Findings and Recommendations

**Well Replacement and Repair of Existing Wells**
The well evaluation project has identified 18 wells that need repairs in order to improve their performance to an acceptable level. This includes 11 Modesto Irrigation District (MID) wells and 7 Oakdale Irrigation District (OID) wells. It is recommended that OID and MID schedule and budget repair of these wells as soon as possible. The specific work that must be performed is identified by well in the evaluation report.

The well evaluation project also identified six wells that must be replaced, including one OID well and five MID wells. The existing wells should be decommissioned and properly destroyed and new wells should be drilled and developed. It is also recommended that the districts budget and schedule a well replacement program for these wells.

**Implement Phase II of the Well Field Optimization Program**
This phase of the program expands the Well Field Optimization to include service areas of other water purveyors in the Basin. This will include expanding the well evaluations, DMS, and DSS. The DMS will also be modified to become web-based to provide access by all Association member agencies.

**Implement Phase III of the Well Field Optimization Program**
This phase will fully automate the DSS and conjunctive management operations, which will include:

- Using remote sensing to collect real-time groundwater level and water quality data as well as water quantities and quality in the agencies' main laterals and pipelines
- Establishing a process to assess the water requirement in each lateral
- Installing a SCADA system to monitor, control, manage, and optimize groundwater pumping, surface water quantities in the laterals, groundwater levels, and operational outflows

**Financial Plan**
A financial plan should be developed to facilitate orderly development and implementation of the recommendations listed above, including identification of potential grant funding.
Executive Summary

The Stanislaus and Tuolumne River Basin Groundwater Association (Association) was formed in 1994 by six agencies interested in improving the management of the Modesto Groundwater Subbasin (Basin). Notable among the Association's accomplishments is the preparation of the Integrated Regional Groundwater Management Plan for the Modesto Subbasin (IRGMP) in 2005. The current project, the Well Field Optimization Project (Project), is also notable because it is the first IRGMP recommendation funded for implementation. The goal of the Project is to improve understanding of the groundwater system and its infrastructure and to develop tools for optimizing operations of the well field in conjunction with the surface water resources of the Basin.

The Project is the first of a three-phase Well Optimization Program (Program). Objectives of the Program are to:

1. Operate wells to meet water supply demands of the districts
2. Lower power costs per unit of water pumped by prioritizing well usage by cost of operations
3. Maintain groundwater levels that satisfy the Basin Management Objectives (BMOs) established in the Groundwater Management Plan
4. Manage the water quality of groundwater discharged into the surface water delivery system
5. Increase the effectiveness of shallow groundwater management

In the current phase, the Project was completed for Modesto and Oakdale Irrigation Districts. Implementation of future phases (depending on funding availability) will automate the decision process for system operators in selecting wells to meet deliveries. The DSS optimizes well selection based on criteria input by the operator, including location, time of delivery, flow rate, efficiency, cost of energy for pumping the water, and water quality. DSS output includes a list of available wells that meet the selection criteria. The user can select from among the eligible wells to satisfy the order.