



July 11, 2019
File No. 18-021

VIA ELECTRONIC MAIL

(stevej@stetsonengineers.com, bingham@svminerals.com)

Mr. Steve Johnson, P.E.
Water Resources Manager
Indian Wells Valley Groundwater Authority
861 Village Oaks, Suite 100
Covina, CA 91724

**SUBJECT: INDIAN WELLS VALLEY GROUNDWATER AUTHORITY TECHNICAL
ADVISORY MEMBER COMMENTS ON THE INDIAN WELLS VALLEY
GROUNDWATER SUSTAINABILITY PLAN,
SECTION 3 – BASIN SETTING (DRAFT)**

Dear Mr. Johnson:

At the request of the Indian Wells Valley Groundwater Authority Technical Advisory Committee (TAC), Luhdorff and Scalmanini Consulting Engineers (LSCE) has reviewed a preliminary draft of Section 3 of the IWV Groundwater Sustainability Plan (GSP) prepared by Stetson Engineers (Stetson) on June 14, 2019. These are our initial comments on the preliminary content of Chapter 3 provided to us by e-mail on June 21, 2019. Future comments will be also provided once a revised and more complete version of Section 3 (which should include, for example content on Baseline Conditions (Section 3.5.3) and Existing Monitoring Network and Evaluation (Section 3.6)).

GENERAL COMMENTS ON TABLE OF CONTENTS

- Based on previous discussions with the TAC members, it was agreed to that the outline for Table of Contents (TOC) for GSP sections would follow California Department of Water Resources GSP Annotated Outline content. This TOC does not follow the GSP Annotated Outline (see Attachment 1).
- As we move forward, please be more transparent on how GSP related items discussed with TAC members will be considered and incorporated into applicable future GSP deliverables.
- Suggest for all subsequent GSP Chapters, a detailed TOC be prepared and submitted to the TAC for review and comment prior to developing content.
- Please include list of Figures and Tables in TOC.
- Please include list of abbreviations in the TOC.
- Please provide the Appendices referenced in the Draft Section 3 document.

- Are there plans to include supporting materials (i.e. Groundwater Model Documentation, revised Hydrogeologic Conceptual Model prepared by Ramboll) as an Appendix to the GSP?

SPECIFIC COMMENTS

Section 3.1 – Introduction

1. Both the Introduction and the remaining sections of draft Section 3 refer occasionally to the GSP Emergency Regulations Guide, by very few references are made specific SGMA or GSP Regulation sections. Such references should be included.

Section 3.2 – History of Water Use in the Indian Wells Valley

1. Revise Table 3-1 to include historical pumping distribution through at least 2015.
2. This section should include a description of the soil characteristics, with particular focus on recharge ability (delineation of existing recharge areas that substantially contribute to the replenishment of the basin; potential recharge areas and discharge areas.
3. The sole cited sources of information for this section is Harris, 2013a and Harris, 2013b, which are cited as newspaper articles from the Daily Independent. Has this historical information been vetted, and were other informational sources considered? Where specific dates and years are referenced, more specific supporting information and sources should be provided.

Section 3.3 – Hydrogeological Conceptual Model

1. This section should synthesize all of the existing studies into a comprehensive Hydrogeologic Conceptual Model, increasing the understanding of aquifer units that are beneficially used, increasing the conceptualization of the shallower part of the subsurface, and expanding upon aquifer properties and extents of major stratigraphic/structural features in the subbasin.
2. Please include a section on subbasin topography.
3. Geology and Hydrogeology section should be two separate sections.
4. Geology section should also include description of geologic setting for entire Basin and surrounding watersheds. Also, reference to prior work including the recent SkyTEM data and subsequent geologic cross sections.
5. Geology section should also be refined to include regional geologic and structural settings.
6. Discuss lateral and vertical boundaries (bottom of the basin).
7. Geologic cross-sections are a key element of the HCM required in a GSP under SGMA. Related work completed for this GSP should include review of existing literature to extract the available geologic cross-sections and construction of additional new geologic cross-sections based on data compiled for GSP efforts. This section of the GSP should provide a general description of the existing and any new cross-sections and documents the source of available existing geologic cross-sections along with details of how the new cross-sections were developed.

8. A detailed summary description for existing Geologic Cross-Sections needs to be included, including the reason for selecting particular Cross-Sections that are depicted in the GSP and reasons why other more recent cross-sections developed by others (i.e. Tetra Tech or Ramboll) were not utilized.
9. Given the availability of existing information and the geological complexity of this Basin, please include more cross-sections, including one in the El Paso Area (recommend utilizing existing information from the SkyTEM data sets).
10. New geologic cross-sections should also be developed during GSP preparation efforts utilizing recent data collected and incorporated into this section.
11. Geologic Cross-Section Summary – Describe what information the existing geologic cross-sections provided and illustrate the vertical distribution of major geologic formations (i.e. the new geologic cross-sections illustrate in a fairly detailed manner the lateral and vertical distribution of fine- and coarse-grained sediments throughout the basin. It is apparent from these cross sections that significant coarse-grained intervals are present to the full depths of most borings shown on the cross sections, although overall the percentage of fine-grained sediments exceeds that of coarse-grained sediments. These cross sections further demonstrate that Kv values are likely to be orders of magnitude less than Hk values.
12. Groundwater System Conceptualization needs to be further explained.
13. Aquifer Parameters – provide more detailed summary of aquifer parameter data derived from existing reports.
14. Aquifers and Aquitards details should be provided:
 - Formation names; physical properties of aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity and storativity
 - Structural properties of the basin that restrict groundwater flow within principal aquifers including information on stratigraphic changes, truncation of units, or other features like faults
 - General water quality of the principal aquifers needs to be included
 - Discuss de-designated areas of drinking water supplied and impacts that could have on future groundwater management activities
 - Identification of the primary use or uses of each aquifer (e.g. domestic, irrigation, or municipal water supply)
15. Groundwater recharge can occur throughout Basin from infiltration of precipitation and excess irrigation water, and other sources. However, some areas may provide greater potential for existing recharge and future managed recharge that may occur during GSP implementation. Areas with increased recharge potential should be identified evaluated using soil mapping data and The Soil Agricultural Groundwater Banking Index (SAGBI) provides a characterization of potential for groundwater recharge on agricultural land. The SAGBI index is based on five main factors: deep percolation, root zone residence time, topography, chemical limitations, and soil surface conditions.

16. Data Gaps in the Hydrogeologic Conceptual Model

- a. Identify data gaps and uncertainty within the hydrogeologic conceptual model

17. Subbasin Water Budget (\$354.18) Provide more description of accounting and assessment of the total annual volume of groundwater entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored.

- Basin Inflows Description
- Basin Outflows Description
- Quantification of Total Surface Water Entering and Leaving the Subbasin
- Quantities of surface water entering and leaving by water source type
- Quantification of Groundwater Inflow
- Quantities of groundwater inflows by water source type, including subsurface groundwater inflow and infiltration of precipitation, applied water
- Quantification of Groundwater Outflow
- Quantities of outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction and subsurface groundwater outflow

18. Change in Groundwater Storage

- Quantification of the change in the annual volume of groundwater in storage between seasonal high conditions should be presented.
- Water Year Types need to be defined.
- Quantification of water year types associated with the annual supply, demand, and change in groundwater stored should be discussed.

19. Historical Water Budget Results

- Quantitative assessment of the historical water budget, starting with the most recently available information and extending back a minimum of 10 years (or as is sufficient to calibrate and reduce uncertainty of the model and therefore reduce the uncertainty of the future aquifer response to proposed sustainable groundwater management practices over the planning and implementation horizon).
- Description of how historical conditions concerning hydrology, water demand, and surface water supply reliability have impacted the ability of the GSAs to operate the basin within the sustainable yield.
- Characterize the historical water budget using water year types.
- Summary of Water Year 2015 Water Budget Results should be included.
- Projected 50-Year Water Budget should be included.
- Utilize 50-year projected hydrology, projected water demand, and projected surface water supply developed above to characterize the projected water budget using water year types.

- Provide summary of quantification of water budget for historical, current, and projected conditions.

20. Additional Specific Comments

- Provide justification of reliance on cited reference for finding there are two principal aquifer units.
- Does Stetson Engineers have an evaporation figure for mountain areas (see Section 3.3.3.1., last sentence).
- Please incorporate discussion of the USGS recharge study.
- Broad references are made regarding things like declining water levels (Section 3.3.4.), TDS concentrations (Section 3.4.2.1.), subsidence rates (3.4.3), and other indicators, but without reference to specific Basin areas or with reference to only selected Basin areas. More detail should be provided, and all areas should be similarly addressed.
- Please refer to the SGMA statute and GSP Regulations to correctly define the “sustainable yield” at Section 3.3. Also, please clarify the meaning of “natural sustainable yield” and “operating sustainable yield” at Section 3.3., which are not defined by SGMA or the GSP Regulations.

Section 3.4 – Current and Historical Groundwater Conditions and Hydrology

Include projected water budget in this section

Section 3.5 – Numerical Groundwater Model

1. An Appendix should include all model reports, and a new Technical Report could be prepared in support of the GSP and would include the technical information relating to the Hydrogeologic Conceptual Model, Groundwater Conditions, the Water Budget, Model Evaluation, Model Application, and Model Results.
2. Also include all meeting minutes from all TAC and TAC model-ad hoc meetings.
3. We reserve opportunity to comment on Baseline Conditions, which is not presently included in draft.

Section 3.6 – Existing Monitoring Network and Evaluation

This section has not been drafted in the draft Section 3, and we reserve the opportunity to comment.

This section should include the following details:

- Development of monitoring network to show short-term, seasonal and long-term groundwater trends.

Description of Monitoring Networks and Programs

- Existing monitoring programs and those programs relevant to/associated with the GSP

Monitoring Network Objectives

- Describe how the network will be developed and implemented to monitor: 1) groundwater and related land surface conditions; and 2) interconnection of surface water and groundwater

Assessment of the Monitoring Network and Recommendations for Expansion/Improvement

- Synthesize surface water, groundwater level, groundwater quality, and subsidence monitoring networks in the Subbasin
- Recommendations for expansion/improvement (including surface water/groundwater monitoring site installation at the planned TSS location)

Description of Monitoring Network and Protocols

- Developed based on best management practices
- Density and monitoring frequency
- Scientific rationale
- Reporting standards

Ongoing Monitoring Network Evaluation

- Review every five years and modify as seen fit
- Identify data gaps, and rationale for the existence
- Figure of GSP Monitoring Network

Section 3.7 – References

- See comments above regarding reference citations
- Further comments may follow for next draft

MR. STEVE JOHNSON, P.E.
JULY 11, 2019
PAGE 7

We appreciate this opportunity to submit the initial comments, and we reserve the opportunity to comment on further drafts and the GSP. Please call if you have any questions or need additional information.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS



Eddy Teasdale, P.G., CHG.
Supervising Hydrogeologist

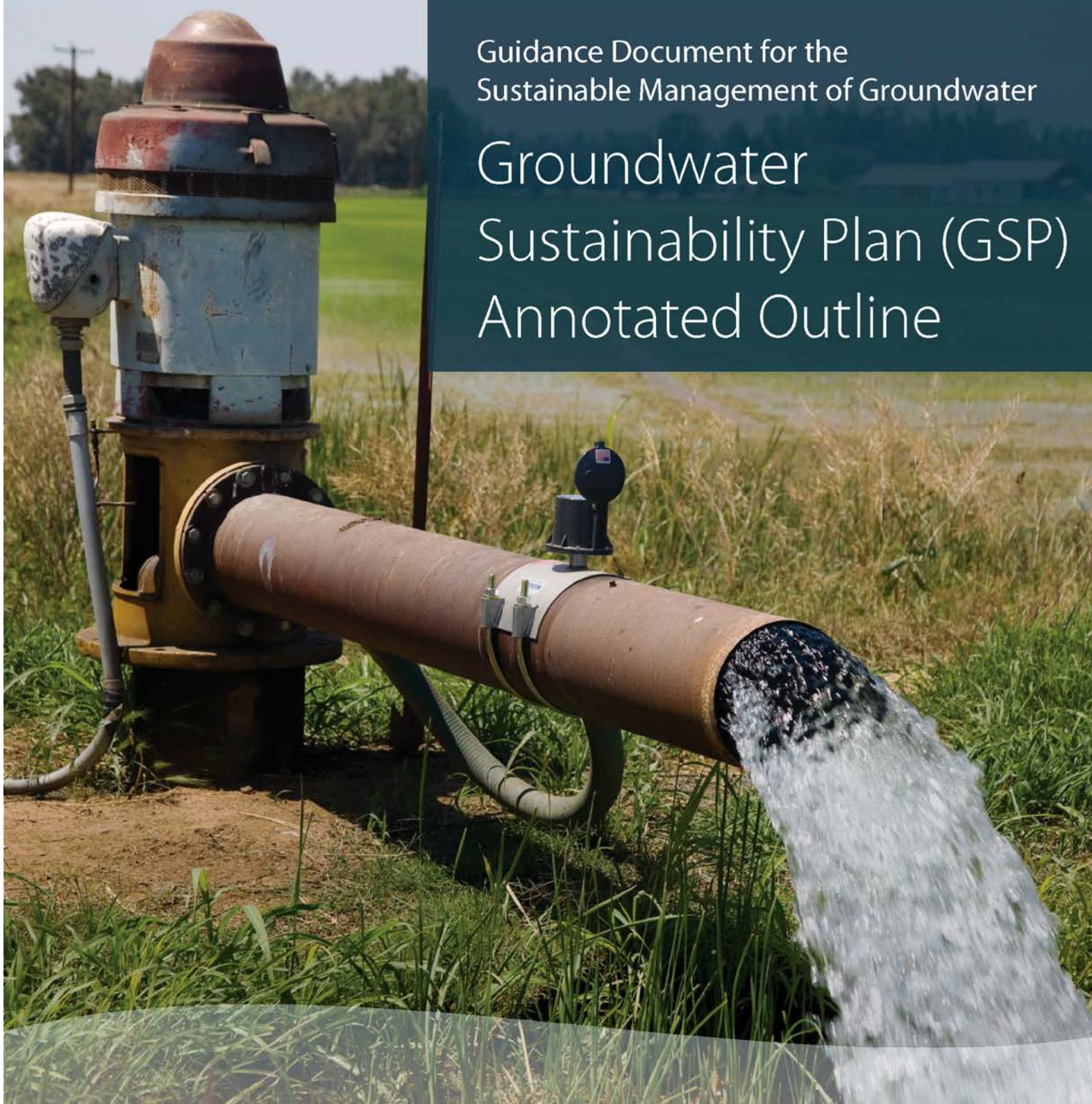
Attachment 1 – CA DWR GSP Annotated Outline



California Department of Water Resources
Sustainable Groundwater Management Program

December 2016

Guidance Document for the Sustainable Management of Groundwater Groundwater Sustainability Plan (GSP) Annotated Outline



Guidance Document for the Sustainable Management of Groundwater **Groundwater Sustainability Plan (GSP) Annotated Outline** December 2016

The objective of this Guidance Document is to provide Groundwater Sustainability Agencies (GSAs) and other stakeholders an example **Groundwater Sustainability Plan (GSP) Annotated Outline** to aid in GSP development and standardize future reporting.

The GSP Annotated Outline is only intended to be a guide. GSAs have the option of using this information as they develop a GSP. The content provided here does not create any new requirements or obligations for the GSA or other stakeholders.

Guidance Documents are not a substitute for the GSP Emergency Regulations (GSP Regulations) or the Sustainable Groundwater Management Act (SGMA). Those GSAs developing a GSP are strongly encouraged to fully read the GSP Regulations and SGMA. In addition, using this Guidance Document to develop a GSP does not equate to an approval determination by DWR.

Context with GSP Regulations and SGMA

The GSP Annotated Outline can be used by GSAs, in conjunction with the *Preparation Checklist for GSP Submittal Guidance Document*, to develop a GSP and determine if the GSP (or coordinated GSPs) meets the minimum requirements of the GSP Regulations and statutory provisions of SGMA. The detailed requirements of a GSP may be found in the GSP Regulations, primarily in Article 5 – Plan Contents, and in SGMA, primarily in Chapter 6 beginning with California Water Code Section 10727. All references to GSP Regulations relate to Title 23 of the California Code of Regulations, Division 2, Chapter 1.5, and Subchapter 2. All references to SGMA relate to California Water Code sections in Division 6, Part 2.74.



California Department of Water Resources
Sustainable Groundwater Management Program
1416 Ninth Street
P.O. Box 942836
Sacramento, CA 94236-0001
www.water.ca.gov/groundwater

Potential Groundwater Sustainability Plan Outline

Executive Summary (*Reg. § 354.4*)

1.0 Introduction

1.1 Purpose of the Groundwater Sustainability Plan (GSP or Plan)

1.2 Sustainability Goal

1.3 Agency Information (*Reg. § 354.6*)

1.3.1 Organization and Management Structure of the Groundwater Sustainability Agency (GSA or Agency)

1.3.2 Legal Authority of the GSA

1.3.3 Estimated Cost of Implementing the GSP and the GSA's Approach to Meet Costs

1.4 GSP Organization

- Description of how the GSP is organized
- Preparation Checklist for GSP Submittal

2.0 Plan Area and Basin Setting

2.1 Description of the Plan Area (*Reg. § 354.8*)

2.1.1 Summary of Jurisdictional Areas and Other Features (*Reg. § 354.8 b*)

- Map(s) (*Reg. § 354.8 a*):
 - o Area covered by GSP
 - o Adjudicated areas, other Agencies within the basin, and areas covered by an Alternative
 - o Jurisdictional boundaries of federal or State land
 - o Existing land use designations
 - o Density of wells per square mile

2.1.2 Water Resources Monitoring and Management Programs*(Reg. § 354.8 c, d, e)*

- Description of water resources monitoring and management programs
 - Description of how monitoring networks of those programs will be incorporated into the GSP
 - Descriptions of how those programs may limit operation flexibility in the basin
 - Description of conjunctive use programs

2.1.3 Land Use Elements or Topic Categories of Applicable General Plans *(Reg. § 354.8 f)*

- Summary of general plans and other land use plans
 - Information could include crop types and acreages, urban land designation, and identification of open spaces.
- Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects
- Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans
- Summary of the process for permitting new or replacement wells in the basin
- Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management

2.1.4 Additional GSP Elements *(Reg. § 354.8 g)*

- Control of saline water intrusion
- Wellhead protection
- Migration of contaminated groundwater
- Well abandonment and well destruction program
- Replenishment of groundwater extractions
- Conjunctive use and underground storage
- Well construction policies

- Groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects
- Efficient water management practices
- Relationships with State and federal regulatory agencies
- Land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity
- Impacts on groundwater dependent ecosystems

2.1.5 Notice and Communication (Reg. § 354.10)

- Description of beneficial uses and users in the basin
- A Communications Section that describes:
 - o Decision-making processes
 - o Public engagement opportunities
 - o Encouraging active involvement
 - o Informing the public on GSP implementation progress

2.2 Basin Setting

2.2.1 Hydrogeologic Conceptual Model (Reg. § 354.14)

- Graphical and narrative description of the physical components of the basin
- At least two scaled cross-sections
- Map(s) of physical characteristics
 - o Topographic information
 - o Surficial geology
 - o Soil characteristics
 - o Delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas
 - o Surface water bodies
 - o Source and point of delivery for local and imported water supplies

2.2.2 Current and Historical Groundwater Conditions (Reg. § 354.16)

- Groundwater elevation data
- Estimate of groundwater storage
- Seawater intrusion conditions
- Groundwater quality issues
- Land subsidence conditions
- Identification of interconnected surface water systems
- Identification of groundwater-dependent ecosystems
 - Including potentially related factors such as instream flow requirements, threatened and endangered species, and critical habitat.

2.2.3 Water Budget Information (Reg. § 354.18)

- Description of inflows, outflows, and change in storage
- Quantification of overdraft (as applicable)
- Estimate of sustainable yield
- Quantification of current, historical, and projected water budget
- Description of surface water supply used or available for use for groundwater recharge or in-lieu use

2.2.4 Management Areas (as Applicable) (Reg. § 354.20)

- Reason for creation of each management area
- Level of monitoring and analysis
- Description of management areas
- Explanation of how management of management areas will not cause undesirable results outside the management area

3.0 Sustainable Management Criteria

3.1 Sustainability Goal (Reg. § 354.24)

- Description of sustainability goal, including:
 - Information from the basin setting used to establish the sustainability goal
 - Discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield

- o Explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon

3.2 Measureable Objectives (Reg. § 354.30)

- Description of each measureable objective and how the measurable objectives were established for each relevant sustainability indicator
- Description of how a reasonable margin of safety was established for each measureable objective
- Description of a reasonable path to achieve and maintain the sustainability goal including a description of interim milestones for each relevant sustainability indicator
 - o Measurable Objective for Sustainability Indicator 1
 - Interim Milestone at 5 years
 - Interim Milestone at 10 years
 - Interim milestone at 15 years
 - Milestone at 20 years
 - o Measurable Objective for Sustainability Indicator 2
 - Interim Milestone at 5 years
 - Interim Milestone at 10 years
 - Interim milestone at 15 years
 - Milestone at 20 years
 - o Measurable Objective for Sustainability Indicator X
- If management areas are used, a description of (Reg. § 354.20 b):
 - o The measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.
 - o An explanation of how the management area can operate under different measurable objectives without causing undesirable results outside the management area, if applicable.

3.3 Minimum Thresholds (Reg. § 354.28)

- Description of each minimum threshold and how they were established for each relevant sustainability indicator

- Relationship for each sustainability indicator
- Description of how minimum thresholds have been selected to avoid causing undesirable results
- Description of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.
- Standards related to sustainability indicators
- How each minimum threshold will be quantitatively measured for each relevant sustainability indicator
- If management areas are used, a description of (*Reg. § 354.20 b*):
 - The minimum thresholds established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.
 - An explanation of how the management area can operate under different minimum thresholds without causing undesirable results outside the management area, if applicable.

3.4 Undesirable Results (*Reg. § 354.26*)

- Description of undesirable results for any of the sustainability indicators
- Cause of groundwater conditions that would lead to undesirable results
- Criteria used to define undesirable results based on minimum thresholds
- Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results

3.5 Monitoring Network

3.5.1 Description of Monitoring Network (*Reg. § 354.34*)

- Description of how the monitoring network is capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about

groundwater conditions as necessary to evaluate Plan implementation

- Description of monitoring network objectives including explanation of how the network will be developed and implemented to monitor:
 - Groundwater and related surface conditions
 - Interconnection of surface water and groundwater
- Description of how implementation of the monitoring network objectives demonstrate progress toward achieving the measureable objectives, monitor impacts to beneficial uses or users of groundwater, monitor changes in groundwater conditions, and quantify annual changes in water budget components
- Description of how the monitoring network is designed to accomplish the following for each sustainability indicator:
 - Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features
 - Reduction of Groundwater Storage. Estimate the change in annual groundwater in storage
 - Seawater Intrusion. Monitor seawater intrusion
 - Degraded Water Quality. Determine groundwater quality trends
 - Land Subsidence. Identify the rate and extent of land subsidence
 - Depletions of Interconnected Surface Water. Calculate depletions of surface water caused by groundwater extractions
- Description of how the monitoring plan provides adequate coverage of the sustainability indicators
- Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends

- Scientific rational (or reason) for site selection
 - Consistency with data and reporting standards
 - Corresponding sustainability indicator, minimum threshold, measureable objective, and interim milestone
 - Location and type of each site on a map
 - If management areas are used, a description of the level of monitoring and analysis appropriate for each management area.
- (Reg. § 354.20 b)

3.5.2 Monitoring Protocols for Data Collection and Monitoring (Reg. § 352.2)

- Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies.

3.5.3 Representative Monitoring (Reg. § 354.36)

- Description of representative sites if designated
- Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators
- Adequate evidence demonstrating site reflects general conditions in the area

3.5.4 Assessment and Improvement of Monitoring Network (Reg. § 354.38)

- Review and evaluation of the monitoring network
- Identification and description of data gaps
- Description of steps to fill data gaps
- Description of monitoring frequency and density of sites

4.0 Projects and Management Actions to Achieve Sustainability Goal (Reg. § 354.44)

4.1 Project #1 Description

- Measureable objective that is expected to benefit from the project or management action
- Circumstances for implementation

- Public noticing
- Overdraft mitigation projects and management actions
- Permitting and regulatory process
- Time-table for initiation and completion, and the accrual of expected benefits
- Expected benefits and how they will be evaluated
- How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.
- Legal authority required
- Estimated costs for the projects and managements and plans to meet those costs (economic analysis and finance strategy for projects and management actions)
- Management of groundwater extractions and recharge
- Relationship to additional GSP elements as described in Water Code §10727.4.

4.2 Project #2 Description

4.3 Project #X Description

5.0 Plan Implementation

5.1 Estimate of GSP Implementation Costs (Reg. § 354.6)

5.2 Schedule for Implementation

5.3 Annual Reporting

- GSA's plan for required annual reporting

5.4 Periodic Evaluations

- GSA's process for required periodic evaluations

6.0 References and Technical Studies (Reg. § 354.4)

Appendices

- Interbasin and Coordination Agreements (as applicable) (Reg. § 357)
- Contact Information for Plan Manager and GSA Mailing Address (Reg. § 354.6)
- List of Public Meetings (Reg. § 354.10)
- Technical Appendices
- Groundwater Model Documentation
- Comments and Responses (Reg. § 354.10)