

RUN 2A - IONE 2018 FLOW, ARSA & CDCR CONTRACTUAL FLOWS. AND 100 YEAR RAIN EVENT WITHOUT WOODARD BOTTOM

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.
Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.
Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

An Additional 0.00 *Acre-Ft of Stororage is Required*

Percolation Ponds 6&7
- (●) Perc Year Round
- ( ) Perc in Winter
- ( ) No Perc

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	●	In	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		In	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.52

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
		APPENDIX A - 2016 Dexter Wilson Report												
ARSA Contractual														
CDCR Contractual	AF	10.00	10.00	20.00	10.00	20.00	20.00	95.00	95.00	95.00	95.00	95.00	95.00	650.00
COWRP														
COWRP Influent	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course	AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.29
Effluent from Preston (ARSA & CDCR)	AF	10.00	10.00	10.00	10.00	20.00	20.00	95.00	95.00	95.00	95.00	95.00	95.00	650.00
Ione														
Days in Month	Days	31.00	30.00	31.00	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	
Base City Flow	AF	31.20	30.20	31.20	31.20	28.18	31.20	30.20	31.20	30.20	31.20	31.20	30.20	367.38
Inflow and Infiltration	AF	4.53	8.92	11.90	13.05	12.08	11.54	6.91	3.50	1.56	0.91	0.97	1.72	77.57
Total to Effluent Disposal	AF	22.59	49.12	53.10	54.25	60.26	62.75	111.52	62.13	28.40	8.15	25.20	57.70	595.14
Existing LAAs														
Water Available for Application	AF	22.59	49.12	53.10	54.25	60.26	62.75	111.52	62.13	28.40	8.15	25.20	57.70	595.14
Needed Applied Water at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.05	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.59
Total Need	AF	13.97	0.00	0.00	0.00	0.00	0.00	14.38	35.10	48.88	58.55	50.25	34.68	255.81
Water Remaining after Irrigation	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.28
Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Proposed LAA														
Water Available to Proposed LAA	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.28
Needed Applied Water at Woodard Bottom	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining Afer Proposed Irrigation	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.28
Remaining Irrigation Need at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Percolation Pond 6														
Rainfall Gain	AF	0.80	1.74	2.37	2.62	2.43	2.30	1.31	0.58	0.17	0.03	0.04	0.20	14.59
Percolation Loss	AF	40.91	39.59	40.91	40.91	36.95	40.91	39.59	40.91	39.59	40.91	40.91	39.59	481.69
Evaporation Loss	AF	0.87	0.32	0.17	0.17	0.26	0.54	0.97	1.63	2.18	2.58	2.20	1.51	13.39
Percolation Pond 7														
Rainfall Gain	AF	1.04	2.26	3.08	3.40	3.15	2.98	1.70	0.75	0.22	0.04	0.05	0.27	18.93
Percolation Loss	AF	61.75	59.76	61.75	61.75	55.77	61.75	59.76	61.75	59.76	61.75	61.75	59.76	727.02
Evaporation Loss	AF	1.22	0.45	0.23	0.23	0.36	0.75	1.35	2.27	3.04	3.60	3.06	2.10	18.66
Percolation Ponds 6 and 7														
Combined Pond Volume	AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.28
Applied Water to Perc Ponds	AF	8.61	49.12	53.10	54.25	60.26	62.75	97.13	27.03	0.00	0.00	0.00	23.02	435.28
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Summative Ponds Percolation Rate	AF	102.66	99.35	102.66	102.66	92.72	102.66	99.35	102.66	99.35	102.66	102.66	99.35	1208.72
Summative Ponds Evaporation Loss	AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains	AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
End of Month Water Remaining	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Extra Effluent to Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Pond 5 Storage														
Pond 5 Volume	AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Influent from Ponds 6 and 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discharge to Needed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Needed Storage														
Influent from Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields														
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Remaining after Proposed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93
Remaining after Pond 5 (Make Up Water Needed)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.48	50.40	25.05	0.00	95.93

RUN 28- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, PERCOLATION POND 7 ONLY, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.

Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.

Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

An Additional 0.00 *Acre-Ft of Storarage is Required*

Percolation Ponds 6&7
- (●) Perc Year Round
- ( ) Perc in Winter
- ( ) No Perc

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	●	In	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		In	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.52

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
		APPENDIX A - 2016 Dexter Wilson Report												
CDCR Contractual	AF	0.0	0.0	0.0	5.5	5.5	5.5	22.4	74.2	88.0	96.8	96.8	13.2	402.0
COWRP														
COWRP Influent	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course	AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.25
Effluent from Preston (ARSA & CDCR)	AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	402.00
Ione														
Days in Month	Days	31.00	30.00	31.00	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	
Base City Flow	AF	34.65	33.53	34.65	34.65	31.30	34.65	33.53	34.65	33.53	34.65	34.65	33.53	408.00
Inflow and Infiltration	AF	4.53	8.92	11.90	13.05	12.08	11.54	6.91	3.50	1.56	0.91	0.97	1.72	77.57
Total to Effluent Disposal	AF	16.04	42.46	46.55	53.20	48.87	51.70	42.25	44.78	24.74	13.40	30.45	0.00	414.43
Existing LAAs														
Water Available for Application	AF	16.04	42.46	46.55	53.20	48.87	51.70	42.25	44.78	24.74	13.40	30.45	0.00	414.43
Needed Applied Water at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.59
Total Need	AF	13.97	0.00	0.00	0.00	0.00	0.00	14.38	35.10	48.88	58.55	50.25	34.68	255.83
Water Remaining after Irrigation	AF	2.06	42.46	46.55	53.20	48.87	51.70	27.87	9.68	0.00	0.00	0.00	0.00	282.39
Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14	45.15	19.80	34.68	123.77
Proposed LAA														
Water Available to Proposed LAA	AF	2.06	42.46	46.55	53.20	48.87	51.70	27.87	9.68	0.00	0.00	0.00	0.00	282.39
Needed Applied Water at Woodard Bottom	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining Afer Proposed Irrigation	AF	2.06	42.46	46.55	53.20	48.87	51.70	27.87	9.68	0.00	0.00	0.00	0.00	282.39
Remaining Irrigation Need at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14	45.15	19.80	34.68	123.77
Percolation Pond 6														
Rainfall Gain	AF	0.80	1.74	2.37	2.62	2.43	2.30	1.31	0.58	0.17	0.03	0.04	0.20	14.59
Percolation Loss	AF	40.91	39.59	40.91	40.91	36.95	40.91	39.59	40.91	39.59	40.91	40.91	39.59	481.69
Evaporation Loss	AF	0.87	0.32	0.17	0.17	0.26	0.54	0.97	1.63	2.18	2.58	2.20	1.51	13.39
Percolation Pond 7														
Rainfall Gain	AF	1.04	2.26	3.08	3.40	3.15	2.98	1.70	0.75	0.22	0.04	0.05	0.27	18.93
Percolation Loss	AF	61.75	59.76	61.75	61.75	55.77	61.75	59.76	61.75	59.76	61.75	61.75	59.76	727.01
Evaporation Loss	AF	1.22	0.45	0.23	0.23	0.36	0.75	1.35	2.27	3.04	3.60	3.06	2.10	18.66
Percolation Ponds 6 and 7														
Combined Pond Volume	AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal	AF	2.06	42.46	46.55	53.20	48.87	51.70	27.87	9.68	0.00	0.00	0.00	0.00	282.39
Applied Water to Perc Ponds	AF	2.06	42.46	46.55	53.20	48.87	51.70	27.87	9.68	0.00	0.00	0.00	0.00	282.39
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Summative Ponds Percolation Rate	AF	102.66	99.35	102.66	102.66	92.72	102.66	99.35	102.66	99.35	102.66	102.66	99.35	1208.72
Summative Ponds Evaporation Loss	AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains	AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
End of Month Water Remaining	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Extra Effluent to Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Pond 5 Storage														
Pond 5 Volume	AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Influent from Ponds 6 and 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discharge to Needed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Needed Storage														
Influent from Pond 5	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields														
Total Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14	45.15	19.80	34.68	123.77
Remaining after Prposed Storage	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14	45.15	19.80	34.68	123.77
Remaining after Pond 5 (Make Up Water Needed)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14	45.15	19.80	34.68	123.77

RUN 2C- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON) and
RUN 2D- IONE 2018 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.

Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.

Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

Percolation Ponds 6&7
- ○ Perc Year Round
- ○ Perc In Winter
- ◉ No Perc

An Additional **158** *Acre-Ft of Storarage is Required*

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	◉	In	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		In	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.51

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
CDCR		AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	402.00
COWRP															
COWRP Influent		AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP		AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course		AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.25
Effluent from Preston (ARSA & CDCR)		AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	402.00
Ione															
Days in Month		Days	31	30	31	31	28	31	30	31	30	31	31	30	
Base City Flow		AF	34.62	33.50	34.62	34.62	31.27	34.62	33.50	34.62	33.50	34.62	34.62	33.50	407.64
Inflow and Infiltration		AF	4.53	8.92	11.90	13.05	12.08	11.54	6.91	3.50	1.56	0.91	0.97	1.72	77.57
Total to Effluent Disposal		AF	16.01	42.43	46.52	53.17	48.85	51.66	42.22	44.74	24.71	13.37	30.42	0.00	414.10
Existing LAAs															
Water Available for Application		AF	16.01	42.43	46.52	53.17	48.85	51.66	42.22	44.74	24.71	13.37	30.42	0.00	414.10
Needed Applied Water at Town Field		AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Total Need		AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Water Remaining after Irrigation		AF	3.32	42.43	46.52	53.17	48.85	51.66	29.17	12.88	0.00	0.00	0.00	0.00	288.00
Remaining Irrigation Need		AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.66	39.78	15.19	31.48	106.12
Proposed LAA															
Water Available to Proposed LAA		AF	3.32	42.43	46.52	53.17	48.85	51.66	29.17	12.88	0.00	0.00	0.00	0.00	288.00
Needed Applied Water at Woodard Bottom		AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Needed Applied Water at Dry Creek		AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining After Proposed Irrigation		AF	0.00	42.43	46.52	53.17	48.85	22.25	0.00	0.00	0.00	0.00	0.00	0.00	213.21
Remaining Irrigation Need at Woodard Bottom/Dry Creek		AF	79.81	0.00	0.00	0.00	0.00	0.00	7.25	262.45	432.87	521.41	429.98	332.39	2066.16
Total Remaining Irrigation Need		AF	79.81	0.00	0.00	0.00	0.00	0.00	7.25	262.45	452.53	561.19	445.17	363.87	2172.28
Ponds 6 and 7															
Combined Pond Volume		AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal		AF	0.00	42.43	46.52	53.17	48.85	22.25	0.00	0.00	0.00	0.00	0.00	0.00	213.21
Applied Water to Ponds 6 and 7		AF	0.00	42.43	0.25	-5.62	-4.95	-3.99	-0.70	0.00	0.00	0.00	0.00	0.00	27.42
Water in Storage from Previous Month		AF	0.00	0.00	45.65	50.96	50.96	50.96	50.96	50.96	1.33	0.00	0.00	0.00	
Summative Ponds Evaporation Loss		AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains		AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
Discharge to Pond 5		AF	0.00	0.00	46.26	58.79	53.80	26.24	0.70	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields		AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.06	0.00	0.00	0.00	0.00	
End of Month Water Remaining		AF	0.00	45.65	97.22	109.75	104.76	77.20	51.66	1.33	0.00	0.00	0.00	0.00	
Pond 5															
Pond 5 Volume		AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water in Storage from Previous Month		AF	0.00	0.00	1.41	36.69	36.69	36.69	36.69	36.69	0.60	0.00	0.00	0.00	
Influent from Ponds 6 & 7		AF	0.00	0.00	46.26	58.79	53.80	26.24	0.70	0.00	0.00	0.00	0.00	0.00	185.79
Evaporation Loss		AF	1.06	0.39	0.20	0.20	0.31	0.65	1.17	1.97	2.64	3.13	2.66	1.82	16.21
Rainfall Gain		AF	0.83	1.80	2.45	2.70	2.51	2.37	1.36	0.60	0.18	0.03	0.04	0.21	15.07
Discharge to Needed Storage		AF	0.00	0.00	13.23	61.29	55.99	27.96	0.88	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields		AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.72	0.00	0.00	0.00	0.00	
End of Month Water Remaining		AF	0.00	1.41	36.69	36.69	36.69	36.69	36.68	0.60	0.00	0.00	0.00	0.00	
Needed Storage															
Influent from Pond 5		AF	0.00	0.00	13.23	61.29	55.99	27.96	0.88	0.00	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month		AF	0.00	0.00	0.00	13.23	74.52	130.51	158.48	152.10	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields		AF	0.00	0.00	0.00	0.00	0.00	0.00	7.25	152.10	0.00	0.00	0.00	0.00	
End of Month Storage		AF	0.00	0.00	13.23	74.52	130.51	158.48	152.10	0.00	0.00	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields															
Total Remaining Irrigation Need		AF	79.81	0.00	0.00	0.00	0.00	0.00	7.25	262.45	452.53	561.19	445.17	363.87	2172.28
Remaining after Proposed Storage		AF	79.81	0.00	0.00	0.00	0.00	0.00	0.00	110.35	452.53	561.19	445.17	363.87	2013.92
Remaining after Pond 5		AF	79.81	0.00	0.00	0.00	0.00	0.00	0.00	75.64	452.53	561.19	445.17	363.87	[illegible]
Remaining after Ponds 6 and 7 (Make-Up Water Needed)		AF	79.81	0.00	0.00	0.00	0.00	0.00	0.00	28.58	452.53	561.19	445.17	363.87	[illegible]

RUN 3A- IONE 2020 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON) and
RUN 3B- IONE 2020 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.
Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.
Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

An Additional **222** *Acre-Ft of Storarage is Required*

Percolation Ponds 6&7
- ○ Perc Year Round
- ○ Perc in Winter
- ◉ No Perc

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	◉	In	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		In	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.52

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
CDCR	AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	402.06
COWRP														
COWRP Influent	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course	AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.25
Effluent from Preston (CDCR)	AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	407.90
Ione														
Days in Month	Days	31.00	30.00	31.00	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	
Base City Flow	AF	39.75	38.47	39.75	39.75	35.90	39.75	38.47	39.75	38.47	39.75	39.75	38.47	468.03
Inflow and Infiltration	AF	4.53	8.92	11.90	13.05	12.08	11.54	6.91	3.50	1.56	0.91	0.97	1.72	77.57
Total to Effluent Disposal	AF	21.13	47.39	51.65	58.30	53.48	56.79	47.19	49.87	29.68	18.50	35.55	-15.83	453.69
Existing LAAs														
Water Available for Application	AF	21.13	47.39	51.65	58.30	53.48	56.79	47.19	49.87	29.68	18.50	35.55	-15.83	453.69
Needed Applied Water at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Total Need	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Water Remaining after Irrigation	AF	8.45	47.39	51.65	58.30	53.48	56.79	34.13	18.01	0.00	0.00	0.00	0.00	328.20
Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.70	34.65	10.07	47.31	106.73
Proposed LAA														
Water Available to Proposed LAA	AF	8.45	47.39	51.65	58.30	53.48	56.79	34.13	18.01	0.00	0.00	0.00	0.00	328.20
Needed Applied Water at Woodard Bottom	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining Afer Proposed Irrigation	AF	0.00	47.39	51.65	58.30	53.48	56.79	7.84	0.00	0.00	0.00	0.00	0.00	275.45
Remaining Irrigation Need at Woodard Bottom	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	46.16	89.37	107.04	91.86	63.41	414.94
Total Remaining Irrigation Need	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	46.16	104.07	141.69	101.93	110.72	521.67
Ponds 6 and 7														
Combined Pond Volume	AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal	AF	0.00	47.39	51.65	58.30	53.48	56.79	7.84	0.00	0.00	0.00	0.00	0.00	275.45
Applied Water to Ponds 6 and 7	AF	0.00	47.39	-4.71	-5.62	-4.95	-3.99	-0.70	0.00	0.00	0.00	0.00	0.00	27.42
Water in Storage from Previous Month	AF	0.00	0.00	50.62	50.96	50.96	50.96	50.96	50.96	48.39	43.56	0.00	0.00	
Summative Ponds Evaporation Loss	AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains	AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
Discharge to Pond 5	AF	0.00	0.00	56.35	63.92	58.43	60.79	8.53	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.44	0.00	0.00	
End of Month Water Remaining	AF	0.00	50.62	107.31	114.88	109.39	111.75	59.48	48.39	43.56	0.00	0.00	0.00	
Pond 5														
Pond 5 Volume	AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water In Storage from Previous Month	AF	0.00	0.00	1.41	36.69	36.69	36.69	36.69	36.69	35.32	32.85	0.03	0.00	
Influent from Ponds 6 and 7	AF	0.00	0.00	56.35	63.92	58.43	60.79	8.53	0.00	0.00	0.00	0.00	0.00	248.02
Evaporation Loss	AF	1.06	0.39	0.20	0.20	0.31	0.65	1.17	1.97	2.64	3.13	2.66	1.82	16.21
Rainfall Gain	AF	0.63	1.80	2.45	2.70	2.51	2.37	1.36	0.60	0.18	0.03	0.04	0.21	15.07
Discharge to Needed Storage	AF	0.00	0.00	23.32	66.42	60.63	62.51	8.72	0.00	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.72	0.00	0.00	
End of Month Water Remaining	AF	0.00	1.41	36.69	36.69	36.69	36.69	36.69	35.32	32.85	0.03	0.00	0.00	
Needed Storage														
Influent from Pond 5	AF	0.00	0.00	23.32	66.42	60.63	62.51	8.72	0.00	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	23.32	89.74	150.37	212.88	221.59	175.43	71.36	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.16	104.07	71.36	0.00	0.00	
End of Month Storage	AF	0.00	0.00	23.32	89.74	150.37	212.88	221.59	175.43	71.36	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields														
Total Remaining Irrigation Need	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	46.16	104.07	141.69	101.93	110.72	521.67
Remaining after Prposed Storage	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.34	101.93	110.72	300.08
Remaining after Pond 5	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.61	101.93	110.72	270.36
Remaining after Ponds 6 and 7 (Make-Up Water Needed)	AF	17.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.17	101.93	110.72	232.92

RUN 4A- IONE 2036 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE IN PRESTON) and
RUN 4B- IONE 2036 FLOW, CDCR CONTRACTUAL FLOWS, NO PERCOLATION, AND 100 YEAR RAIN EVENT WITH WOODARD BOTTOM (ADDTL STORAGE ON CITY FIELD)

Assumptions:

Storage Pond 5 has an average area of 4.37 Acres, an area of 5 Acres when full and a volume of 36.69 Acre-Feet.

Perc. Pond 6 has an average area of 3.61 Acres, an area of 4.23 when full, a volume of 25.18 Acre-Feet and a Perc rate of 1.32 Acre-Feet per Day.

Perc. Pond 7 has an average area of 5.03 Acres, an area of 5.49 Acres when full, a volume of 25.78 Acre-Feet and a Perc rate of 1.99 Acre-Feet per Day.

Percolation Ponds 6&7
- ○ Perc Year Round
- ○ Perc in Winter
- ◉ No Perc

An Additional **330** *Acre-Ft of Storarage is Required*

Month			October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	○	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	○	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	○	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	◉	In	2.27	4.94	6.73	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	41.38
Pan Evaporation		In	2.90	1.08	0.55	0.55	0.86	1.78	3.22	5.42	7.25	8.59	7.31	5.01	44.52

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
CDCR	AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	402.00
COWRP														
COWRP Influent	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.76
COWRP Backwash to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
COWRP Tertiary Effluent to Castle Oaks Golf Course	AF	26.04	0.00	0.00	0.00	0.00	0.00	23.16	76.03	110.64	133.83	114.72	77.87	562.29
Effluent from Preston (CDCR)	AF	0.00	0.00	0.00	5.50	5.50	5.50	22.40	74.20	88.00	96.80	96.80	13.20	407.90
Ione														
Days in Month	Days	31.00	30.00	31.00	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	
Base City Flow	AF	65.40	63.29	65.40	65.40	59.07	65.40	63.25	65.40	63.29	65.40	65.40	63.29	[illegible]
Inflow and Infiltration	AF	4.53	0.00	0.00	0.00	0.00	0.00	15.18	32.80	44.65	53.19	45.68	31.81	237.31
Total to Effluent Disposal	AF	46.78	63.29	65.40	70.90	64.57	70.90	80.28	104.82	97.59	96.43	105.90	39.08	905.93
Existing LAAs														
Water Available for Application	AF	46.78	63.29	65.40	70.90	64.57	70.90	80.28	104.82	97.59	96.43	105.90	39.08	905.93
Needed Applied Water at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Total Need	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Water Remaining after Irrigation	AF	34.10	63.29	65.40	70.90	64.57	70.90	67.23	72.96	53.22	43.28	60.29	7.60	673.71
Remaining Irrigation Need	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Proposed LAA														
Water Available to Proposed LAA	AF	34.10	63.29	65.40	70.90	64.57	70.90	67.23	72.96	53.22	43.28	60.29	7.60	673.71
Needed Applied Water at Woodard Bottom	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Needed Applied Water at Dry Creek	AF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Water Remaining Afer Proposed Irrigation	AF	8.55	63.29	65.40	70.90	64.57	70.90	40.93	8.79	0.00	0.00	0.00	0.00	393.31
Remaining Irrigation Need at Woodard Bottom and Dry Creek	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	219.95	287.68	310.82	291.34	181.70	1357.62
Total Remaining Irrigation Need	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	219.95	287.68	310.82	291.34	181.70	1357.62
Ponds 6 and 7														
Combined Pond Volume	AF	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	50.96	
Remaing Water for Disposal	AF	8.55	63.29	65.40	70.90	64.57	70.90	40.93	8.79	0.00	0.00	0.00	0.00	393.31
Applied Water to Ponds 6 and 7	AF	8.55	39.44	-5.05	-5.62	-4.95	-3.99	-0.70	2.57	0.00	0.00	0.00	0.00	30.24
Water in Storage from Previous Month	AF	0.00	8.30	50.96	50.96	50.96	50.96	50.96	50.96	50.96	0.00	0.00	0.00	
Summative Ponds Evaporation Loss	AF	2.09	0.78	0.40	0.40	0.62	1.28	2.32	3.90	5.22	6.18	5.26	3.61	32.05
Summative Ponds Rainfall Gains	AF	1.84	4.00	5.45	6.01	5.57	5.27	3.01	1.33	0.39	0.06	0.09	0.47	33.52
Discharge to Pond 5	AF	0.00	23.85	70.45	76.51	69.52	74.89	41.63	6.22	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.13	0.00	0.00	0.00	
End of Month Water Remaining	AF	8.30	74.81	121.41	127.47	120.48	125.85	92.59	57.18	0.00	0.00	0.00	0.00	
Pond 5														
Pond 5 Volume	AF	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	36.69	
Water in Storage from Previous Month	AF	0.00	0.00	25.26	36.69	36.69	36.69	36.69	36.69	36.69	0.18	0.00	0.00	
Influent from Ponds 6 and 7	AF	0.00	23.85	70.45	76.51	69.52	74.89	41.63	6.22	0.00	0.00	0.00	0.00	363.07
Evaporation Loss	AF	1.06	0.39	0.20	0.20	0.31	0.65	1.17	1.97	2.64	3.13	2.66	1.82	16.21
Rainfall Gain	AF	0.83	1.80	2.45	2.70	2.51	2.37	1.36	0.60	0.18	0.03	0.04	0.21	15.07
Discharge to Needed Storage	AF	0.00	0.00	61.26	79.02	71.71	76.61	41.81	4.85	0.00	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.05	0.00	0.00	0.00	
End of Month Water Remaining	AF	0.00	25.26	36.69	36.69	36.69	36.69	36.69	36.69	0.18	0.00	0.00	0.00	
Needed Storage														
Influent from Pond 5	AF	0.00	0.00	61.26	79.02	71.71	76.61	41.81	4.85	0.00	0.00	0.00	0.00	
Water in Storage from Previous Month	AF	0.00	0.00	0.00	61.26	140.28	211.99	288.60	330.42	115.31	0.00	0.00	0.00	
Discharge to Irrigation/Spray Fields	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	219.95	115.31	0.00	0.00	0.00	
End of Month Storage	AF	0.00	0.00	61.26	140.28	211.99	288.60	330.42	115.31	0.00	0.00	0.00	0.00	
Make Up Water for Irrigation/Spray Fields														
Total Remaining Irrigation Need	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	219.95	287.68	310.82	291.34	181.70	1357.62
Remaining after Prposed Storage	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	172.37	310.82	291.34	181.70	1022.35
Remaining after Pond 5	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	138.32	310.82	291.34	181.70	988.30
Remaining after Ponds 6 and 7 (Make-Up Water Needed)	AF	66.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92.19	310.82	291.34	181.70	942.17

IRRIGATION DEMANDS FOR ALL LAA'S (100 YEAR RAIN EVENT)

Available Disposal on Castle Oak Golf Course

Month	Effective Precipitation	Monthly ETO	Crop Coefficient	Effective ETO	Needed Irrigation	Needed Applied Water, in	Needed Applied Water (AF)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
October	1.59	3.72	0.80	2.98	1.39	1.74	26.04
November	3.46	1.80	0.80	1.44	0.00	0.00	0.00
December	4.71	0.93	0.80	0.74	0.00	0.00	0.00
January	5.20	1.24	0.80	0.99	0.00	0.00	0.00
February	4.82	1.96	0.80	1.57	0.00	0.00	0.00
March	4.56	3.10	0.80	2.48	0.00	0.00	0.00
April	2.60	4.80	0.80	3.84	1.24	1.54	23.16
May	1.15	6.51	0.80	5.21	4.05	5.07	76.03
June	0.34	7.80	0.80	6.24	5.90	7.38	110.64
July	0.05	8.99	0.80	7.19	7.14	8.92	133.83
August	0.08	7.75	0.80	6.20	6.12	7.65	114.72
September	0.41	5.70	0.80	4.56	4.15	5.19	77.87
Total	28.97	54.30	--	43.44	29.99	37.49	562.29

APPENDIX A - 2016 Dexter Wilson Report

Assumed Acreage 180.00 Acres

(1) Effective precipitation is calculated using the Rainfall Data and a factor of 0.70

(5) If the value of Needed Irrigation was found to be negative, a zero was inserted instead.

Available Disposal on Town Field

Month	Effective Precipitation	Monthly ETO	Crop Coefficient	Effective ETO	Needed Irrigation	Needed Applied Water, in	Needed Applied Water (AF)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
October	1.59	3.72	1.00	3.72	2.13	2.67	12.68
November	3.46	1.80	1.00	1.80	0.00	0.00	0.00
December	4.71	0.93	1.00	0.93	0.00	0.00	0.00
January	5.20	1.24	1.00	1.24	0.00	0.00	0.00
February	4.82	1.96	1.00	1.96	0.00	0.00	0.00
March	4.56	3.10	1.00	3.10	0.00	0.00	0.00
April	2.60	4.80	1.00	4.80	2.20	2.74	13.06
May	1.15	6.51	1.00	6.51	5.36	6.70	31.86
June	0.34	7.80	1.00	7.80	7.46	9.33	44.38
July	0.05	8.99	1.00	8.99	8.94	11.17	53.15
August	0.08	7.75	1.00	7.75	7.67	9.59	45.61
September	0.41	5.70	1.00	5.70	5.29	6.62	31.48
Total	28.97	54.30	--	54.30	39.04	48.80	232.22

Assumed Acreage 57.10 Acres

(1) Effective precipitation is calculated using the Rainfall Data and a factor of 0.70

(5) If the value of Needed Irrigation was found to be negative, a zero was inserted instead.

Available Disposal on City Field

Month	Effective Precipitation	Monthly ETO	Crop Coefficient	Effective ETO	Needed Irrigation	Needed Applied Water, in	Needed Applied Water (AF)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
October	1.59	3.72	1.00	3.72	2.13	2.67	1.29
November	3.46	1.80	1.00	1.80	0.00	0.00	0.00
December	4.71	0.93	1.00	0.93	0.00	0.00	0.00
January	5.20	1.24	1.00	1.24	0.00	0.00	0.00
February	4.82	1.96	1.00	1.96	0.00	0.00	0.00
March	4.56	3.10	1.00	3.10	0.00	0.00	0.00
April	2.60	4.80	1.00	4.80	2.20	2.74	1.33
May	1.15	6.51	1.00	6.51	5.36	6.70	3.24
June	0.34	7.80	1.00	7.80	7.46	9.33	4.51
July	0.05	8.99	1.00	8.99	8.94	11.17	5.40
August	0.08	7.75	1.00	7.75	7.67	9.59	4.63
September	0.41	5.70	1.00	5.70	5.29	6.62	3.20
Total	28.97	54.30	--	54.30	39.04	48.80	23.59

Assumed Acreage 5.80 Acres

(1) Effective precipitation is calculated using the Rainfall Data and a factor of 0.70

(5) If the value of Needed Irrigation was found to be negative, a zero was inserted instead.

Available Disposal on Woodard Bottom

Month	Effective Precipitation	Monthly ETO	Crop Coefficient	Effective ETO	Needed Irrigation	Needed Applied Water, in	Needed Applied Water (AF)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
October	1.59	3.72	1.00	3.72	2.13	2.67	25.59
November	3.46	1.80	1.00	1.80	0.00	0.00	0.00
December	4.71	0.93	1.00	0.93	0.00	0.00	0.00
January	5.20	1.24	1.00	1.24	0.00	0.00	0.00
February	4.82	1.96	1.00	1.96	0.00	0.00	0.00
March	4.56	3.10	1.00	3.10	0.00	0.00	0.00
April	2.60	4.80	1.00	4.80	2.20	2.74	26.30
May	1.15	6.51	1.00	6.51	5.36	6.70	64.17
June	0.34	7.80	1.00	7.80	7.46	9.33	89.37
July	0.05	8.99	1.00	8.99	8.94	11.17	107.04
August	0.08	7.75	1.00	7.75	7.67	9.59	91.86
September	0.41	5.70	1.00	5.70	5.29	6.62	63.41
Total	28.97	54.30	--	54.30	39.04	48.80	467.70

Assumed Acreage 115.00 Acres

(1) Effective precipitation is calculated using the Rainfall Data and a factor of 0.70

(5) If the value of Needed Irrigation was found to be negative, a zero was inserted instead.

Available Disposal on Dry Creek

Month	Effective Precipitation	Monthly ETO	Crop Coefficient	Effective ETO	Needed Irrigation	Needed Applied Water, in	Needed Applied Water (AF)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
October	1.59	3.72	1	3.72	2.13	2.67	115.96
November	3.46	1.8	1	1.8	0.00	0.00	0.00
December	4.71	0.93	1	0.93	0.00	0.00	0.00
January	5.20	1.24	1	1.24	0.00	0.00	0.00
February	4.82	1.96	1	1.96	0.00	0.00	0.00
March	4.56	3.1	1	3.1	0.00	0.00	0.00
April	2.60	4.8	1	4.8	2.20	2.74	119.36
May	1.15	6.51	1	6.51	5.36	6.70	291.28
June	0.34	7.8	1	7.8	7.46	9.33	405.68
July	0.05	8.99	1	8.99	8.94	11.17	485.88
August	0.08	7.75	1	7.75	7.67	9.59	416.98
September	0.41	5.7	1	5.7	5.29	6.62	287.81
Total	28.97	54.3	1	54.3	39.04	48.80	2122.94

Assumed Acreage 522 Acres

(1) Effective precipitation is calculated using the Rainfall Data and a factor of 0.7

(5) If the value of Needed Irrigation was found to be negative, a zero was inserted instead.

APPENDIX B

WATER BALANCE MODEL
WATER BALANCE COMPONENTS

The water balance model is utilized to assess the disposal capacity of Ione. Wastewater flows, disposal capacity, and storage are the input variables. The model utilizes monthly inputs and provides monthly summaries. Any wastewater flow greater than the available capacity goes to storage. If there is surplus disposal capacity, any secondary effluent in storage is sent to disposal.

The water balance starts accounting for flows at the beginning of the wet season in October and accounts for flows for a twelve month period to end of the dry season. The model was run for the year of 2016, 2018, 2020, and 2036.

The following will summarize each component of the water balance model.

Wastewater Flows

All flows mentioned in Chapter 6 are accounted for in the water model except for AWA backwash, as this flow source no longer exists. Thus, the model accounts for City Base Flows, Inflow and Infiltration for the 100 year rain event, CORWP Backwash, and contractual ARSA flows from Preston Reservoir.

The irrigation demand at COWRP in some months exceeds the contractual obligations of the City of Ione for disposal of ARSA secondary effluent. To address this discrepancy, the model has two runs with respect to effluent from Preston Reservoir. Runs 1 and 2A assume that 650 AF is an annual maximum of effluent from Preston Reservoir. Runs 2B, 2C, 2D, 3A, 3B, 4A, and 4B assume that the effluent from Preston Reservoir will be the contractual flow based on the Woodard agreement.

Disposal

All disposal options mentioned in Chapter 8 are accounted for the in water balance model. Each disposal area capacity takes into account precipitation for the 100 year rain event as well as evaporation. The model is run with and without Woodard Bottom as an available LAA.

Table B-1 displays the monthly values in inches of rainfall used for each month. The 100 year rain event is based on the mean precipitation per month applied to the 100 year total rainfall from the previous RWD.

Storage

The water balance models Pond 5 as storage. If the storage in Pond 5 is not sufficient for any period of time, the model determines the additional storage that would be necessary.

MODEL RUNS

The model runs are shown as follows:

- 1 - Current Conditions- Ione 2016 Flow, ARSA & CDCR Contractual Flows, and 100 Year Rain Event Without Woodard Bottom
- 2A - Ione 2018 Flow, ARSA & CDCR Contractual Flows, and 100 Year Rain Event Without Woodard Bottom
- 2B - Ione 2018 Flow, CDCR Contractual Flows, Percolation Pond 7 Only, and 100 Year Rain Event Without Woodard Bottom
- 2C - Ione 2018 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event Without Woodard Bottom (Additional Storage in Preston)
- 2D - Ione 2018 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event With Woodard Bottom (Additional Storage on City Field)
- 3A - Ione 2020 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event With Woodard Bottom (Additional Storage in Preston)
- 3B - Ione 2020 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event With Woodard Bottom (Additional Storage on City Field)
- 4A - Ione 2036 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event With Woodard Bottom (Additional Storage in Preston)

- 4B - Ione 2036 Flow, CDCR Contractual Flows, No Percolation, and 100 Year Rain Event With Woodard Bottom (Additional Storage on City Field)

TABLE B-1
AVERAGE MONTHLY TOTAL PRECIPITATION
1926 TO 2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Average Monthly Total	3.83	3.55	3.36	1.92	0.85	0.25	0.04	0.06	0.3	1.17	2.55	3.47	**21.35**
Percentage of Annual Total	17.9%	16.6%	15.7%	9.0%	4.0%	1.2%	0.2%	0.3%	1.4%	5.5%	11.9%	16.3%	**100.0%**
100 Year Rain Event	7.42	6.88	6.51	3.72	1.65	0.48	0.08	0.12	0.58	2.27	4.94	6.73	**41.38**

Appendix B

2009 Ground Lease Agreement

STATE OF CALIFORNIA

DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION

GROUND LEASE

Lease No.: L-2070

LEASE COVERING PREMISES LOCATED AT
Mule Creek Prison and Preston Youth Correctional Facility
Amador County
AGENCY
Department of Corrections and Rehabilitation
REAL PROPERTY NOS.: 43 and 1575

Lessee: Amador Regional Sanitation Authority

This Lease, dated for reference purposes only, January 1, 2009, by and between the State of California, acting by and through the Director of General Services (DGS), with the consent of the California Department of Corrections and Rehabilitation (CDCR), hereinafter collectively referred to as STATE, and the Amador Regional Sanitation Authority (ARSA), a joint powers authority, hereinafter referred to as LESSEE.

RECITALS

WHEREAS, CDCR has under its jurisdiction certain real properties located in the County of Amador, State of California, commonly known as the Mule Creek State Prison (MCSP) and the Preston Youth Correctional Facility, formerly known as Ione Youth Authority, and hereinafter referred to as "Preston"; and

WHEREAS, pursuant to Government Code (GC) Section 14672.100, the Director of the Department of General Services, with the consent of CDCR, may lease real property appurtenant to or part of Preston, which real property is located in Amador County and further described in this Lease to ARSA (LESSEE) for a term not to exceed thirty (30) years and at a rate of one dollar ($1.00) per year for its continued use as a wastewater delivery and disposal system; and

WHEREAS, CDCR owns a series of pipelines and reservoirs, each of which interconnect to allow the transport of water and or wastewater, which is known as Henderson/Preston System. The Henderson/Preston System, hereinafter referred to as the "Premises", is depicted in "Supplement #2 to Appendix L of Amador County Wastewater Management Plan", dated November 1977, and hereinafter referred to as the "Water Plan". Per the Water Plan, said Premises is composed of an upper element and a lower element. The upper element consists of the area from the outfall of the Sutter Creek Treatment Plant to Preston, including all pipelines, rights of way, reservoirs, and water rights. The lower element includes the components that lie below Preston Forebay to the outfall of the pipeline where it enters Castle Oaks property, including Preston Reservoir. Said Water Plan defines and illustrates the elements of the Henderson/Preston System, is marked Exhibit "A", consists of two (2) pages and is attached hereto and by this reference made a part hereof; and

WHEREAS, the City of Ione, LESSEE and CDCR, entered into the "Agreement to Regulate Use of Henderson/Preston Wastewater Disposal System", hereinafter referred to as "Agreement for Wastewater", dated September 18, 2007. Said Agreement governs the wastewater disposal rights and obligations among the parties to the Agreement, is marked Exhibit "B", which consists of nine (9) pages, and is attached hereto and by this reference made a part hereof; and

WHEREAS, LESSEE currently occupies the Premises per the "Agreement for Wastewater Management" dated March 22, 1977, which agreement shall be superseded by this Lease and the Agreement for Wastewater; and

WHEREAS, STATE is willing to lease the Premises to the LESSEE, and LESSEE is willing to lease the Premises from STATE, on the conditions set forth herein.

NOW, THEREFORE, it is hereby mutually agreed as follows:

WITNESSETH

DESCRIPTION

1. STATE does hereby lease to LESSEE, and LESSEE hereby hires from STATE, the Premises, as further described and depicted in the Water Plan, Exhibit "A" to this Lease.

TERM

2. The term of this Lease shall be for a period of twenty-nine (29) years eight (8) months to commence on January 1, 2009, and shall terminate on September 18, 2037, to coincide with the termination date of the Agreement for Wastewater.

USE

3. (a) LESSEE agrees to use the leased Premises to transport water and wastewater through the Premises pursuant to the Agreement for Wastewater, attached hereto as Exhibit "B", and by this reference made a part hereof.

(b) All activities upon the Premises will be conducted hereunder only in a manner which will not interfere with the orderly operation of the MCSP and Preston.

LESSEE'S OBLIGATION FOR WATER DIVERSION

4. (a) LESSEE agrees to annually divert a minimum of 250 acre/feet of water and a maximum of 1,100 acre/feet, from the Sutter Creek point of diversion in order to maintain STATE's water rights, as is more particularly described in the Water Plan, Exhibit "A" to this Lease. STATE reserves all of its water rights including the water rights for diversion from Sutter Creek at a maximum level of 1,100 acre/feet; and

(b) LESSEE shall maintain and supply upon reasonable request documentation of water diversion rates. Said documentation shall be sent to:

Department of Corrections and Rehabilitation
Facilities Management Branch
9838 Old Placerville Road, Suite B
Sacramento, California 95827

(c) STATE reserves its claim to receive not less than 250 acre/feet of water annually for use at Preston.

RENT

5. The first annual rent payment shall be paid by the LESSEE in the amount of ONE DOLLAR AND 00/100s ($1.00), due and payable on January 1, 2009. Rent shall be payable annually in advance for the duration of the Lease, or at the LESSEE's option, shall be paid in one lump sum in advance.

All rent payments shall be addressed and delivered to:

Department of General Services
Accounts Receivable PAL (L-2070)
P.O. Box 989053
West Sacramento, CA. 95798-9053

FEE

6. LESSEE will reimburse DGS for its costs related to the lease, including, but not limited to, any survey costs, title transfer fees, administrative costs, and department staff time. DGS will invoice for the fees and payment shall be made to DGS at the address shown above and shall be made by February 1, 2009.

LESSEE'S ACCESS RIGHTS

7. During the term of this Lease, STATE hereby grants to LESSEE and its contractors, agents, employees, representatives or licensees, the non exclusive temporary right to access, at any and all times and at any and all places, upon STATE lands and easements identified as the Premises. LESSEE has acquired or shall acquire all access rights for the lands not owned by STATE, at LESSEE's own expense.

CONDITION OF PREMISES

8. (a) LESSEE has visited and inspected said Premises and it is agreed that the Premises stated herein, and on the attached Exhibit "A", is not described using a legal description and that the description is approximate. It is also acknowledged by all parties to this Lease, that the Premises will be leased "as-is" and the STATE does not warrant or guarantee the condition of the system, its pipelines, ponds, dams, equipment and appurtenances included hereunder.

(b) LESSEE agrees, pursuant to the "Surrender of Premises" clause of this Lease, to surrender up to STATE the Premises with any real property improvements therein, in at least the same condition as when received, reasonable use and wear thereof and damage by act of God, or by the elements excepted.

TERMINATION AND INJUNCTIVE RELIEF

9. The parties to this Lease hereto recognize that the Premises leased hereunder is part of a wastewater system, regulated under the California Water Code, and that termination of this Lease is not practicable nor feasible as it would render an essential utility service inoperable, with no alternate means readily available to STATE and LESSEE to dispose of their effluent that is not in violation of their other permit obligations. Therefore, the parties to this Lease have deleted any reference herein to termination of this Lease for breach, and instead expressly agree that injunctive relief to cure any actual or threatened breach is appropriate, and agree that either party shall be entitled to seek equitable injunctive relief from a court of competent jurisdiction to enforce compliance with the obligations hereunder. Neither party shall be entitled to defend such action on the basis that injunctive relief is improper, or that monetary damages are adequate. In the event of a violation of an injunctive order issued under this provision, in a subsequent proceeding to enforce the injunction, a court may, should it deem it appropriate, issue an order terminating the lease thereafter, on such terms as may be just and which will not work undue hardship on the parties to this Lease.

HOLD OVER

10. Any holding over after the expiration of said term or any extension thereof, with the written consent of STATE , shall be deemed a tenancy only from month to month. Otherwise, the terms and conditions specified in lease shall remain applicable.

UTILITIES

11. LESSEE agrees to pay at its sole cost and expense any and all water, electric, gas and other utility charges or any other charges payable in connection with LESSEE's use of said Premises during the term of this Lease. No utilities will be provided by STATE and STATE assumes no liability for the existence or nonexistence of utilities.

REGULATION BY STATE

12. LESSEE agrees to cooperate with the MCSP and or Preston to ensure that activities conducted on the Premises, or persons brought onto the Premises to conduct such activities, do not interfere with the orderly operation of the facilities.

AGREEMENT TO REGULATE

13. LESSEE hereby agrees to continue to operate the Premises in accordance with those guidelines found within the Agreement for Wastewater as outlined in the attached Exhibit "B".

IMPROVEMENTS

14. (a) STATE hereby grants to LESSEE the right to, at its sole cost and expense, improve the Premises. Said improvements include but are not limited to, installing, operating, maintaining, repairing and removing and or demolishing components of the wastewater system. Additionally, LESSEE shall keep the Premises fully functional and operational, in accordance with generally accepted and recommended practices and procedures and in compliance with all applicable federal, state and local laws and regulations, any and all improvements including, but not limited to any pipelines, valves and valve boxes, ponds, dams, equipment, pipes and pipelines, valves, wells, pumps, electrical panels, meter socket and wiring or other improvements existing on the Premises or constructed upon the Premises by LESSEE.

(b) LESSEE hereby assumes, at its sole expense, without limitation, the cost of any necessary improvements as defined in paragraph (a) immediately preceding this paragraph of this Lease, as well as environmental impact reports, engineering reports, government permits, or any other applicable regulatory compliance items.

(c) Prior to making any needed improvements to the Premises, LESSEE shall submit plans, specifications, and/or drawings, as applicable, in writing to the STATE. LESSEE and shall receive STATE's written consent to proceed with such improvements. Said consent will not be unreasonably withheld.

(d) LESSEE agrees that in no event shall STATE be required to perform any maintenance on or make repairs or alterations to the leased Premises of any nature whatsoever.

(e) When making any necessary excavation on the Premises, LESSEE shall make such excavation in a manner that will cause the least damage to the surface of the ground, and shall replace the earth so removed by it and restore the surface of the ground and any improvement thereon to as near the same condition as existed prior to said excavation as practicable.

LIENS

15. (a) During continuance in force of this Lease, LESSEE shall keep the leased Premises free from any liens arising out of any work performed, materials furnished, or obligations incurred by LESSEE and shall indemnify, hold harmless and defend STATE from such liens and encumbrances arising out of any work performed or materials furnished by or at the direction of LESSEE or contractors of LESSEE. Notice is hereby given that STATE shall not be liable for any work or materials furnished to LESSEE on credit and no mechanic's or other lien for any such work or materials shall attach to or affect STATE's interest in the leased Premises based on any work or materials supplied to LESSEE or anybody claiming through LESSEE. LESSEE shall within thirty (30) days after being furnished a notice of filing of any such lien, take action, whether by bonding or otherwise, to remove or satisfy any such lien.

(b) STATE shall have the right at all times to post and keep posted on the leased Premises any notices, that STATE deems proper for its protection and the protection of the leased Premises and STATE from liens. If, nevertheless, any

such lien shall be recorded, LESSEE shall, within sixty (60) days after notice from STATE, pay, settle, or otherwise release such lien, or deposit into escrow with a reputable bank or trust company in California a sum sufficient to satisfy such lien, in full. In the event of unsuccessful termination of any litigation in connection with such lien and under the terms of which it shall be obligated to pay such lien upon the unsuccessful termination of such litigation, then, upon the failure of LESSEE to comply with said requirements, STATE may pay or otherwise dispose of said lien, or defend, settle, or compromise any lawsuit brought to foreclose the same, in its sole discretion, and all amounts so paid by it or any loss sustained by STATE on that account, including reasonable amount for its attorney's fees, shall be repaid to STATE and shall be in addition to any other payments by way of rents, or otherwise, required under the terms of this Lease. A failure to pay any such sum within thirty (30) days after mailing of bill therefore to LESSEE shall constitute a breach of this Lease.

NOTICES

16. (a) All notices or other communications required or permitted hereunder shall be in writing, and shall be personally delivered (including by means of professional messenger service) or sent by overnight courier, or sent by registered or certified mail, postage prepaid, return receipt requested to the addresses set forth below.

(b) All such notices or other communications shall be deemed received upon the earlier of (i) if personally delivered or sent by overnight courier, the date of delivery to the address of the person to receive such notice, (ii) if mailed as provided above, on the date of receipt or rejection, when received by the other party if received Monday through Friday between 6:00a.m. and 5:00p.m. Pacific Time so long as such day is not a state or federal holiday and otherwise on the next day provided that if the next day is Saturday, Sunday, or a state or federal holiday, such notice shall be effective on the following business day.

To the LESSEE: ARSA
Attn.: Rob Duke General Manager
18 Main Street
Sutter Creek, CA 95685
(209) 267-5647 (phone)

STATE:

To the DGS: Department of General Services
Real Estate Services Division-SOLD (L-2070)
707 Third Street, MS 505
Post Office Box 989052
West Sacramento, California 95798-9052
(916) 375-4025 (phone)

To CDCR: California Department of Corrections
Attn.: Warden
Mule Creek State Prison
4001 Highway 104
Sutter Creek, CA 95685
(209) 274-5225 (phone)

California Department of Corrections
Attn.: Superintendent
Preston Youth Correctional Facility (PYCS)
201 Waterman Road
Ione, CA 95640

NOTICES (CONTINUED)

(209) 274-8102 (phone)

(c) The address to which notices may be mailed as aforesaid to either party, may be changed by written notice given by subject party to the other, as hereinbefore provided; but nothing herein contained shall preclude the giving of any such notice by personal service.

SUBLETTING

17. LESSEE shall not assign this Lease in any event and shall not sublet the leased Premises or any part thereof and will not permit the use of the leased Premises by anyone other than the LESSEE without prior written consent by the STATE.

RECOVERY OF LEGAL FEES

18. If action is brought by any parties to this Lease for any breach hereof, or to restrain the breach of any agreement contained herein, the prevailing party in such action shall be entitled to the amount in attorney's fees in said action as the court shall determine to be reasonable, which shall be fixed by the court as part of the costs of said action.

PARTNERSHIP DISCLAIMER

19. LESSEE, and any and all agents and employees of LESSEE, shall act in an independent capacity and not as officers or employees of STATE. Nothing herein contained shall be construed as constituting the parties to this Lease herein as partners.

HOLD HARMLESS

20. (a) This Lease is made upon the express condition that STATE is to be free from all liability and claims for damages by reason of any injury to any person or persons, including LESSEE, or property of any kind whatsoever and to whomsoever belonging, including LESSEE, from any cause or causes whatsoever while in, upon, or in any way connected with the Premises during the term of this Lease or any occupancy hereunder, except those arising out of the sole negligence of STATE.

(b) LESSEE agrees to defend, indemnify and hold harmless STATE from all liability, loss, cost or obligation on account of or arising out of LESSEE's use and/or occupancy of the Premises during the Lease term or any such injury or loss, however occurring.

(c) LESSEE further agrees to provide necessary Workers' Compensation Insurance for all employees of LESSEE upon said Premises at the LESSEE's own cost and expense.

INSURANCE

21. STATE acknowledges that LESSEE is self-insured in whole or in part as to any of the below described types and levels of coverage. LESSEE shall provide STATE with written acknowledgment of this fact at the time of the execution of this Lease. Said acknowledgement shall contain the STATE Lease Number, L-2070. If, at any time after the execution of this Lease, LESSEE abandons its self-insured status, LESSEE shall immediately notify STATE of this fact and shall comply with all of the terms and conditions of this "Insurance" clause pertaining to policies of insurance in regard to those types and levels of insurance as follows:

COMMERCIAL GENERAL LIABILITY

LESSEE shall maintain general liability with limits of not less than $1,000,000 aggregate for bodily injury and property damage liability combined. The policy shall include coverage for liabilities arising out of Premises, operations, independent contractors, products, completed operations, personal & advertising

injury, and liability assumed under an insured contract. This insurance shall apply separately to each insured against whom claim is made or suit is brought subject to the LESSEE's limit of liability.

The policy must include State of California, Department of General Services, LESSEE, and their officers, agents, employees and servants as additional insureds, but only insofar as the operations under the Lease are concerned.

AUTOMOBILE LIABILITY

LESSEE shall maintain motor vehicle liability with limits of not less than $1,000,000 per accident for bodily injury and property damage. The State of California and Department of General Services are to be additional insured with respect to liability arising out of all vehicles owned, hired and non-owned.

WORKERS' COMPENSATION

LESSEE shall maintain statutory workers' compensation and employer's liability coverage for all its employees who will be engaged in the performance of the Lease, including special coverage extensions where applicable. Employer's liability limits of $1,000,000 shall be required, and the policy shall include a waiver of subrogation in favor of the State of California.

GENERAL REQUIREMENTS

LESSEE shall ensure that the following general requirements are met:

(a) Insurance Companies must be acceptable to Department of General Services, Office of Risk and Insurance Management.

(b) LESSEE shall provide STATE with a true copy of the policy in place providing coverage for General Liability, within thirty (30) days after each insurance policy renewal.

(c) Coverage needs to be in-force for complete term of this Lease. If insurance expires during the term of the Lease, a new certificate must be received by the STATE at least ten (10) days prior to the expiration of this insurance. This new insurance must still meet the terms of the original contract.

(d) Insurance policies shall contain a provision that coverage will not be cancelled without thirty (30) days prior written notice to STATE.

(e) LESSEE is responsible for any deductible or self-insured retention contained within the insurance program.

(f) In the event LESSEE fails to keep in effect at all times the specified insurance coverage, STATE may, in addition to any other remedies it may have, terminate this Lease upon the occurrence of such event, subject to the provisions of this Lease.

(g) Any insurance required to be carried shall be primary, and not excess, to any other insurance carried by STATE.

It is agreed that STATE shall not be liable for the payment of any premiums or assessments on the required insurance coverage.

NON-DISCRIMINATION

22. LESSEE agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, ancestry, national origin, sex, age or physical handicap. LESSEE agrees to take action to ensure that applicants for employment and employees are treated during employment without regard to their race, color, religion, ancestry, national origin, sex, age or physical handicap. (See California Government Code Sections 12920-12994 for further details.)

Remedies for willful violation:

(a) STATE may determine a willful violation of the Fair Employment Practices provision to have occurred upon receipt of a final judgment having the effect from a court in an action to which LESSEE was a party, or upon receipt of a written notice from the Fair Employment Practices Commission that is has investigated and determined that the LESSEE has violated the Fair Employment Practices Act and has issued an order pursuant to the appropriate provisions of the Government Code.

(b) STATE shall have the right to seek appropriate legal relief, whether monetary or injunctive, as a result of said breach, and consistent with the provisions of the "Termination and Injunctive Relief" clause of this Lease.

AMERICANS WITH DISABILITIES ACT

23. Where applicable, LESSEE shall comply with all federal requirements established under the 28 Code of Regulations, Part 36, Americans with Disabilities Act, to ensure the Premises is accessible to all participants and to provide equally effective communications.

LOSSES

24. STATE will not be responsible for losses or damage to personal property, equipment or materials of the LESSEE and all losses shall be reported to STATE immediately upon discovery.

DEBT LIABILITY DISCLAIMER

25. STATE will not be liable for any debts or claims that arise from the operation of this Lease.

TAXES / ASSESSMENTS

26. LESSEE agrees to pay all lawful taxes, assessments, or charges which at any time may be levied upon interest in this agreement. It is understood that this lease may create a possessory interest subject to property taxation and LESSEE may be subject to the payment of property taxes levied on such interest.

PROTECTION OF PREMISES

27. No removal of soil in excess of five (5) cubic yards, or dumping of refuse by LESSEE, except for transport of wastewater as contemplated by this Lease, is permitted in any area of the Premises, and LESSEE shall not commit or suffer to be committed any waste or nuisance upon the Premises; and LESSEE agrees not to cut or remove any trees, larger than four (4) inches in diameter and measured at three (3) feet in height, thereon except as approved in writing by STATE and LESSEE further agrees that at all times to exercise due diligence in the protection of the Premises against damage or destruction by fire or other causes.

PROPERTY RESTRICTIONS

28. LESSEE shall comply with the following with respect to activities on the Premises:

(a) LESSEE shall not permit hunting on the Premises but shall not be required to post "No Hunting" signs; and

(b) Compliance to any and all rules and regulations by governing agencies to include EPA, Department of Health or local water quality board must be strictly adhered to; and

(c) Should LESSEE desire to use pesticides on the area (either herbicides, rodenticides or insecticides) all applicable Environmental Protection Agency (EPA) both state and federal, standards must be met and prior approval must be received from STATE as not all EPA approved pesticides will be permitted.

AERIAL APPLICATIONS

29. Any aerial applications of any pesticides on the Premises shall be in compliance with the California Food and Agriculture Code (FAC), Section 12972 and Title 3, California Code of Regulations (3 CCR), Section 6614.

LESSEE shall notify the Warden and Superintendent in writing within three (3) business days in advance, of any aerial application and a completed Material Safety Data Sheet (MSDS) shall accompany the notice. LESSEE shall ensure that there will be minimal to no drift over the prison site adjacent to the subject Premises. LESSEE shall insure that any aircraft used for any aerial application will not encroach into the airspace of the MCSP and Preston.

WEED ABATEMENT

30. Any weed burning operations on the leased Premises will be carried out pursuant to local ordinances and at LESSEE's own cost and expense. LESSEE will inform MCSP and Preston in advance of any weed burning operations.

ENVIRONMENTAL COMPLIANCE AND HAZARDOUS WASTE

31. (a) Compliance. LESSEE shall be solely responsible for determining the applicability of and for complying with all applicable federal, state and local environmental, natural resources, zoning laws and regulations, including but not limited to CERCLA (42 USC 9601.14), SARA [42 USC 11021(e)], or Resources Conservation and Recovery Act of 1976 (RCRA), Pub. L. 94-580 (1976), 42 USC 6901 et seq. and amendments, including the Hazardous and Solid Waste Amendments of 1984 (HSWA), Pub. L. 98-616 (1984), with respect to LESSEE's activities on the Premises. LESSEE agrees that it shall comply with all applicable laws, federal, state, and local, existing during the term of this Lease pertaining to the use, storage, generation, treatment, transportation, and disposal of LESSEE's hazardous substances (including petroleum and petroleum derivatives) as that term is defined in such applicable law.

(b) Copies of Materials. LESSEE shall maintain copies of Material Safety Data Sheets (MSDS) and hazardous waste manifests, if any, for all hazardous materials used or transported on or from the Premises. MSDS and manifests shall be provided to the CDCR Facilities Management Division upon its request. If LESSEE is required to prepare a Business Plan, as specified by Health and Safety Code Section 25500 et seq., or a Hazardous Waste Contingency Plan, as specified in 22 CCR 66264.51 et seq., then a copy of the plan shall be submitted first to the Facilities Management Division for review and written approval.

(c) Spill Reporting; Cleanup. Any spill or release of a hazardous substance or material to the air, soil, surface water, or groundwater will be immediately reported to STATE as well as to appropriate government agencies, and shall be promptly and fully cleaned up and the Premises (including soils, surface water, and groundwater) restored to its original condition or such condition as approved by the applicable government agency with jurisdiction.

(d) RCRA Facility Prohibited. LESSEE shall not apply to become a "permitted" RCRA hazardous waste storage or disposal facility on the Premises.

(e) Inspection. STATE or its representatives reserve inspection rights pursuant to the "STATE's Rights to Enter" clause of this Lease.

Termination. Any violation of federal, state, or local environmental law by LESSEE, which continues unaddressed for a period of thirty (30) days from the date LESSEE receives notice of such violation, shall be grounds for STATE to pursue specific performance and injunctive relief in accordance with the "Termination and Injunctive Relief" clause of this Lease. STATE shall not have the right to pursue remedies under said clause if LESSEE commences addressing the violation within such thirty (30) day period and, thereafter, diligently pursues remediation of the violation.

(f) Indemnification by LESSEE. In addition to any other indemnity set forth herein, LESSEE shall fully indemnify, defend, and hold harmless STATE and its agents and representatives for any violation of environmental, hazardous waste, hazardous materials (including petroleum and petroleum derivatives), and/or natural resources law caused by LESSEE or LESSEE's agents or representatives. Furthermore, LESSEE shall reimburse the STATE for any and all costs and liability related to investigation, clean up, settlement amounts, and/or fines, including attorneys' fees, incurred by the STATE for such violation.

(g) Indemnification by STATE. In the event a government order is issued naming LESSEE as a potentially responsible party, or LESSEE incurs any other loss, cost, expense (including attorney's fees) or liability during or after the term of the Lease in connection with contamination which pre-existed LESSEE's obligations and occupancy under this Lease, or which was caused by STATE, STATE will hold harmless and defend LESSEE in connection therewith and shall be solely responsible as between LESSEE and STATE for all efforts, liabilities, losses, costs and expenses therefore, including attorney's fees. LESSEE shall have the burden of proof that the condition pre-existed the LESSEE's use and occupancy of the Premises or was caused by STATE.

SURRENDER OF PREMISES

32. (a) All personal property and equipment that is nonessential to the wastewater operations on the Premises shall be removed by LESSEE, at its sole cost and expense within thirty (30) days after expiration or termination of LESSEE's tenancy.

(b) Should LESSEE fail to remove said nonessential personal property and equipment within thirty (30) days after expiration or termination of the Lease, STATE may do so at the risk of LESSEE. Upon written demand by STATE, LESSEE shall immediately pay all costs and expenses associated with the removal of said property belonging to LESSEE.

(c) LESSEE may, however, with written consent of STATE, abandon in place any and all of LESSEE's nonessential personal property and equipment, whereupon, as abandoned, title to said improvements will vest in STATE.

RELOCATION

33. In the event that Court should terminate this Lease for a refusal to obey an injunctive order as provided in the "Termination and Injunctive Relief" clause of this Lease, LESSEE acknowledges and agrees that it has no claim against STATE for Relocation Payments, Relocation Advisory Assistance, or costs pursuant to the Government Code sections 7260 et seq, or any regulations implementing or interpreting such sections. LESSEE further agrees that it has no claim in either law or equity against STATE for damages or other relief should the Lease be so terminated, and waives any such claims it may have.

STATE'S RIGHT TO ENTER

34. During the term of this Lease, there shall be and is hereby expressly reserved to STATE and to any of its agencies, contractors, agents, employees, representatives or licensees, the right at any and all times, and any and all places, to temporarily enter upon said Premises for survey, inspection, or any other lawful STATE purposes.

EASEMENTS AND RIGHTS OF WAY

35. This lease is subject to all existing easements and rights of way. STATE further reserves the right to grant additional public utility easements as may be necessary and LESSEE hereby consents to the granting of any such easement, as long as such easement does not interfere with the operations of LESSEE's established uses. If the right to grant such easement is exercised, the public utility or their contractor will be required to reimburse LESSEE for any damages caused by the construction work on the easement area.

MINERAL RIGHTS

36. LESSEE agrees not to interfere, in any way, with the interests of any person or persons that may presently, or in the future, hold oil, gas, or other mineral interests upon or under said Premises; nor shall LESSEE, in any way, interfere with the rights of ingress and egress of said interest holders.

BINDING

37. The terms of this Lease and covenants and agreements herein contained shall apply to and shall bind and inure to the benefit of the heirs, representatives, assigns and successors in interest of the parties to this Lease hereto.

UNDERGROUND UTILITIES

38. LESSEE shall be responsible for maintaining all underground utilities to include all pipelines connecting to the Premises.

ESSENCE OF TIME

39. Time is of the essence for each and all of the provisions, covenants and conditions of this Lease.

CLAUSE HEADINGS

40. All clause headings contained herein are for convenience of reference only and are not intended to define or limit the scope of any provision of this Lease.

WAIVER

41. If STATE waives the performance of any term, covenant or condition contained in this Lease, such waiver shall not be deemed to be a waiver of that or any subsequent term, covenant or condition. Failure by STATE to enforce any of the terms, covenants or conditions of this Lease for any length of time shall not be deemed to waive or decrease STATE'S right to insist thereafter upon strict performance by LESSEE. Waiver by STATE of any term, covenant, or condition contained in this Lease may only be made by a written document properly signed by an authorized STATE representative.

SEVERABILITY

42. If any term, covenant, condition, or provision of this Lease or any application thereof, to any extent, is found invalid, void, or unenforceable by a court of competent jurisdiction, the remainder of this Lease will not be affected thereby, and will be valid and enforceable to the fullest extent permitted by law.

This Lease contains all currently enforceable agreements between STATE and LESSEE. In addition, this Lease and with Exhibit B are intended to be compatible and work together and collectively supersede all prior agreements between STATE and LESSEE. There have been no representations by STATE or understandings made between STATE and LESSEE other than those set forth in this Lease and its exhibits. This Lease may not be modified except by a written instrument duly executed by the parties to this Lease hereto.

IN WITNESS WHEREOF, this agreement has been executed by the parties to this Lease hereto as of the date written below.

STATE OF CALIFORNIA

DIRECTOR OF DEPARTMENT OF GENERAL SERVICES

By: _____
TONY PSIHOPAIDAS, Manager
State Owned Leasing & Development
707 Third Street, MS-505
West Sacramento, CA 95605
(916) 375-4025

02/23/09
Execution Date

LESSEE:

AMADOR REGIONAL SANITATION AUTHORITY, a Joint Powers Authority

By: _____
ROB DUKE, General Manager

1-28-09
Date Signed

Consent:

DEPARTMENT OF CORRECTIONS

By: _____
DEBORAH HYSEN, Chief Deputy Secretary
Facility Planning, Construction, and Management

Approved as to form:

MCDONOUGH HOLLAND & ALLEN

By: _____
HARRIET STEINER
Attorneys for ARSA

Approved as to form:

CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION, OFFICE OF LEGAL AFFAIRS

By: _____
CHRIS SWANBERG, Senior Staff Counsel
Attorney for CDCR

Approval Recommended:

DEPARTMENT OF GENERAL SERVICES
REAL ESTATE SERVICES DIVISION
State Owned Leasing and Development

By: _____
PAMELA DYER,
Associate Real Estate Officer

APPENDIX B - 2009 Ground Lease Agreement

EXHIBIT A

SUTTER CREEK - IONE OUTFALL

WASTEWATER

RECLAMATION PROJECT

SUPPLEMENT #2

TO

APPENDIX L

OF

AMADOR COUNTY

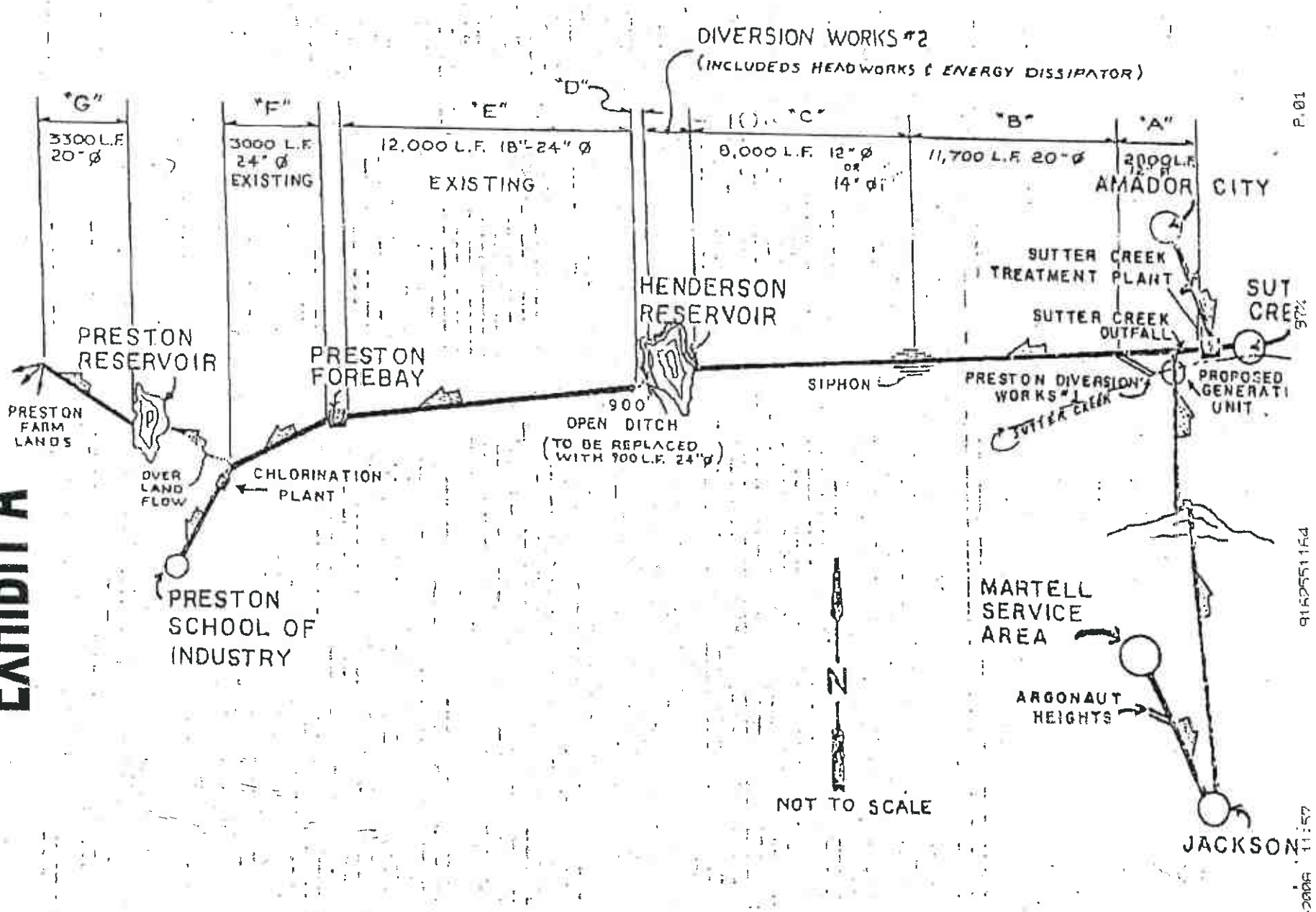
WASTEWATER MANAGEMENT PLAN

NOVEMBER, 1977

PROJECT NO. 75-0995

APPENDIX B 2009 Ground Lease Agreement

EXHIBIT A



SUTTER CREEK - IONE OUTFALL PROJECT

FACILITIES INVENTORY

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Appendix C

Detailed Water Balance Model Runs

APPENDIX C - Detailed Water Balance Model Runs

RUN 1

EXISTING CONDITIONS: 100-YEAR WET SEASON, 2019 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES

Parameters:

Year	2019	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	X
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	X
Pond 7 Percolation	X
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1310.62	
Disposed/Lost	1310.62	
An Additional	0.00	*Acre-Ft of Storage is Required*
Carryover water to following year	0.00	*Acre-Ft*

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	35.00	33.87	35.00	35.00	31.61	35.00	33.87	35.00	33.87	35.00	35.00	33.87	412.07
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	2.35	4.56	5.46	7.92	4.80	5.03	3.00	1.56	1.07	0.88	0.96	1.18	38.77
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**46.11**	**58.16**	**66.25**	**79.79**	**60.27**	**63.17**	**49.62**	**39.59**	**35.93**	**36.05**	**36.26**	**36.90**	**608.10**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	10.00	10.00	10.00	10.00	10.00	10.00	36.67	36.67	36.67	36.67	36.67	36.67	280.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**13.78**	**11.02**	**10.52**	**10.71**	**11.17**	**11.37**	**98.40**	**103.94**	**108.13**	**110.41**	**108.94**	**104.13**	**702.52**
TOTAL INFLOW	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**148.02**	**143.53**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	59.89	69.18	76.77	90.51	71.44	74.54	148.02	143.53	144.06	146.46	145.20	141.03	1310.62
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.03	0.00	0.00	0.00	0.00	
Total Volume for Disposal/Storage	AF	59.89	69.18	76.77	90.51	71.44	74.54	148.02	148.57	144.06	146.46	145.20	141.03	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.28	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	56.72	68.00	76.17	89.90	70.50	72.59	99.35	102.66	39.59	40.91	40.91	39.59	796.89
Water Remaining for Irrigation/Land Application/Storage	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**45.15**	**39.98**	**96.54**	**96.15**	**96.30**	**95.96**	**470.08**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (includes storage from prev month)	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**45.15**	**39.98**	**96.54**	**96.15**	**96.30**	**95.96**	**470.08**
Actual Sent to COWRP	AF	0.00	0.00	0.00	0.00	0.00	0.00	25.73	39.98	96.54	96.15	96.30	86.52	441.22
Actual Applied at Town Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	13.06	0.00	0.00	0.00	0.00	9.44	22.50
Actual Applied at City Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	1.33
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**39.98**	**96.54**	**96.15**	**96.30**	**95.96**	**465.05**
Water to Remain in Storage at End of Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	5.03	0.00	0.00	0.00	0.00	0.00	
Remaining Irrigation Need/Disposal Available	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	79.59	75.28	111.10	81.41	25.24	415.52
Total Disposed/Lost This Month	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**142.99**	**148.57**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
Storage														
Net Change in Storage this Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	5.03	-5.03	0.00	0.00	0.00	0.00	
Total Stored at End of Month (Total Storage Needed)	AF	0.00	0.00	0.00	0.00	0.00	0.00	5.03	0.00	0.00	0.00	0.00	0.00	5.03
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SUMMARY														
INFLOW	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**148.02**	**143.53**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
EVAPORATION & PERCOLATION	AF	59.89	69.18	76.77	90.51	71.44	74.54	102.87	108.58	47.52	50.30	48.90	45.07	845.57
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	0.00	0.00	0.00	0.00	0.00	0.00	40.12	39.98	96.54	96.15	96.30	95.96	465.05
IRRIGATION/DISPOSAL NOT USED	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	79.59	75.28	111.10	81.41	25.24	415.52
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**142.99**	**148.57**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
NET CHANGE IN STORAGE THIS MONTH	AF	0.00	0.00	0.00	0.00	0.00	0.00	5.03	-5.03	0.00	0.00	0.00	0.00	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.03	0.00	0.00	0.00	0.00	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

APPENDIX C - Detailed Water Balance Model Runs

RUN 2

100-YEAR WET SEASON, 2019 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Year	2019	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	X
Pond 7 Percolation	X
Preston Available (No ARSA flows – 295 ac-ft)	

Inflow	1030.62	
Disposed/Lost	1030.62	
An Additional	0.00	Acre-ft of Storage is Required
Carryover water to following year	0.00	Acre-ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	in	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	in	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	in	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	in	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	in	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	35.00	33.87	35.00	35.00	31.61	35.00	33.87	35.00	33.87	35.00	35.00	33.87	412.07
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	2.35	4.56	5.46	7.92	4.80	5.03	3.00	1.56	1.07	0.88	0.96	1.18	38.77
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**46.11**	**58.16**	**66.25**	**79.79**	**60.27**	**63.17**	**49.62**	**39.59**	**35.93**	**36.05**	**36.26**	**36.90**	**608.10**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	**AF**	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	49.89	59.18	66.77	80.51	61.44	64.54	111.36	106.87	107.39	109.79	108.53	104.36	1030.62
Water in Storage from Previous Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total Volume for Disposal/Storage	AF	49.89	59.18	66.77	80.51	61.44	64.54	111.36	106.87	107.39	109.79	108.53	104.36	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	46.72	58.00	66.17	79.90	60.50	62.59	99.35	100.94	99.59	40.91	40.91	39.59	735.17
Water Remaining for Irrigation/Land Application/Storage	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**8.49**	**0.00**	**59.87**	**59.49**	**59.63**	**59.29**	**246.77**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (includes storage from prev month)	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**8.49**	**0.00**	**59.87**	**59.49**	**59.63**	**59.29**	**246.77**
Actual Sent to COWRP	AF	0.00	0.00	0.00	0.00	0.00	0.00	8.49	0.00	59.87	59.49	59.63	59.29	246.77
Actual Applied at Town Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Applied at City Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**8.49**	**0.00**	**59.87**	**59.49**	**59.63**	**59.29**	**246.77**
Water to Remain in Storage at End of Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Remaining Irrigation Need/Disposal Available	AF	42.90	0.00	0.00	0.00	0.00	0.00	31.63	119.57	111.95	147.76	118.08	61.91	633.80
Total Disposed/Lost This Month	**AF**	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
Storage														
Net Change in Storage this Month	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total Stored at End of Month (Total Storage Needed)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SUMMARY														
INFLOW	AF	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
EVAPORATION & PERCOLATION	AF	49.89	59.18	66.77	80.51	61.44	64.54	102.87	106.87	47.52	50.30	48.90	45.07	783.85
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	0.00	0.00	0.00	0.00	0.00	0.00	8.49	0.00	59.87	59.49	59.63	59.29	246.77
IRRIGATION/DISPOSAL NOT USED	AF	42.90	0.00	0.00	0.00	0.00	0.00	31.63	119.57	111.95	147.76	118.08	61.91	633.80
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
NET CHANGE IN STORAGE THIS MONTH	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

APPENDIX C - Detailed Water Balance Model Runs

RUN 3

100-YEAR WET SEASON, 2019 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES

Parameters:

Year	2019	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	X
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	
Pond 7 Percolation	
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1310.62	
Disposal/Lost	929.25	
An Additional	880.57	Acre-Ft of Storage Is Required
Carryover water to following year	381.37	Acre-Ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	35.00	33.87	35.00	35.00	31.61	35.00	33.87	35.00	33.87	35.00	35.00	33.87	412.07
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	2.35	4.56	5.46	7.92	4.80	5.03	3.00	1.56	1.07	0.88	0.96	1.18	38.77
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**46.11**	**58.16**	**66.25**	**79.79**	**60.27**	**63.17**	**49.62**	**39.59**	**35.93**	**36.05**	**36.26**	**36.90**	**608.10**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP.	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	10.00	10.00	10.00	10.00	10.00	10.00	36.67	36.67	36.67	36.67	36.67	36.67	280.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**13.78**	**11.02**	**10.52**	**10.71**	**11.17**	**11.37**	**98.40**	**103.94**	**108.13**	**110.41**	**108.94**	**104.13**	**702.52**
TOTAL INFLOW	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**148.02**	**143.53**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	59.89	69.18	76.77	90.51	71.44	74.54	148.02	143.53	144.06	146.46	145.20	141.03	1310.62
Water in Storage from Previous Month	AF	0.00	13.82	81.82	157.99	247.89	318.39	390.98	495.37	513.40	477.71	407.53	367.02	
Total Volume for Disposal/Storage	AF	59.89	83.00	158.59	248.49	319.33	392.93	539.01	638.90	657.46	624.17	552.73	508.05	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	**AF**	**56.72**	**81.82**	**157.99**	**247.89**	**318.39**	**390.98**	**535.49**	**632.97**	**649.53**	**614.78**	**544.73**	**502.57**	**4733.86**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (includes storage from prev month)	**AF**	**56.72**	**81.82**	**157.99**	**247.89**	**318.39**	**390.98**	**535.49**	**632.97**	**649.53**	**614.78**	**544.73**	**502.57**	**4733.86**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	13.82	81.82	157.99	247.89	318.39	390.98	495.37	513.40	477.71	407.53	367.02	381.37	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**125.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	13.82	68.00	76.17	89.90	70.50	72.59	104.38	18.04	-35.69	-70.19	-40.50	14.35	
Total Stored at End of Month (Total Storage Needed)	AF	13.82	81.82	157.99	247.89	318.39	390.98	495.37	513.40	477.71	407.53	367.02	381.37	513.40
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	65.31	155.21	225.72	298.31	402.69	420.72	385.03	314.85	274.35	288.70	
SUMMARY														
INFLOW	**AF**	**59.89**	**69.18**	**76.77**	**90.51**	**71.44**	**74.54**	**148.02**	**143.53**	**144.06**	**146.46**	**145.20**	**141.03**	**1310.62**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	13.82	68.00	76.17	89.90	70.50	72.59	104.38	18.04	-35.69	-70.19	-40.50	14.35	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	13.82	81.82	157.99	247.89	318.39	390.98	495.37	513.40	477.71	407.53	367.02	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**13.82**	**81.82**	**157.99**	**247.89**	**318.39**	**390.98**	**495.37**	**513.40**	**477.71**	**407.53**	**367.02**	**381.37**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	65.31	155.21	225.72	298.31	402.69	420.72	385.03	314.85	274.35	288.70	

APPENDIX C - Detailed Water Balance Model Runs

RUN 4

100-YEAR WET SEASON, 2019 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Year	2019	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	
Pond 7 Percolation	
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1050.62	
Disposed/Lost	929.25	
An Additional	880.57	*Acre-Ft of Storage Is Required*
Carryover water in following year	101.37	*Acre-Ft*

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	35.00	33.87	35.00	35.00	31.61	35.00	33.87	35.00	33.87	35.00	35.00	33.87	412.07
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	2.35	4.56	5.46	7.92	4.80	5.03	3.00	1.56	1.07	0.88	0.96	1.18	38.77
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**46.11**	**58.16**	**66.25**	**79.79**	**60.27**	**63.17**	**49.62**	**39.59**	**35.93**	**36.05**	**36.26**	**36.90**	**608.10**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	**AF**	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	49.89	59.18	66.77	80.51	61.44	64.54	111.36	106.87	107.39	109.79	108.53	104.36	1030.62
Water in Storage from Previous Month	AF	0.00	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	
Total Volume for Disposal/Storage	AF	49.89	63.00	128.59	208.49	269.33	332.93	442.34	505.56	487.46	417.50	309.39	228.05	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	**AF**	**46.72**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**438.82**	**499.64**	**479.53**	**408.11**	**301.40**	**222.57**	**3393.86**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (Includes storage from prev month)	**AF**	**46.72**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**438.82**	**499.64**	**479.53**	**408.11**	**301.40**	**222.57**	**3393.86**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	101.37	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	3.82	58.00	66.17	79.90	60.50	62.59	67.71	-18.63	-72.36	-106.85	-77.17	-22.32	
Total Stored at End of Month (Total Storage Needed)	AF	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	101.37	398.70
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	35.31	115.21	175.72	238.31	306.02	287.39	215.03	108.18	31.01	8.70	
SUMMARY														
INFLOW	**AF**	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (Includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	3.82	58.00	66.17	79.90	60.50	62.59	67.71	-18.63	-72.36	-106.85	-77.17	-22.32	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**3.82**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**398.70**	**380.07**	**307.71**	**200.86**	**123.69**	**101.37**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	35.31	115.21	175.72	238.31	306.02	287.39	215.03	108.18	31.01	8.70	

APPENDIX C - Detailed Water Balance Model Runs

RUN 4A

100-YEAR WET SEASON, 2019 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Year	2019
Rainfall Event	100
Assumed Carryover Water	0 AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Appropriation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	
Pond 7 Percolation	
Preston Available (No ARSA flows – 235 ac-ft)	X

Inflow	1030.62	
Disposed/Lost	929.25	
An Additional	71.02	Acre-Ft of Storage is Required
Carryover water to following year	101.37	Acre-Ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.29	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	35.00	33.87	35.00	35.00	31.61	35.00	33.87	35.00	33.87	35.00	35.00	33.87	412.07
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	2.35	4.56	5.46	7.92	4.80	5.03	3.00	1.56	1.07	0.88	0.96	1.18	38.77
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	AF	**46.21**	**58.16**	**66.25**	**79.79**	**60.27**	**63.17**	**49.62**	**39.59**	**35.93**	**36.05**	**36.26**	**36.90**	**608.10**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	AF	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	AF	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	49.89	59.18	66.77	80.51	61.44	64.54	111.36	106.87	107.39	109.79	108.53	104.36	1030.62
Water in Storage from Previous Month	AF	0.00	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	
Total Volume for Disposal/Storage	AF	49.89	63.00	128.59	208.49	269.33	332.93	442.34	505.56	487.46	417.50	309.39	228.05	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	AF	**46.72**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**438.82**	**499.64**	**479.53**	**408.11**	**301.40**	**222.57**	**3393.86**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (Includes storage from prev month)	AF	**46.72**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**438.82**	**499.64**	**479.53**	**408.11**	**301.40**	**222.57**	**3393.86**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	101.37	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	3.82	58.00	66.17	79.90	60.50	62.59	67.71	-18.63	-72.36	-106.85	-77.17	-22.32	
Total Stored at End of Month (Total Storage Needed)	AF	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	101.37	398.70
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	
System Storage Deficiency	AF	0.00	0.00	0.00	0.00	0.00	3.31	71.02	52.39	0.00	0.00	0.00	0.00	
SUMMARY														
INFLOW	AF	**49.89**	**59.18**	**66.77**	**80.51**	**61.44**	**64.54**	**111.36**	**106.87**	**107.39**	**109.79**	**108.53**	**104.36**	**1030.62**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	3.82	58.00	66.17	79.90	60.50	62.59	67.71	-18.63	-72.36	-106.85	-77.17	-22.32	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	3.82	61.82	127.99	207.89	268.39	330.98	398.70	380.07	307.71	200.86	123.69	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	AF	**3.82**	**61.82**	**127.99**	**207.89**	**268.39**	**330.98**	**398.70**	**380.07**	**307.71**	**200.86**	**123.69**	**101.37**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	0.00	0.00	3.31	71.02	52.39	0.00	0.00	0.00	0.00	

APPENDIX C - Detailed Water Balance Model Runs

RUN 5

100-YEAR WET SEASON, 2039 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES

Parameters:

Year	2039	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (900 ac-ft per 2007 Agreement)	X
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	X
Pond 7 Percolation	X
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1751.11	
Disposed/Lost	1742.10	
As Additional	33.19	*Acre-ft of Storage is Required*
Carryover water to following year	9.01	*Acre-ft*

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.85	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	69.19	66.96	69.19	69.19	62.50	69.19	66.96	69.19	66.96	69.19	69.19	66.96	814.68
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	4.65	9.01	10.79	15.66	9.50	9.94	5.94	3.08	2.11	1.74	1.90	2.34	76.65
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**82.60**	**95.70**	**105.77**	**121.73**	**95.85**	**102.28**	**85.64**	**75.31**	**70.06**	**71.10**	**71.39**	**71.15**	**1048.59**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	10.00	10.00	10.00	10.00	10.00	10.00	36.67	36.67	36.67	36.67	36.67	36.67	280.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**13.78**	**11.02**	**10.52**	**10.71**	**11.17**	**11.37**	**98.40**	**103.94**	**108.13**	**110.41**	**108.94**	**104.13**	**702.52**
TOTAL INFLOW	**AF**	**96.38**	**106.72**	**116.30**	**132.44**	**107.02**	**113.64**	**184.05**	**179.25**	**178.19**	**181.51**	**180.33**	**175.28**	**1751.11**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	96.38	106.72	116.30	132.44	107.02	113.64	184.05	179.25	178.19	181.51	180.33	175.28	1751.11
Water in Storage from Previous Month	AF	0.00	0.00	6.19	19.23	48.41	61.77	70.81	111.87	62.96	21.81	0.00	0.00	
Total Volume for Disposal/Storage	AF	96.38	106.72	122.49	151.67	155.43	175.41	254.85	291.11	241.15	203.32	180.33	175.28	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	93.21	99.35	102.66	102.66	92.72	102.66	99.35	102.66	39.59	40.91	40.91	39.59	956.26
Water Remaining for Irrigation/Land Application/Storage	**AF**	**0.00**	**6.19**	**19.23**	**48.41**	**61.77**	**70.81**	**151.99**	**182.53**	**193.63**	**153.02**	**131.43**	**130.21**	**1149.21**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (Includes storage from prev month)	**AF**	**0.00**	**6.19**	**19.23**	**48.41**	**61.77**	**70.81**	**151.99**	**182.53**	**193.63**	**153.02**	**131.43**	**130.21**	**1149.21**
Actual Sent to COWRP	AF	0.00	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	595.82
Actual Applied at Town Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	4.32	3.96	31.48	129.06
Actual Applied at City Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	0.00	0.00	3.20	12.28
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**153.02**	**131.43**	**121.20**	**737.16**
Water to Remain in Storage at End of Month	AF	0.00	6.19	19.23	48.41	61.77	70.81	111.87	62.96	21.81	0.00	0.00	9.01	
Remaining Irrigation Need/Disposal Available	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.23	46.28	0.00	143.41
Total Disposed/Lost This Month	**AF**	**96.38**	**100.53**	**103.26**	**103.26**	**93.66**	**104.60**	**142.99**	**228.15**	**219.34**	**203.32**	**180.33**	**166.27**	**1742.10**
Storage														
Net Change in Storage this Month	AF	0.00	6.19	13.04	29.18	13.36	9.04	41.06	-48.91	-41.15	-21.81	0.00	9.01	
Total Stored at End of Month (Total Storage Needed)	AF	0.00	6.19	19.23	48.41	61.77	70.81	111.87	62.96	21.81	0.00	0.00	9.01	111.87
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	0.00	0.00	0.00	0.00	19.19	0.00	0.00	0.00	0.00	0.00	
SUMMARY														
INFLOW	**AF**	**96.38**	**106.72**	**116.30**	**132.44**	**107.02**	**113.64**	**184.05**	**179.25**	**178.19**	**181.51**	**180.33**	**175.28**	**1751.11**
EVAPORATION & PERCOLATION	AF	96.38	100.53	103.26	103.26	93.66	104.60	102.87	108.58	47.52	50.30	48.90	45.07	1004.94
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	0.00	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	153.02	131.43	121.20	737.16
IRRIGATION/DISPOSAL NOT USED	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.23	46.28	0.00	143.41
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**96.38**	**100.53**	**103.26**	**103.26**	**93.66**	**104.60**	**142.99**	**228.15**	**219.34**	**203.32**	**180.33**	**166.27**	**1742.10**
NET CHANGE IN STORAGE THIS MONTH	AF	0.00	6.19	13.04	29.18	13.36	9.04	41.06	-48.91	-41.15	-21.81	0.00	9.01	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	0.00	6.19	19.23	48.41	61.77	70.81	111.87	62.96	21.81	0.00	0.00	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**0.00**	**6.19**	**19.23**	**48.41**	**61.77**	**70.81**	**111.87**	**62.96**	**21.81**	**0.00**	**0.00**	**9.01**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	0.00	0.00	0.00	19.19	0.00	0.00	0.00	0.00	0.00	

APPENDIX C - Detailed Water Balance Model Runs

RUN 6

100-YEAR WET SEASON, 2039 FLOW, PERCOLATION PONDS 6 AND 7, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Year	2039	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	
CDCR Contractual (350 ac-ft per 2007 Agreement)	0
Town Field Tailwater Recirculation (100 ac-ft)	0

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	X
Pond 7 Percolation	X
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1471.11	
Disposed/Lost	1471.11	
An Additional	0.00	*Acre-Ft of Storage is Required*
Carryover water to following year	0.00	*Acre-Ft*

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	69.19	66.96	69.19	69.19	62.50	69.19	66.96	69.19	66.96	69.19	69.19	66.96	814.68
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	4.65	9.01	10.79	15.66	9.50	9.94	5.94	3.08	2.11	1.74	1.90	2.34	76.65
Treatment Pond 1 Rainfall Gain	AF	0.29	0.68	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	AF	**82.60**	**95.70**	**105.77**	**121.73**	**95.85**	**102.28**	**85.64**	**75.33**	**70.06**	**71.10**	**71.39**	**71.15**	**1048.59**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	AF	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	AF	**86.38**	**96.72**	**106.30**	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	86.38	96.72	106.30	122.44	97.02	103.64	147.38	142.58	141.53	144.84	143.67	138.61	1471.11
Water in Storage from Previous Month	AF	0.00	0.00	0.00	3.04	22.22	25.57	24.61	29.01	0.00	0.00	0.00	0.00	
Total Volume for Disposal/Storage	AF	86.38	96.72	106.30	125.48	119.24	129.22	171.99	171.59	141.53	144.84	143.67	138.61	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	83.21	95.54	102.66	102.66	92.72	102.66	99.35	102.66	39.59	40.91	40.91	39.59	942.46
Water Remaining for Irrigation/Land Application/Storage	AF	**0.00**	**0.00**	**3.04**	**22.22**	**25.57**	**24.61**	**69.13**	**63.00**	**94.01**	**94.54**	**94.76**	**93.54**	**584.42**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (includes storage from prev month)	AF	**0.00**	**0.00**	**3.04**	**22.22**	**25.57**	**24.61**	**69.13**	**63.00**	**94.01**	**94.54**	**94.76**	**93.54**	**584.42**
Actual Sent to COWRP	AF	0.00	0.00	0.00	0.00	0.00	0.00	25.73	63.00	94.01	94.54	94.76	86.52	458.56
Actual Applied at Town Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	13.06	0.00	0.00	0.00	0.00	7.02	20.08
Actual Applied at City Field	AF	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	1.33
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	AF	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**63.00**	**94.01**	**94.54**	**94.76**	**93.54**	**479.97**
Water to Remain in Storage at End of Month	AF	0.00	0.00	3.04	22.22	25.57	24.61	29.01	0.00	0.00	0.00	0.00	0.00	
Remaining Irrigation Need/Disposal Available	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	56.57	77.81	112.71	82.95	27.66	400.60
Total Disposed/Lost This Month	AF	**86.38**	**96.72**	**103.26**	**103.26**	**93.66**	**104.60**	**142.99**	**171.59**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
Storage														
Net Change in Storage this Month	AF	0.00	0.00	3.04	19.18	3.36	-0.96	4.39	-29.01	0.00	0.00	0.00	0.00	
Total Stored at End of Month (Total Storage Needed)	AF	0.00	0.00	3.04	22.22	25.57	24.61	29.01	0.00	0.00	0.00	0.00	0.00	29.01
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SUMMARY														
INFLOW	AF	**86.38**	**96.72**	**106.30**	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
EVAPORATION & PERCOLATION	AF	86.38	96.72	103.26	103.26	93.66	104.60	102.87	108.58	47.52	50.30	48.90	45.07	991.14
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	0.00	0.00	0.00	0.00	0.00	0.00	40.12	63.00	94.01	94.54	94.76	93.54	479.97
IRRIGATION/DISPOSAL NOT USED	AF	42.90	0.00	0.00	0.00	0.00	0.00	0.00	56.57	77.81	112.71	82.95	27.66	400.60
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	AF	**86.38**	**96.72**	**103.26**	**103.26**	**93.66**	**104.60**	**142.99**	**171.59**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
NET CHANGE IN STORAGE THIS MONTH	AF	0.00	0.00	3.04	19.18	3.36	-0.96	4.39	-29.01	0.00	0.00	0.00	0.00	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	0.00	0.00	3.04	22.22	25.57	24.61	29.01	0.00	0.00	0.00	0.00	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	AF	**0.00**	**0.00**	**3.04**	**22.22**	**25.57**	**24.61**	**29.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

APPENDIX C - Detailed Water Balance Model Runs

RUN 7

100-YEAR WET SEASON, 2039 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND ARSA FLOW CONTINUES

Parameters:

Year	2039	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	X
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	
Pond 7 Percolation	
Preston Available (No ARSA flows – 235 ac-ft)	

Inflow	1751.11	
Disposed/Lost	929.25	
At Additional	729.18	Acre-ft of Storage is Required
Carryover water to following year	821.86	Acre-ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	69.19	66.96	69.19	69.19	62.50	69.19	66.96	69.19	66.96	69.19	69.19	66.96	814.68
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	4.65	9.01	10.79	15.66	9.50	9.94	5.94	3.08	2.11	1.74	1.90	2.34	76.65
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	AF	**82.60**	**95.70**	**105.77**	**121.73**	**95.85**	**102.28**	**85.64**	**75.31**	**70.06**	**71.10**	**71.39**	**71.15**	**1048.59**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP.	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	10.00	10.00	10.00	10.00	10.00	10.00	36.67	36.67	36.67	36.67	36.67	36.67	280.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	AF	**13.78**	**11.02**	**10.52**	**10.71**	**11.17**	**11.37**	**98.40**	**103.94**	**108.13**	**110.41**	**108.94**	**104.13**	**702.52**
TOTAL INFLOW	AF	**96.38**	**106.72**	**116.30**	**132.44**	**107.02**	**113.64**	**184.05**	**179.25**	**178.19**	**181.51**	**180.33**	**175.28**	**1751.11**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	96.38	106.72	116.30	132.44	107.02	113.64	184.05	179.25	178.19	181.51	180.33	175.28	1751.11
Water in Storage from Previous Month	AF	0.00	50.31	155.85	271.55	403.38	509.46	621.16	761.57	815.32	813.76	778.63	773.26	
Total Volume for Disposal/Storage	AF	96.38	157.03	272.15	403.98	510.40	623.11	805.21	940.81	993.51	995.27	958.96	948.54	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	AF	**93.21**	**155.85**	**271.55**	**403.38**	**509.46**	**621.16**	**801.69**	**934.89**	**985.58**	**985.88**	**950.97**	**943.06**	7656.67
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.05	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (Includes storage from prev month)	AF	**93.21**	**155.85**	**271.55**	**403.38**	**509.46**	**621.16**	**801.69**	**934.89**	**985.58**	**985.88**	**950.97**	**943.06**	**7656.67**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.05	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	50.31	155.85	271.55	403.38	509.46	621.16	761.57	815.32	813.76	778.63	773.26	821.86	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	50.31	105.54	115.70	131.84	106.08	111.70	140.41	53.75	-1.55	-35.13	-5.37	48.60	
Total Stored at End of Month (Total Storage Needed)	AF	50.31	155.85	271.55	403.38	509.46	621.16	761.57	815.32	813.76	778.63	773.26	821.86	821.86
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	63.17	178.87	310.71	416.79	528.48	668.89	722.64	721.09	685.95	680.58	729.18	
SUMMARY														
INFLOW	AF	**96.38**	**106.72**	**116.30**	**132.44**	**107.02**	**113.64**	**184.05**	**179.25**	**178.19**	**181.51**	**180.33**	**175.28**	**1751.11**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	50.31	105.54	115.70	131.84	106.08	111.70	140.41	53.75	-1.55	-35.13	-5.37	48.60	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	50.31	155.85	271.55	403.38	509.46	621.16	761.57	815.32	813.76	778.63	773.26	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	AF	**50.31**	**155.85**	**271.55**	**403.38**	**509.46**	**621.16**	**761.57**	**815.32**	**813.76**	**778.63**	**773.26**	**821.86**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	63.17	178.87	310.71	416.79	528.48	668.89	722.64	721.09	685.95	680.58	729.18	

APPENDIX C - Detailed Water Balance Model Runs

RUN 8

100-YEAR WET SEASON, 2039 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, NO USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Year	2039	
Rainfall Event	100	
Assumed Carryover Water	0	AF

INFLOW

ARSA Contractual (400 ac-ft per 2007 Agreement)	
CDCR Contractual (350 ac-ft per 2007 Agreement)	X
Town Field Tailwater Recirculation (100 ac-ft)	X

DISPOSAL/STORAGE

Town Field (Disposal)	X
City Field (Disposal)	X
Dry Creek	
Pond 6 Percolation	
Pond 7 Percolation	
Preston Available (No ARSA flows - 235 ac-ft)	

Inflow	1471.11	
Disposed/Lost	929.25	
An Additional	680.57	Acre-ft of Storage Is Required
Carryover water to following year	541.86	Acre-ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	1.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	69.19	66.96	69.19	69.19	62.50	69.19	66.96	69.19	66.96	69.19	69.19	66.96	814.68
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	4.65	9.01	10.79	15.66	9.50	9.94	5.94	3.08	2.11	1.74	1.90	2.34	76.65
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	**AF**	**82.60**	**95.70**	**105.77**	**121.73**	**95.85**	**102.28**	**85.64**	**75.31**	**70.06**	**71.10**	**71.39**	**71.15**	**1048.59**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	**AF**	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	**AF**	**86.38**	**96.72**	**106.30**	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	86.38	96.72	106.30	122.44	97.02	103.64	147.38	142.58	141.53	144.84	143.67	138.61	1471.11
Water in Storage from Previous Month	AF	0.00	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	
Total Volume for Disposal/Storage	AF	86.38	137.03	242.15	363.98	460.40	563.11	708.54	807.48	823.51	788.61	715.63	668.54	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	**AF**	**83.21**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**705.02**	**801.55**	**815.58**	**779.21**	**707.64**	**663.06**	**6316.67**
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (Includes storage from prev month)	**AF**	**83.21**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**705.02**	**801.55**	**815.58**	**779.21**	**707.64**	**663.06**	**6316.67**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	**AF**	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	541.86	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	40.31	95.54	105.70	121.84	96.08	101.70	103.74	17.08	-38.22	-71.80	-42.04	11.93	
Total Stored at End of Month (Total Storage Needed)	AF	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	541.86	681.98
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
System Storage Deficiency	AF	0.00	43.17	148.87	270.71	366.79	468.48	572.22	589.31	551.09	479.29	437.25	449.18	
SUMMARY														
INFLOW	**AF**	**86.38**	**96.72**	**106.30**	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	**AF**	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	40.31	95.54	105.70	121.84	96.08	101.70	103.74	17.08	-38.22	-71.80	-42.04	11.93	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	**AF**	**40.31**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**664.90**	**681.98**	**643.76**	**571.96**	**529.93**	**541.86**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	43.17	148.87	270.71	366.79	468.48	572.22	589.31	551.09	479.29	437.25	449.18	

APPENDIX C - Detailed Water Balance Model Runs

RUN 8A

100-YEAR WET SEASON, 2039 FLOW, PONDS 6 AND 7 ARE LINED, LAND APPLICATION AT TOWN FIELD AND CITY FIELD CONTINUES, USE OF PRESTON, AND NO ARSA FLOW

Parameters:

Parameter	Value	
Year	2039	
Rainfall Event	100	
Assumed Carryover Water	0	AF
INFLOW		
ARSA Contractual (400 ac-ft per 2007 Agreement)		
CDCR Contractual (350 ac-ft per 2007 Agreement)	X	
Town Field Tailwater Recirculation (100 ac-ft)	X	
DISPOSAL/STORAGE		
Town Field (Disposal)	X	
City Field (Disposal)	X	
Dry Creek		
Pond 6 Percolation		
Pond 7 Percolation		
Preston Available (No ARSA flows – 235 ac-ft)	X	

Inflow	1471.11	
Disposed/Lost	[illegible]	
An Additional	[illegible]	*Acre-Ft of Storage is Required*
Carryover water to following year	[illegible]	Acre-Ft

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Dry Year	In	0.56	1.21	1.65	1.82	1.68	2.59	0.91	0.40	0.12	0.02	0.03	0.14	10.13
Rainfall Normal Year	In	1.18	2.57	3.49	3.85	3.57	3.38	1.93	0.86	0.25	0.04	0.06	0.30	21.48
Rainfall 25 Year	In	1.96	4.26	5.80	6.40	5.94	5.62	3.21	1.42	0.42	0.07	0.10	0.50	35.70
Rainfall 100 Year	In	2.13	4.87	6.32	8.17	6.05	5.95	3.29	1.33	0.44	0.10	0.17	0.56	39.38
Pan Evaporation (Reduced 30% from Average for Wet Year)	In	2.03	0.76	0.39	0.39	0.60	1.25	2.25	3.79	5.08	6.01	5.12	3.51	31.16

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
SYSTEM INFLOW														
Base City Flow (Includes Normal Year I&I)	AF	69.19	66.96	69.19	69.19	62.50	69.19	66.96	69.19	66.96	69.19	69.19	66.96	814.68
Additional I&I for Wet Year Scenario (Escalated to model run year based on number of EDU	AF	4.65	9.01	10.79	15.66	9.50	9.94	5.94	3.08	2.11	1.74	1.90	2.34	76.65
Treatment Pond 1 Rainfall Gain	AF	0.29	0.66	0.85	1.10	0.82	0.80	0.44	0.18	0.06	0.01	0.02	0.08	5.31
Treatment Pond 2 Rainfall Gain	AF	0.24	0.56	0.72	0.93	0.69	0.68	0.38	0.15	0.05	0.01	0.02	0.06	4.49
Treatment Pond 3 Rainfall Gain	AF	0.19	0.45	0.58	0.75	0.55	0.54	0.30	0.12	0.04	0.01	0.02	0.05	3.61
Treatment Pond 4 Rainfall Gain	AF	0.38	0.88	1.14	1.48	1.09	1.08	0.59	0.24	0.08	0.02	0.03	0.10	7.12
Storage Pond 5 Rainfall Gain	AF	0.88	2.00	2.60	3.36	2.49	2.45	1.35	0.55	0.18	0.04	0.07	0.23	16.19
Storage/Percolation Pond 6 Rainfall Gain	AF	0.75	1.72	2.23	2.88	2.13	2.10	1.16	0.47	0.16	0.04	0.06	0.20	13.88
Storage/Percolation Pond 7 Rainfall Gain	AF	0.97	2.23	2.89	3.74	2.77	2.72	1.51	0.61	0.20	0.05	0.08	0.26	18.02
Rainfall Onto Town Field	AF	11.54	26.38	34.23	44.25	32.77	32.23	17.82	7.20	2.38	0.54	0.92	3.03	213.31
Percolation From Town Field	AF	6.48	15.13	19.45	21.61	19.45	19.45	10.81	6.48	2.16	0.54	0.92	2.16	124.65
Runoff From Town Field Sent Back to Storage	AF	5.05	11.25	14.78	22.64	13.32	12.78	7.01	0.72	0.22	0.00	0.00	0.87	88.65
SUBTOTAL (INFLOW FROM CITY SOURCES)	AF	**82.60**	**95.70**	**105.77**	**121.73**	**95.85**	**102.28**	**85.64**	**75.31**	**70.06**	**71.10**	**71.39**	**71.15**	**1048.59**
COWRP Backwash (10% of COWRP Influent) to Ione WWTP.	AF	2.89	0.00	0.00	0.00	0.00	0.00	2.57	8.45	12.29	14.87	12.75	8.65	62.48
AWA Backwash Flows	AF	0.88	1.02	0.52	0.71	1.17	1.37	0.83	0.49	0.84	0.54	1.20	0.47	10.05
ARSA Contractual (fluxuates depending on CDCR Usage entered below)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CDCR Contractual - 2007 Agreement (Adjusted to release all during dry months)	AF	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.33	58.33	58.33	58.33	58.33	350.00
CDCR Contractual - Woodard Bottom "Agreement"?	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL (INFLOW FROM NON-CITY SOURCES)	AF	**3.78**	**1.02**	**0.52**	**0.71**	**1.17**	**1.37**	**61.74**	**67.27**	**71.46**	**73.74**	**72.28**	**67.46**	**422.52**
TOTAL INFLOW	AF	**86.38**	**96.72**	**106.30**	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
												68.61		
SYSTEM OUTFLOW AND STORAGE														
Percolation & Evaporation Loss														
Inflow from WWTP	AF	86.38	96.72	106.30	122.44	97.02	103.64	147.38	242.58	141.53	144.84	143.67	138.61	1471.11
Water in Storage from Previous Month	AF	0.00	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	
Total Volume for Disposal/Storage	AF	86.38	137.03	242.15	363.98	460.40	563.11	708.54	807.48	823.51	788.61	715.63	668.54	
Evaporation Loss from Ponds 1, 2, 3, 4, 5, 6, & 7	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
Actual Percolation Loss from Ponds 6 & 7	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Remaining for Irrigation/Land Application/Storage	AF	**83.21**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**705.02**	**801.55**	**815.58**	**779.21**	**707.64**	**663.06**	6316.67
Irrigation Need/Disposal Available														
Needed sent to COWRP for Tertiary Treatment & Golf Course Irrigation (100-year)	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Needed Applied Water at Town Field (100-year)	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Needed Applied Water at City Field (100-year)	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Available Effluent Disposal at Woodard Bottom (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Effluent Disposal at Dry Creek (100-year)	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month Total Irrigation Need/Disposal Available	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Total Water Available for Irrigation/Land Application (includes storage from prev month)	AF	**83.21**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**705.02**	**801.55**	**815.58**	**779.21**	**707.64**	**663.06**	**6316.67**
Actual Sent to COWRP	AF	28.93	0.00	0.00	0.00	0.00	0.00	25.73	84.47	122.93	148.70	127.47	86.52	624.75
Actual Applied at Town Field	AF	12.68	0.00	0.00	0.00	0.00	0.00	13.06	31.86	44.38	53.15	45.61	31.48	232.22
Actual Applied at City Field	AF	1.29	0.00	0.00	0.00	0.00	0.00	1.33	3.24	4.51	5.40	4.63	3.20	23.60
Actual Disposal at Woodard Bottom	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal at Dry Creek	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Actual Disposal Used / Irrigation Provided	AF	**42.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**40.12**	**119.57**	**171.82**	**207.25**	**177.71**	**121.20**	**880.57**
Water to Remain in Storage at End of Month	AF	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	541.86	
Remaining Irrigation Need/Disposal Available	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Disposed/Lost This Month	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
Storage														
Net Change in Storage this Month	AF	40.31	95.54	105.70	121.84	96.08	101.70	103.74	17.08	-38.22	-71.80	-42.04	11.93	
Total Stored at End of Month (Total Storage Needed)	AF	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	541.86	681.98
Storage Available at WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
Storage Available at Preston	AF	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	
System Storage Deficiency	AF	0.00	0.00	0.00	35.71	131.79	233.48	337.22	354.31	316.09	244.29	202.25	214.18	
SUMMARY														
INFLOW	AF	**86.38**	**96.72**	106.30	**122.44**	**97.02**	**103.64**	**147.38**	**142.58**	**141.53**	**144.84**	**143.67**	**138.61**	**1471.11**
EVAPORATION & PERCOLATION	AF	3.17	1.18	0.60	0.60	0.94	1.95	3.52	5.93	7.93	9.39	7.99	5.48	48.68
IRRIGATION/DISPOSAL AVAILABLE	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
ACTUAL IRRIGATION/DISPOSAL (includes irrigation from storage)	AF	42.90	0.00	0.00	0.00	0.00	0.00	40.12	119.57	171.82	207.25	177.71	121.20	880.57
IRRIGATION/DISPOSAL NOT USED	AF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL DISPOSED/LOST THIS MONTH (INCLUDES EVAPORATION & PERCOLATION)	AF	**46.07**	**1.18**	**0.60**	**0.60**	**0.94**	**1.95**	**43.64**	**125.50**	**179.75**	**216.64**	**185.70**	**126.68**	**929.25**
NET CHANGE IN STORAGE THIS MONTH	AF	40.31	95.54	105.70	121.84	96.08	101.70	103.74	17.08	-38.22	-71.80	-42.04	11.93	
WATER IN STORAGE FROM PREVIOUS MONTH	AF	0.00	40.31	135.85	241.55	363.38	459.46	561.16	664.90	681.98	643.76	571.96	529.93	
TOTAL STORAGE NEEDED AT END OF THIS MONTH (CARRYOVER TO NEXT MONTH)	AF	**40.31**	**135.85**	**241.55**	**363.38**	**459.46**	**561.16**	**664.90**	**681.98**	**643.76**	**571.96**	**529.93**	**541.86**	
AVAILABLE STORAGE AT WWTP (ponds 5, 6, 7)	AF	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	92.68	
AVAILABLE IN PRESTON RESERVOIR	AF	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	
ADDITIONAL STORAGE NEEDED	AF	0.00	0.00	0.00	35.71	131.79	233.48	337.22	354.31	316.09	244.29	202.25	214.18	

Appendix D

Detailed CIP Cost Estimates

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 2 - Ione Headworks Replacement

Item	Description	Unit	Quantity	Unit Price	Total
Headworks Material/Equipment					
1	Partial Flume	EA	1	$ 50,000	$ 50,000
2	Vertical Screen	EA	1	$ 240,000	$ 240,000
2	Grinder	EA	1	$ 50,000	$ 50,000
4	Influent Pumps	EA	3	$ 20,000	$ 60,000
5	Screen Wet Well	EA	1	$ 50,000	$ 50,000
5	Pump Wet Well	EA	1	$ 50,000	$ 50,000
6	Instrumentation & Controls	LS	1	$ 120,000	$ 120,000
				Sub-total, Materials and Equipment:	**$ 620,000**
Installation					
6	Dirt work	LS	1	$ 100,000	$ 100,000
7	Pipeline	LF	100	$ 200	$ 20,000
8	Mechanical	LS	1	$ 75,000	$ 75,000
9	Electrical	LS	1	$ 50,000	$ 50,000
10	Lift Station Coating	LS	1	$ 30,000	$ 30,000
11	Start Up	LS	1	$ 10,000	$ 10,000
				Sub-total, Installation:	**$ 285,000**
Temp Bypass					
12	Bypass	LS	1	$ 50,000	$ 50,000
				Sub-total, Temporary Bypass:	**$ 50,000**
Sub-Total (Construction & Equipment)					**$ 955,000**
Other Direct Costs					
15%	Engineering - Design				$ 143,250
10%	Construction Management, Inspection & Testing				$ 95,500
15%	General Conditions				$ 143,250
1.0%	P&P Bond				$ 9,550
1.5%	Insurance 15/1000				$ 14,325
EST	Survey				$ 5,000
Sub-Total (Other Direct Costs)					**$ 410,875**
Sub-Total (Direct Costs)					**$ 1,365,875**
4%	Inflation (2019 to 2020)				$ 61,189
20%	Contingency				$ 273,175
15%	Contractor Overhead & Profit				$ 204,881
TOTAL PRELIMINARY ESTIMATED CONSTRUCTION COST					**$ 1,905,120**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 3 - COWRP Plant Rehabilitation							
Item	Description	Unit	Quantity	Unit Price		Total	
Plant Area							
1	Mobilization	LS	1	$	41,000	$	41,000
2	Sewage Lift Station	EA	1	$	60,000	$	60,000
3	Headworks / Flocculation	EA	1	$	20,000	$	20,000
4	Chemical Storage and Handling	EA	1	$	120,000	$	120,000
5	Sand Filters	EA	1	$	200,000	$	200,000
6	Chlorine Contact Basin	EA	1	$	50,000	$	50,000
7	Effluent Pumping	EA	1	$	120,000	$	120,000
8	Filter Backwash Clarifier	EA	1	$	50,000	$	50,000
9	Sludge Drying Beds	EA	1	$	100,000	$	100,000
10	Plant Controls	EA	1	$	100,000	$	100,000
					Sub-total, Materials and Equipment:	**$**	**820,000**
Sub-Total (Construction & Equipment)						**$**	**820,000**
Other Direct Costs							
15%	Engineering - Design					$	123,000
10%	Construction Management, Inspection & Testing					$	82,000
15%	General Conditions					$	123,000
1.0%	P&P Bond					$	8,200
1.5%	Insurance 15/1000					$	12,300
EST	Survey					$	5,000
Sub-Total (Other Direct Costs)						**$**	**353,500**
Sub-Total (Direct Costs)						**$**	**1,173,500**
0%	Inflation					$	-
20%	Contingency					$	234,700
15%	Contractor Overhead & Profit					$	176,025
TOTAL PRELIMINARY ESTIMATED CONSTRUCTION COST						**$**	**1,584,225**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 4 - Interconnection of the WWTP and COWRP and Effluent Pump Station[1]							
Item	Description	Unit	Quantity		Unit Price		Total
Construction Cost							
1	Mobilization	LS	1	$	10,375	$	10,375
2	12" PVC Forcemain[2,3]	LF	750	$	250	$	187,500
3	Tie in to Existing Line	LS	1	$	10,000	$	10,000
4	Tie in at COWRP	LS	1	$	10,000	$	10,000
Sub-Total (Construction Cost)						**$**	**218,000**
Other Direct Costs							
15%	Engineering - Design					$	32,700
10%	Construction Management, Inspection & Testing					$	21,800
15%	General Conditions					$	32,700
1.0%	P&P Bond					$	2,180
1.5%	Insurance 15/1000					$	3,270
EST	Survey					$	8,000
Sub-Total (Other Direct Costs)						**$**	**100,650**
Sub-Total (Direct Costs)						**$**	**318,650**
0%	Inflation					$	-
20%	Contingency					$	63,730
15%	Contractor Overhead & Profit					$	32,700
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**416,000**

[1]This estimate assumes that the WWTP effluent pump station provides adequate pumping capacity to pump to COWRP and that no additional pumping costs will be needed.

[2]This estimate assumes that only 750 LF of new force main is required to be installed to connect the effluent pump station to the existing ARSA line at the junction structure between Ponds 4 and 5, and that the existing PVC ARSA line between the WWTP and the COWRP can be used as a force main. Adequacy of using the existing 12" ARSA line as a force main will need to be verified. If the ARSA line cannot be used as a force main, an additional 1,100 feet of force main, valving and controls will be needed to interconnect the two treatment plants. This also assumes that COWRP can function on an intermittent backwash cycle to allow the line to be used for flow in both directions between the two plants. If the existing line cannot be used for flow in both directions, a parallel main will need to be constructed (the additional 1,100 LF of force main.)

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 5 - Town Field Tailwater Modifications							
Item	Description	Unit	Quantity	Unit Price		Total	
Construction Cost							
1	Mobilization	LS	1	$	21,750	$	21,750
2	6" PVC Forcemain[1]	LF	1,850	$	100	$	185,000
3	Packaged Electric Tailwater Pump Station	LS	1	$	250,000	$	250,000
Sub-Total (Construction Cost)						**$**	**457,000**
Other Direct Costs							
15%	Engineering - Design					$	68,550
10%	Construction Management, Inspection & Testing					$	45,700
15%	General Conditions					$	68,550
1.0%	P&P Bond					$	4,570
1.5%	Insurance 15/1000					$	6,855
EST	Survey					$	5,000
Sub-Total (Other Direct Costs)						**$**	**199,225**
Sub-Total (Direct Costs)						**$**	**656,225**
0%	Inflation					$	-
20%	Contingency					$	131,245
15%	Contractor Overhead & Profit					$	68,550
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**857,000**

[1]This estimate assumes that a force main will be constructed from the proposed pump station to the existing distribution box that allows effluent to be distributed to Ponds 5, 6 or 7. Alternatively, the tailwater force main could be designed to flow directly to Pond 7, reducing the proposed force main length from 1,850 to approximately 1,000 L.F. Please note that if tailwater is pump directly into Pond 7, flexibility of putting this water into any of the other ponds will no longer exist.

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No.6 - Lining of Ponds 6 and 7

Item	Description	Unit	Quantity	Unit Price	Total
Construction Cost - Lining Pond 6					
1	Mobilization	LS	1	$ 24,100	$ 24,100
2	Pond Liner	LS	1	$ 448,000	$ 448,000
3	Holt Pump	LS	1	$ 500	$ 500
4	Sludge Removal	LS	1	$ 7,000	$ 7,000
5	Water Use for Import	LS	1	$ 500	$ 500
6	Import Fill	LS	1	$ 26,000	$ 26,000
	Sub-total, Materials and Equipment (Rounded):				**$ 507,000**
Construction Cost - Lining Pond 7					
7	Mobilization	LS	1	$ 31,250	$ 31,250
8	Pond Liner	LS	1	$ 581,000	$ 581,000
9	Bypass Pumping	LS	1	$ 500	$ 500
10	Sludge Removal	LS	1	$ 9,000	$ 9,000
11	Water Use for Import	LS	1	$ 500	$ 500
12	Import Fill	LS	1	$ 34,000	$ 34,000
	Sub-total, Materials and Equipment (Rounded):				**$ 657,000**
Sub-Total (Construction of Ponds 6 and 7)					**$ 1,164,000**
Other Direct Costs					
15%	Engineering - Design				$ 174,600
10%	Construction Management, Inspection & Testing				$ 116,400
15%	General Conditions				$ 174,600
1.0%	P&P Bond				$ 11,640
1.5%	Insurance 15/1000				$ 17,460
EST	Survey				$ 25,000
Sub-Total (Other Direct Costs)					**$ 519,700**
Sub-Total (Direct Costs)					**$ 1,683,700**
6%	Inflation (2018 to 2020)				$ 101,022
20%	Contingency				$ 336,740
15%	Contractor Overhead & Profit				$ 174,600
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)					**$ 2,297,000**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 7 - Pond 8 Reservoir Construction (50 AF)							
Item	Description	Unit	Quantity		Unit Price		Total
Construction Cost							
1	Mobilization	LS	1	$	128,890	$	128,890
2	Material Excavated (in-situ volume)	CY	80,667	$	10	$	806,667
3	Place and compact for berms	CY	37,625	$	5	$	188,125
4	Material Offhauled (bulk volume)	CY	51,650	$	20	$	1,033,000
5	Pond Liner	LS	1	$	550,000	$	550,000
Sub-Total (Construction Cost)						**$**	**2,707,000**
Other Direct Costs							
15%	Engineering - Design					$	406,050
10%	Construction Management, Inspection & Testing					$	270,700
15%	General Conditions					$	406,050
1.0%	P&P Bond					$	27,070
1.5%	Insurance 15/1000					$	40,605
EST	Survey					$	8,000
Sub-Total (Other Direct Costs)						**$**	**1,158,475**
Sub-Total (Direct Costs)						**$**	**3,865,475**
0%	Inflation					$	-
20%	Contingency					$	773,095
15%	Contractor Overhead & Profit					$	406,050
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**5,045,000**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 8 - Effluent Disinfection							
Item	Description	Unit	Quantity	Unit Price		Total	
Construction Cost							
1	Mobilization	LS	1	$	20,250	$	20,250
2	Subgrade Prep	LS	1	$	30,000	$	30,000
3	Insulated Metal or CMU Block Building for Tank, Feed equipment, controls	LS	1	$	120,000	$	120,000
4	2,500 Gal Polyethylene Tank w/ containment	LS	1	$	15,000	$	15,000
5	Chemical Feed Equipment	LS	1	$	30,000	$	30,000
6	Chemical Piping	LS	1	$	20,000	$	20,000
7	Cl2 Monitoring Equipment	LS	1	$	30,000	$	30,000
8	Electrical and Controls	LS	1	$	100,000	$	100,000
9	Feed and mixing system at manhole	LS	1	$	60,000	$	60,000
Sub-Total (Construction Cost)						**$**	**426,000**
Other Direct Costs							
15%	Engineering - Design					$	63,900
10%	Construction Management, Inspection & Testing					$	42,600
15%	General Conditions					$	63,900
1.0%	P&P Bond					$	4,260
1.5%	Insurance 15/1000					$	6,390
EST	Survey					$	8,000
Sub-Total (Other Direct Costs)						**$**	**189,050**
Sub-Total (Direct Costs)						**$**	**615,050**
0%	Inflation					$	-
30%	Contingency					$	184,515
15%	Contractor Overhead & Profit					$	63,900
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**864,000**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 9 - Preston Reservoir Connection to WWTP							
Item	Description	Unit	Quantity	Unit Price		Total	
Construction Cost							
1	Mobilization	LS	1	$	151,000	$	151,000
2	New 2.2 MGD Pump Station	LS	1	$	1,910,000	$	1,910,000
3	New 12" PVC Forcemain	LF	2,000	$	225	$	450,000
4	Remove existing 24" ACP and Install 12" PVC Pipe	LF	2,800	$	225	$	630,000
5	Tie In to Existing 12" PVC Forcemain	EA	2	$	5,000	$	10,000
6	Tie In to WWTP	LS	1	$	10,000	$	10,000
7	Tie In at Preston Reservoir	LS	1	$	10,000	$	10,000
Sub-Total (Construction Cost)						**$**	**3,171,000**
Other Direct Costs							
15%	Engineering - Design					$	475,650
10%	Construction Management, Inspection & Testing					$	317,100
15%	General Conditions					$	475,650
1.0%	P&P Bond					$	31,710
1.5%	Insurance 15/1000					$	47,565
EST	Survey					$	35,000
Sub-Total (Other Direct Costs)						**$**	**1,347,675**
Sub-Total (Direct Costs)						**$**	**4,518,675**
0%	Inflation (2018 to 2020)					$	-
20%	Contingency					$	903,735
15%	Contractor Overhead & Profit					$	677,801
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**6,101,000**

APPENDIX D - Detailed CIP Cost Estimates

CIP Project No. 10 - Large Offsite Reservoir Construction[1] (682 AF)							
Item	Description	Unit	Quantity	Unit Price		Total	
Construction Cost							
1	Mobilization	LS	1	$	359,432	$	359,432
2	Material Excavated (in-situ volume)	CY	880,235	$	4	$	3,520,939
3	Place and compact for berms	CY	624,815	$	2	$	1,249,631
4	Material Offhauled (bulk volume)[2]	CY	306,503	$	10	$	3,065,030
5	Pond Liner	SF	3,309,526	$	1.75	$	5,791,670
6	Misc site costs (fencing, roads, etc.)	LS	750,000	$	750,000	$	750,000
Sub-Total (Construction Cost)						**$**	**14,737,000**
Other Direct Costs							
5%	Engineering - Design					$	736,850
5%	Construction Management, Inspection & Testing					$	736,850
10%	General Conditions					$	1,473,700
1.0%	P&P Bond					$	147,370
1.5%	Insurance 15/1000					$	221,055
EST	Survey					$	25,000
Sub-Total (Other Direct Costs)						**$**	**3,340,825**
Sub-Total (Direct Costs)						**$**	**18,077,825**
0%	Inflation					$	-
15%	Contingency					$	2,711,674
10%	Contractor Overhead & Profit					$	1,473,700
TOTAL ESTIMATED CAPITAL IMPROVEMENT PROGRAM BUDGET (Rounded)						**$**	**22,264,000**

[1] This estimate does not include land acquisition, pipeline, or easement costs.

[2] Costs for offhaul can be highly variable; as low as $2 and up to $20 or more.

EXHIBIT D

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2014-0166

AMENDING WASTE DISCHARGE REQUIREMENTS ORDER R5-2013-0022
FOR
CITY OF IONE AND
GREENROCK RANCH LANDS, LLC
IONE WASTEWATER TREATMENT FACILITY
AMADOR COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board), finds:

1. On 11 April 2013, the Central Valley Water Board adopted Waste Discharge Requirements (WDRs) Order R5-2013-0022, prescribing requirements for City of Ione Wastewater Treatment Facility (WWTF) in Amador County. The City owns and operates the WWTF and certain recycled water land application areas (LAAs). Greenrock Ranch Lands, LLC owns and will operate additional recycled water LAAs. The City and Greenrock Ranch Lands, LLC are hereafter jointly referred to as "Dischargers".

2. The wastewater treatment and disposal facilities consist of Ponds 1 through 7. The first four ponds provide secondary treatment via aeration and settling, and the remaining three ponds provide disposal of treated effluent via percolation and evaporation.

3. In order to correct a longstanding storage and disposal capacity issue and provide sufficient capacity for expected growth in the near future, WDRS Order R5-2013-0022 requires that the City complete specific improvements that the City proposed as follows:

   a. Phase I (to be completed by 30 October 2013) was to include constructing new water recycling land application areas (LAAs) on land owned by the City, including the 11-acre WWTF Field and the 67-acre Town Field; and installing an effluent disinfection system.

   b. Phase II (to be completed in 2015) was to include constructing a new effluent storage pond (Pond 8) on the location of the 11-acre WWTF Field and adding additional water recycling LAAs totaling 56 acres: the 40-acre Greenrock LAA and the 16-acre Castle Oaks Water Recycling Plant (COWRP) Field.

   Phases I and II also included other improvements intended specifically to resolve groundwater pollution caused by the unlined treatment storage and disposal ponds pursuant to a 2011 Cease and Desist Order (CDO R5-2011-0019). Those improvements are not relevant to this Order.

4. The City intended to produce secondary treated disinfected effluent for use as recycled water on the recycled water LAAs, so WDRs Order R5-2013-0022 includes effluent limitations and discharge requirements that implement the statewide criteria for the use of recycled water in Title 22 that are specific to the level of disinfection provided. Specifically:

   a. Effluent Limitation C.2 requires that effluent discharged to the LAAs meet the total coliform criteria for disinfected secondary-23 recycled water (i.e., a monthly median concentration of total coliform bacteria not to exceed 23 MPN/ 100 mL and a maximum of 240 MPN/ 100 mL in any 30-day period).

   b. Water Recycling Specification G.5 requires that the recycled water be at least disinfected secondary-23 recycled water as defined in Title 22, section 60301.225.

   c. Water Recycling Specification G.6 limits the uses of recycled water to those allowed for disinfected secondary-23 recycled water.

   d. Water Recycling Specification G.13 provides for recycled water LAA setbacks that are specific to disinfected secondary-23 recycled water. Land Application Area

   e. Specification F.4 allows off-site discharge of storm water runoff from the LAAs under certain circumstances.

5. The City completed most of the Phase I improvements described in Finding 3. a by 31 December 2013. However, due to construction bids higher than the engineer's estimate, the City was not able to finance all of the work and elected not to install the effluent disinfection system. Effluent disinfection is not necessary to protect groundwater quality, nor is it required by Title 22 if the recycled effluent is only used to irrigate fodder crops, as was proposed by the City in its Title 22 Engineering Report.

   On 4 June 2013, the California Department of Public Health Drinking Water Program (now the State Water Board Division of Drinking Water) approved the temporary use of undisinfected secondary effluent to irrigate fodder crops and pasture for animals not producing milk for human consumption. Because disinfection is not necessary to protect groundwater quality, it is appropriate to amend WDRs Order R5-2013-0022 to remove the disinfection requirement, remove the effluent coliform limit, and change the related discharge requirements cited in Finding 4 to reflect the change to undisinfected secondary effluent.

6. In accordance with the City's proposed scope of work for the Phase II capacity expansion work, Provision 1.c. of WDRs Order R5-2013-0022 requires that the City submit a Phase II Improvements Completion Report by 30 October 2015 that certifies construction and start-up testing of the new effluent storage pond and Phase II recycling sites have been completed.

7. On 10 September 2014, the City stated that the Phase II expansion project may not be needed to ensure sufficient treatment, storage and disposal capacity for projected flows through 2020. The City cleaned out two of its percolation ponds and deep ripped them to enhance percolation in 2013. The City reports that shallow groundwater levels have declined and percolation rates have increased significantly and those ponds have received little use since the two recycled water LAAs have been in use. Additionally, the City has renewed its efforts to work with the Amador Regional Sanitation Agency on a regional effluent storage and disposal system and filter backwash flows to the WWTF from the Amador Water Agency that may result in reduced influent flows to the WWTF.

   Although the City has not demonstrated that the facility has the required capacity, and some of the observed changes in the percolation rates may be at least partly due to the severe drought conditions of the last year, it is reasonable to remove the requirement to complete the specific improvements that were proposed as the Phase II expansion project while retaining the underlying capacity requirement and time schedule. This would allow the City to either demonstrate that compliance with the capacity requirement has already been achieved or achieve compliance through other means, whichever is appropriate. Therefore, it is appropriate to amend Flow Limitation B.2 and Provision 1.c to make these requirements completely performance based.

8. Discharge Specification E.16 states:

   "The City shall monitor sludge accumulation in Ponds 1 through 4 at least every five years beginning in 2016, and shall periodically remove sludge as necessary to maintain adequate storage capacity. Specifically, if the estimated volume of sludge in any pond exceeds five percent of the permitted capacity specified in Finding 7, the City shall complete sludge cleanout for that pond within 12 months after the date of the estimate".

   The City requested that this requirement be amended to clarify that the volume of sludge that would trigger pond cleaning is to be measured as a percentage of the dry volume of the sludge; not as a wet volume.

9. Discharge Specification E.1 states:

   "No waste constituent shall be released, discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations of this Order".

   It appropriate to amend this requirement to clarify that the City would not be responsible for the acts of others which are beyond its control.

10. Discharge Specification E.2 states:

    "The discharge shall not cause degradation of any water supply".

The Central Valley Water Board expressly allowed degradation of groundwater quality in WDRs Order R5-2013-0022. It is appropriate to delete this specification because it is contrary to the Board's intent.

Public Notice

11. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to amend waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

12. The Central Valley Water Board, in a public meeting, heard, and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order R5-2013-0022 is amended solely to allow the use of the new LAAs at the WWTP site and to revise the groundwater limitations. Pursuant to Water Code sections 13263 and 13267, the Discharger, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted thereunder, shall comply with amended Order R5-2013-0022 as follows:

1. Flow Limitation B.2 shall be amended as follows:

   Effective on the date of Executive Officer approval of the ~~Phase II~~ **2020 Capacity Expansion** Completion Report submitted pursuant to Provision I.1.c, influent flows to the WWTF and total effluent flows to the ~~percolation ponds and~~ storage**/disposal** pond**s** shall not exceed the following limits…
   …

   Influent flows at the headworks shall include domestic wastewater generated from the City of Ione, tertiary filter backwash flows from the COWRP, and filter backwash flows from the AWA water treatment plant **as applicable**. Total effluent flows to the ~~percolation ponds and~~ storage**/disposal** pond**s** shall include the influent flows at the headworks and the ARSA secondary effluent flows to the percolation ponds **as applicable**".

2. Effluent Limitation C.2 shall be deleted and subsequent paragraphs shall be renumbered.

3. Discharge Specification E.2 shall be deleted and subsequent paragraphs shall be renumbered.

4. Discharge Specification E.16 shall be amended as follows:

"...if the estimated volume of **dry** sludge in any pond exceeds five percent of the permitted capacity specified in Finding 7, the City shall complete sludge cleanout..."

5. Land Application Area Specification F.4 shall be amended as follows:

"Any irrigation runoff (tailwater) shall be confined to the LAAs **or collected and recycled at the LAAs**, and shall not enter any surface water drainage course or storm water drainage system. ~~Storm water may be discharged off-site provided that the Dischargers comply with Land Application Area Specification F.5 below."~~

6. Water Recycling Specification G.5 shall be amended as follows:

"The recycled water shall be at least ~~disinfected~~ **undisinfected** secondary recycled water as defined in Title 22, section 60301.~~225~~**900**".

7. Water Recycling Specification G.6 shall be amended as follows:

"Recycled water shall be used in compliance with Title 22, sections 60304 and 60307. Specifically, uses of recycled water shall be limited to those set forth in Title 22, sections 60304(~~c~~**d**) and 60307(~~b~~**c**)".

8. The following additional paragraphs shall be inserted after Water Recycling Specification G.11 and subsequent paragraphs shall be renumbered:

"12. All storm water runoff from the LAAs shall be captured and recycled for irrigation or allowed to percolate within the use areas.

13. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.

14. All drinking fountains located within the use areas shall be protected by location and/or structure from contact with recycled water spray, mist, or runoff.

15. Grazing of milking animals within the LAAs is prohibited".

9. Water Recycling Specification G.13 shall be amended as follows:

"The LAAs and recycled water impoundments shall be designed, maintained, and operated to comply with the following setback requirements:

Setback Definition	Minimum Irrigation Setback (feet)
...	..
Toe of recycled water impoundment berm to domestic water supply well	~~100~~ **150**
...	..."

10. Provision 1.c. shall be amended as follows:

> "By 30 October 2015, the City shall submit a **2020 Capacity Expansion** ~~Phase II Improvements~~ Completion Report that certifies construction and startup testing ~~of the new effluent storage pond and Phase II recycling sites of~~ **all improvements needed to provide sufficient treatment, storage and disposal capacity for projected flows through 2020** have been completed, and that the WWTF can comply with the applicable effluent limitations. The report shall include as-built drawings of the WWTF and recycling site **and/or other** improvements...
> ...
>
> The water balance shall include documentation of, and technical support for, all data inputs used and shall consider at least the following:
>
> (1) The as-built geometry of all ponds and effluent recycling/**disposal** areas;...
>
> (5) **Projected** ~~Proposed~~ wastewater generation rates based on historical flows and new development to be served by the expansion distributed monthly in accordance with expected seasonal variations;...
>
> (8) Projected long-term percolation rates **based on documented percolation test results** (including consideration of percolation from unlined ponds and the effects of solids plugging on all ponds).

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 5 December 2014.

Original signed by

PAMELA C. CREEDON, Executive Officer

LF/ALO: 9/22/14

Item 5 – Not Available At Time Of Posting

Item 6 – Not Available At Time Of Posting

Agenda Item

7

DATE: April 15, 2021

TO: Honorable Mayor Rhoades and Members of the City Council

FROM: Lori McGraw, Interim City Manager/Finance Director

SUBJECT: Update on CDBG Grant Status, per request by Councilmen Wratten

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RECOMMENDED ACTION:
Discussion- During the April 6, 2021 Ione City Council meeting Councilmen Wratten requested that an agenda item regarding the current status of the CDBG Grant be placed on the agenda for the next Council Meeting.

FISCAL IMPACT:
Grant Award $63,003

BACKGROUND:
At the last City Council meeting, Councilor Wratten requested that I provide Council with an update on the CDBG CV1, Small Business Grant. This Grant request was originally presented to Council at the August 4, 2020 Council Meeting, Resolution 2020-29 approve submission of the grant. The application that was originally submitted was incomplete and returned to the City for corrections. The application was corrected and resubmitted on November, 20, 2020. The status of the grant as of April 15, 2021 on the State of California ECivis Portal, is listed "Under Review"

Once the grant receives approval, staff will update Council accordingly.

ATTACHMENTS:

Screenshot of approval status
Staff Report 7/27/2020
Resolution 2020-29

Recently Viewed Programs

Clear Recent Programs

Show 10 entries

Search:

Grant Application	Last Viewed	Solicitation Link
	No applications have been recently viewed	

Showing 0 to 0 of 0 entries

Previous Next

My Applications

Show 10 entries

Search:

Program Solicitation	Due Date	Status	Actions
CDBG - Economic Development - Programs (2019) Assistance for Job Retention Related to Impacts from COVID Pandemic California Department of Housing and Community Development, CDBG - Economic Development	03/29/2021	Draft	≡
CDBG - Economic Development - Programs (2019) N/A California Department of Housing and Community Development, CDBG - Economic Development	02/28/2021	Draft	≡
CDBG-CV1 2020 Ione Emergency Small Business Loan Program California Department of Housing and Community Development, CDBG - CV	03/31/2021	Under Review	≡
CDBG-CV1 2020 California Department of Housing and Community Development, CDBG - CV	03/31/2021	Draft	≡

Showing 1 to 4 of 4 entries

Previous 1 Next

Reload

Portal

5:58 PM
4/15/2021

My Awards

Show 10 entries

Search:

Grant Title	Project Title	Award Status	Notification Date	Performance Period	Role	Actions
			You currently have no awards to display.			

Showing 0 to 0 of 0 entries

Previous Next

Reload

Agenda Item

3

DATE: July 27, 2020

TO: Ione City Council

FROM: Jon G. Hanken, City Manager

SUBJECT: Resolution No. 2020 – 29: A Resolution of the City Council of the City of Ione Approving an Application for Funding and the Execution of a Grant Agreement and any Amendments Thereto from the 2020 Community Development Block Grant Program-Coronavirus Response Round 1 (CDBG-CV1) NOFA Dated June 5, 2020

RECOMMENDED ACTION: Council is being asked to adopt Resolution No. 2020 – 29: A Resolution of the City Council of the City of Ione Approving an Application for Funding and the Execution of a Grant Agreement and any Amendments Thereto from the 2020 Community Development Block Grant Program-Coronavirus Response Round 1 (CDBG-CV1) Notice of Financial Availability (NOFA) Dated June 5, 2020.

Motion: _____/_____.

FISCAL IMPACT: City will receive $63,003 in CDBG-CV1 Funds.

BACKGROUND: As discussed in previous Council meetings, the federal CARES Act allocated funds to the states to address the issues created by the COVID-19 pandemic. The State of California, through the Housing and Community Development, modified the Community Development Block Grant program to allow non-entitlement communities to receive a direct allocation of funds, based on the formula for direct allocation communities, to address issues caused by the COVID-19 pandemic.

The Department of issued the 2020 Community Development Block Grant Program-Coronavirus Response Round 1 (CDBG-CV1) Notice of Financial Availability (NOFA) and, and as discussed business assistance, in the form of forgivable loans, is one of the activities that is allowed under the program.

As per the CARES CDBG-CV 1 NOFA guidelines, Business must meet the following criteria in order to be eligible for financial assistance:

Length of time in business - since January 2019
Have a current Ione Business License
Be operating within the Ione city limits
Less than 25 full time equivalent (FTE) employees prior to March 1, 2020

Maximum 4 part-time employees
Not be in default of taxes owed to government entity
Provide financial information prior to March 1, 2020 (income/expense report)

Funds can be used for:

Operating Expenses (OE) and Working Capital (W/C)
W/C number will be net of OE. OE includes primary expenses including payroll, insurance and lease payment.
Furniture, Fixtures, and Equipment (FF&E)
Support operational needs to address COVID requirements for opening and operating. Supported by list of FF&E and costs (vendor proposals).
Capital Improvements
Limited to responding to modifications required to address COVID related impacts (e.g.; drive thru, curbside pickup, no touch entries).
Pay off high interest credit card debt for verified business expenses (no personal debt).

The CDBG-CV1 guidelines also established a minimum guideline for the number of months jobs needed to be retained in order for the loans to be forgiven. The CDBG guidelines list of minimum of three (3) months for loan forgiveness. Based on this guideline, staff has modified the City's Emergency Loan program to retaining jobs for three (3) months for 50% loan forgiveness and six (six) months for 100% loan forgiveness.

Applications and all required notices and attachments are due to the Department of Housing and Community by 5:00 p.m. on August 31, 2020.

Staff request that Council adopt the resolution as presented.

Attachments: Resolution No. 2020 – 29: A Resolution of the City Council of the City of Ione Approving an Application for Funding and the Execution of a Grant Agreement and any Amendments Thereto from the 2020 Community Development Block Grant Program-Coronavirus Response Round 1 (CDBG-CV1) NOFA Dated June 5, 2020

RESOLUTION NO. 2020 - 29

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF IONE APPROVING AN APPLICATION FOR FUNDING AND THE EXECUTION OF A GRANT AGREEMENT AND ANY AMENDMENTS THERETO FROM THE 2020 COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM- CORONAVIRUS RESPONSE ROUND 1 (CDBG-CV1) NOFA DATED JUNE 5, 2020

BE IT RESOLVED by the City Council of the City of Ione as follows:

SECTION 1:

The Ione City Council has reviewed and hereby approves the submission to the State of California of one or more application(s) in the aggregate amount, not to exceed, of $63,003 for the following CDBG-CV1 activities, pursuant to the June 2020 CDBG-CV1 NOFA:

List activities and amounts

Economic Development- Business Assistance	$ 63,003

SECTION 2:

The City hereby approves the use of Program Income in an amount not to exceed $63,003 for the CDBG-CV1 activities described in Section 1.

SECTION 3:

The City acknowledges compliance with all state and federal public participation requirements in the development of its application(s).

SECTION 4:

The City hereby authorizes and directs the Ione City Manager to execute and deliver all applications and act on the City's behalf in all matters pertaining to all such applications.

SECTION 5:

If an application is approved, the Ione City Manager is authorized to enter into, execute and deliver the grant agreement (*i.e.*, Standard Agreement) and any and all subsequent amendments thereto with the State of California for the purposes of the grant.

SECTION 6:

If an application is approved, the Ione City Manager is authorized to sign and submit Funds Requests and all required reporting forms and other documentation as may be required by the State of California fromtime to time in connection with the grant.

PASSED AND ADOPTED at a regular meeting of the City Council of the City of Ione held on Tuesday, August 4, 2020 by the following vote:

AYES:_____ NOES:_____
ABSENT: _____ ABSTAIN: _____

_____
Diane Wratten, Mayor
City of Ione

STATE OF CALIFORNIA

City of _____

I,_____, City Clerk of the City of Ione, State of California, hereby certify the above and foregoing to be a full, true and correct copy of a resolution adopted by said City Council on this 4th day of August, 2020.

_____
Name, City Clerk of the City of Ione, State of California

By:_____
Name and Title

IONE EMERGENCY SMALL BUSINESS LOAN PROGRAM

The Ione Emergency Small Business Loan Program provides forgivable loans, for up to $10,000, for eligible Ione small businesses to retain jobs held by persons that may otherwise be lost due to closures related to social distancing and COVID 19.

ELIGIBILITY REQUIREMENTS:

Business must meet the following criteria:

Length of time in business - since January 2019
Have a current Ione Business License
Be operating within the Ione city limits
Less than 25 full time equivalent (FTE) employees prior to March 1, 2020
Maximum 4 part-time employees
Not be in default of taxes owed to government entity
Provide financial information prior to March 1, 2020 (income/expense report)

TERMS:

Loans for up to $10,000 may be made to qualified companies. Loans can be forgiven at the sole discretion of the City of Ione.

50% of an Ione Emergency Small Business Loan awarded to a business may be forgiven if the business remains open and maintains the same levels of jobs/positions for three (3) months following the date of the loan.

100% of an Ione Emergency Small Business Loan awarded to a business may be forgiven if the business remains open and maintains the same levels of job/positions for six (6) months following the date of the loan.

If an Emergency Small Business Loan is required to be paid back by the borrower due to business closure or failure to maintain jobs/position levels, payment arrangements will be made with the Ione City Manager. Zero percent interest will be charged on loan repayment balances and loan repayment duration shall not exceed 24 months.

Self-employed individuals and consultants would not be eligible as per CDBG guidelines.

USE OF FUNDS:

Operating Expenses (OE) and Working Capital (W/C)

W/C number will be net of OE. OE includes primary expenses including payroll, insurance and lease payment.

Furniture, Fixtures, and Equipment (FF&E)

Support operational needs to address COVID requirements for opening and operating.
Supported by list of FF&E and costs (vendor proposals).

Capital Improvements

Limited to responding to modifications required to address COVID related impacts (e.g.; drive thru, curbside pickup, no touch entries).

Pay off high interest credit card debt for verified business expenses (no personal debt).

APPLICATION PROCESS:

In order to apply for the Ione Emergency Small Business Loan Program, applicants must complete and submit the attached Ione Emergency Small Business Loan Program application.

IONE EMERGENCY SMALL BUSINESS LOAN PROGRAM
APPLICATION FORM

Business's Name: _____

Address: _____

City: _____ **State:** _____ **Zip Code:** _____

Owner Name: _____ **Phone Number:** _____

Ione Business License #: _____ **Number of Jobs/Positions:** _____

Years in Business: _____ **Amount of Funds Requested:** $_____

Statement of How Funds Will Be Used to Retain Jobs/Positions: _____

_____

_____

_____

_____

_____

_____

_____

_____

I certify that the above information contained in this application is true, accurate and correct.

_____
Signature of Applicant