

MEMORANDUM

To: Kevin Kauffman, Eastside Water District
 From: Randy Hopkins
 Subject: Diffused Surface Water Project Summary
 Date: March 20, 2015

Background

The Eastside Water District (EWD or District) is pursuing the development of a groundwater recharge facility along Turlock Irrigation District's (TID) Highline Canal. EWD plans to utilize this facility to capture diffused surface waters which are drained from the adjacent land into the Highline Canal. In this pursuit, EWD retained the Wood-Rodgers/E-Pur team to analyze the regional hydrogeologic conditions and the near surface soil conditions in order to identify areas near or within the District that are favorable for groundwater recharge. Provost & Pritchard Consulting Group (P&P) has been retained to help identify sites for recharge projects. Working collectively, P&P, the Wood-Rodgers/E-Pur team and the District selected 13 sites to analyze.

Site Screening & Design

P&P reviewed and ranked 13 sites along the Highline Canal with the potential ability to receive diffused storm water from TID's highline canal for the purposed of recharge. The sites were evaluated based on a number of factors such as the hydrogeologic conditions, land use, proximity to a water source, and constructability. From the 13 sites, three were selected to advance to the 30% design level along with an expansion of the existing pilot-scale recharge site the District currently operates.

Below is a summary of the costs, estimated volumes of diffused water available and estimated recharge capability of three sites. It is understood the District could pursue other water supplies for groundwater recharge however, at this time the type of program and amount of water are unknown.

Summary of Potential Recharge Sites Evaluated

Site (APN)	Recharge Area (acres)	Estimated 2 year Storm Volume Available (acre-feet)	Estimated Recharge Capacity (acre-feet/day)	Opinion of Probable Costs (\$)
019-041-036	35.8	220	27	\$ 4,950,000
024-005-001	25.9	425	19	\$ 2,536,000
024-006-004	16.4	430	8	\$ 1,916,000
024-006-013	3.4	430	1.7	\$ 422,000

Conclusion

Based on this information, it is recommended that the District pursue Site 024-005-001 (Site 001). When the 13 sites were evaluated on a matrix of 13 separate criteria, Site 001 was the preferred site prior to the detailed evaluation. The site ranked the highest due to receiving higher marks in the following criteria:

- Its physical location in relation to the groundwater depression beneath EWD;
- Estimated vertical hydraulic conductivity;
- Size;
- Access to both the Highline Canal and floodwaters that may pass beneath the Highline Canal;
- Current land use;
- Property gradient; and
- Its proximity to existing agricultural operations.

Upon the more detailed analysis, Site 001 is estimated to have the best cost to benefit ratio compared to the other two sites based upon the amount of diffused surface water available for recharge and its recharge capacity (combination of the estimated recharge rate and the recharge area footprint). It should be noted that APN 024-006-004 was also one of the higher ranked sites in the preliminary screening steps, but its small footprint hindered its cost to benefit ratio in relation to Site 001.

Additional Considerations

Although not a part of this study, the District could also develop an in-lieu groundwater recharge program. This type of program would provide growers in the District, who rely solely on groundwater to irrigate, surface water when it is available in wet years. Growers would then shut off their wells while surface water is available.

Utilizing the diffused water for an in-lieu groundwater recharge program would need careful consideration, primarily due to the unpredictable nature of when diffused surface water would be available. Since the diffused surface water is storm runoff. Generally, the water would be available when the crops would not require it. Since storms tend to occur in the winter months, the permanent planting would be dormant or in the early growth stages that do not have high irrigation requirements, but may have frost protection demands. To counter this, the District could utilize the recharge ponds to store water, work with TID to store water in the Highline (when not in use), or develop a surface storage facility along the Highline.

However, developing any type of groundwater recharge whether in the form of direct recharge, in-lieu programs, injection wells, or combinations thereof, within the District will be beneficial to the growers in the long term by beginning to stabilize groundwater levels.