



## BIGHORN-DESERT VIEW WATER AGENCY

*Our Mission - "To provide a high quality supply of water and reliable service to all customers at a fair and reasonable rate."*

### Planning/Legislative/Engineering & Grant Standing Committee SPECIAL Meeting Agenda

Committee Members: President Burkhart & Director Close-Dees

BOARD MEETING OFFICE  
1720 N. CHEROKEE TR.  
LANDERS, CALIFORNIA 92285

NOTE MEETING TIME



October 17, 2023  
Time – 4:00 PM

PUBLIC AND BOARD WISHING TO PARTICIPATE REMOTELY

**\*\*TELECONFERENCE LINE THRU ZOOM 669-900-6833\*\***

OR

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1-669-900-6833

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#### CALL TO ORDER

#### PLEDGE OF ALLEGIANCE

#### ROLL CALL

#### APPROVAL OF AGENDA

**Discussion and Action Items** - The Committee Directors and Staff will discuss the following items, and the Committee will consider taking action, if so inclined.

The Public is invited to comment on any item on the agenda during discussion of that item. When giving your public comment, please have your information prepared. If you wish to be identified for the record, then please state your name. Due to time constraints, each member of the public will be allotted three minutes to provide their public comment.

#### 1. Review Ames-Reche Management Area Annual Report for Fiscal Year 2022/23

#### 2. Status Report of Activities of the Community Water Systems Alliance

3. **Status Report Goat Mountain Replacement Well (Prop. 1/ Rnd. 1 Grant)**
4. **Status Report Water Meter Replacement Program (Drought Grant)**
5. **Status Report System Interconnection at Winters & Rainbow Road (Prop. 1/Rnd 2 Grant)**
6. **Status Report Potable Water Systems Improvements Consolidation of Water Systems (\$11M PI/C Project Grant)**
  - a. **Discuss proposal for grant administrative services from Landstedt Consulting Services**
7. **Consent Items** – The following items are expected to be routine and non-controversial and will be acted on by the Committee at one time without discussion, unless a member of the public or member of the Committee requests that the item be held for discussion or further action.
  - a. **PLEGS Committee Meeting Minutes, August 16, 2023.**

Recommended Action:

Approve as presented:

**8. Public Comment Period**

Any person may address the Committee on any matter within the Agency's jurisdiction on items not appearing on this agenda. When giving your public comment, please have your information prepared. If you wish to be identified for the record, then please state your name. Due to time constraints, each member of the public will be allotted three minutes to provide their public comment. State Law prohibits the Committee from discussing or taking action on items not included on the agenda.

**9. Verbal Reports - Including Reports on Courses/Conferences/Meetings**

1. Committee Members' Comments/Reports
2. General Manager's Report

**10. Adjournment**

In accordance with the requirements of California Government Code Section 54954.2, this agenda has been posted in the main lobby of the Bighorn-Desert View Water Agency, 622 S. Jemez Trail, Yucca Valley, CA not less than 72 hours if prior to a Regular meeting, date and time above; or in accordance with California Government Code Section 54956 this agenda has been posted not less than 24 hours if prior to a Special meeting, date and time above.

As a general rule, agenda reports or other written documentation have been prepared or organized with respect to each item of business listed on the agenda.

Copies of these materials and other disclosable public records in connection with an open session agenda item, are also on file with and available for inspection at the Office of the Agency Secretary, 622 S. Jemez Trail, Yucca Valley, California, during regular business hours, 8:00 A.M. to 4:30 P.M., Monday through Friday. If such writings are distributed to members of the Board of Directors on the day of a Board meeting, the writings will be available at the entrance to the Board of Directors meeting room at the Bighorn-Desert View Water Agency.

**Internet:** Once uploaded, agenda materials can also be viewed at [www.bdvwa.org](http://www.bdvwa.org)

**Public Comments:** You may wish to submit your comments in writing to assure that you are able to express yourself adequately. Per Government Code Section 54954.2, any person with a disability who requires a modification or accommodation, including auxiliary aids or services, in order to participate in the meeting, should contact the Board's Secretary at 760-364-2315 during Agency business hours.



PLEGs Agenda Packet Version w/o Tables, Maps/Plates, Attachments or Appendix  
Full report at: <https://bdvwa.org/document-library/technical-report/amesreche/>

# Ames-Reche Management Area

Annual Report for FY 2022-2023



Prepared by: Mojave Water Agency

## September 2023



Hi-Desert Water District



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## **1 EXECUTIVE SUMMARY**

This report is presented by the Mojave Water Agency (MWA) to satisfy the annual monitoring report requirement outlined in the Amended and Restated Judgement from the Ames-Reche Groundwater Storage and Recovery Program and Management Agreement for the year 2022-2023. Production values have been consistently below the Annual Baseline Amount (ABA) total of 1,646-acre feet (AF) for all the Ames-Reche Program partners combined. Water level data collected in accordance with the Monitoring Program Plan demonstrate that water levels in the management area that once appeared to be stabilizing since the implementation of the Ames-Reche Management Agreement in 2012 has changed and now most wells are showing declining trends ([Plate 1](#)). Recommendations to Partners ABA are made every five (5) Years, this annual report includes recommendations to consider reductions and increase State Water Project (SWP) recharge efforts. Supplemental tables, figures and documents provided within this report present the results of the continued monitoring and sampling activities, along with the results of a groundwater model.

The Monitoring Plan requires groundwater level monitoring and water quality sampling. Sampling includes total dissolved solids (TDS), Gross Alpha, and Uranium concentrations. Measurable concentrations of these analytes have been reported in some wells and are continuing to be monitored. Water quality samples collected after recharge of SWP at the Ames-Reche Recharge Facility appear to suggest the native groundwater chemistry at the downgradient monitoring well is influenced by SWP water and is showing a beneficial effect on groundwater quality in the aquifers near the recharge site.

An existing groundwater numerical model designed by Todd Engineers (2011), was updated by MWA, and used to conduct various estimates and analyses. The estimated net recharge for the calibration period of the model (Water Year (WY) 1995 – WY 2022) is 1,054 acre feet a year (AFY) which is below the prescribed ABA of 1,646 AFY. The model showed that even though groundwater rose by as much as 30 feet (ft) underneath the recharge facility during active recharge, long term gain was less than 3 ft, at the site and negligible away from the recharge facility. This is due to insufficient and infrequent recharge. Without sustained active recharge through SWP imports, the annual baseline is not sustainable.

## **2 INTRODUCTION**

This report presents the results of the monitoring and sampling activities outlined in the Monitoring Program Plan developed as part of the Ames-Reche Groundwater



Storage and Recovery Program and Management Agreement. The Ames-Reche Management Area ([Map 1](#)) encompasses roughly 95 square mile area and includes the communities of Flamingo Heights, Landers, Yucca Mesa, and Pioneertown.

The Ames-Reche Groundwater Storage and Recovery Program was established by area partners Bighorn-Desert View Water Agency (BDVWA), Hi-Desert Water District (HDWD), County of San Bernardino Service Area 70 W-1 (CSA 70 W-1) and County of San Bernardino Service Area 70 W-4 (CSA 70 W-4), with Mojave Water Agency (MWA) providing administrative support. The Stipulation and Amended and Restated Judgement were finalized by the Superior Court of the State of California, County of Riverside on September 17, 2014. As required by the Amended and Restated Judgement, annual monitoring reports are to be prepared by MWA. This report constitutes as the annual report for the year 2022-2023 and the five-year report with recommendations to reduce ABA.

### **3 BACKGROUND**

On June 3, 1991, the Court recorded a Judgement pursuant to a Stipulation for Judgement entered by BDVWA and HDWD. The Judgement regarded the proposed construction of a new production well (the Mainstream Well or HDWD Well #24), located within BDVWA's sphere of influence, in an area between the BDVWA and HDWD service areas. The Judgement required monitoring of the subject groundwater supplies for quantity and quality and the regulation of production from the Mainstream Well.

On May 29, 2012, BDVWA, HDWD, MWA, CSA 70 W-1, and CSA 70 W-4 entered into an agreement providing for more comprehensive regulation of the groundwater supplies protected in the Judgement, including provisions of supplemental water supplies for beneficial use, allocation of water production, storage and transfer rights to all of the public entity water retailers utilizing the subject groundwater supply, and continuing monitoring of water supply quality and quantity, all subject to the Court's continuing jurisdiction. MWA and County of San Bernardino 70 W-1 and 70 W-4 moved to intervene as parties to receive the benefits and undertake the obligations provided for in the Amended and Restated Judgement. All the Parties have stipulated to the Court's entry of the September 17, 2014, Amended and Restated Judgement.

Effective July 1, 2015, the Local Agency Formation Commission (LAFCO) certified the annexation of CSA 70 W-1 as an Improvement District of BDVWA, informally named Improvement District Goat Mountain (IDGM).

As described above, the Project Partners formed the Ames-Reche Management Area as part of the Ames-Reche Groundwater Storage and Recovery Program and Management Agreement. The boundaries of the approximately 95-square mile management area were established on Exhibit B of the Amended and Restated Judgement and are shown on [Map 1](#).

A separate water exchange agreement between the CSA 70 W-4 and HDWD ([Agreement No. 17-819](#)) was developed upon the completion of the Pioneertown Pipeline and Water System Improvement Project to benefit the Pioneertown area. This exchange agreement provides CSA 70 W-4 access to groundwater in the Warren Valley Sub-basin in exchange for an equal amount of groundwater from within the Ames-Reche basin. HDWD and CSA 70 W-4 are to provide MWA with transfers from annual baseline amounts. Ames-Reche supplies available to exchange are not allowed to fall negative.

As part of the Ames-Reche Groundwater Storage and Recovery Program and Management Agreement, a Monitoring Program Plan was developed as a mechanism for the management of water supply reliability and protection of the Basin. The Monitoring Program includes a network of wells that are monitored for water level and water quality data, as designated on [Map 2](#). MWA is assisting with administration of the monitoring program, to ensure protection of the Basin for the Parties and their end users. Specific elements of the Monitoring Program consist of:

### 3.1 PRODUCTION WELLS GUIDELINES

Groundwater Production: Project Partners BDVWA, IDGM, CSA 70 W-4 and HDWD agree to provide to MWA each year (no later than July 10), the meter readings, electrical records and any other available data reflecting the production of groundwater from the Basin for the immediate prior 12 months (July 1 – June 30).

Water Levels: The well owner shall monitor water levels in these wells on a quarterly basis or better and provide all water level records to MWA annually on or before July 10.

Water Quality Sampling: The owner shall collect and have analyzed Title 22 water quality samples from active wells listed in the Monitoring Program Plan, in accordance with their own California Department of Public Health requirements. There are 22 active production wells that are to be sampled for Total Dissolved Solids (TDS), Gross Alpha and Uranium by the respective well owner annually for the first 5-years of the program.

### 3.2 MONITORING WELLS

Nine (9) monitoring wells located within the management area and listed in the Monitoring Program Plan, are also shown on Exhibit C of the Amended and Restated Judgement. The MWA is to monitor water levels in these wells on a semi-annual basis or better. The MWA shall also collect and have analyzed water quality samples from 02N05E24H02 (BDVMW-2) and 02N05E24P01 (BDVMW-1) annually. Analysis includes general minerals, gross alpha, uranium, and inorganic constituents.

## 4 HYDROGEOLOGY AND GROUNDWATER LEVELS

The aquifers in the area are basin fill deposits derived principally from eroded rocks of the San Bernardino Mountains, and consist of interbedded lenses of clay, silt, sand, and gravel. Sediments were transported from the mountains by alluvial washes through the narrow canyons in the mountains and deposited as alluvial fans on the basin floor. Many faults in the area act as groundwater flow barriers (Pipes Barrier and the Johnson Valley, Kickapoo, Homestead Valley, and Emerson faults) making it challenging to determine groundwater level surface with the current level of monitoring (Todd, 2007). More monitoring is needed to fully characterize the flow pattern.

Discrete manual water levels and pressure transducer dataloggers are used to collect water level data from 32 wells within the Ames-Reche Management Area Monitoring Network ([Map 2](#)). MWA staff hand-measure monitoring wells on a quarterly basis and download data from MWA-maintained transducers semi-annually. MWA prepares updated hydrograph maps of these groundwater data for the Landers Vicinity ([Plate 1](#)) and the Pioneertown Vicinity ([Plate 2](#)) of the Ames-Reche Management Area. These maps show groundwater elevation data for the Monitoring Network Wells. Water levels across the Ames-Reche Management Area Wells which have previously appeared stable since the implementation of the Ames-Reche Management Agreement, ([Plate 1](#)) are now showing declining trends. Groundwater elevation contours, in feet (ft) relative to NAVD88, are generated annually each spring ([Map 3](#)). The overall flow direction is south to north.

## 5 GROUNDWATER WATER QUALITY

Water quality data for total dissolved solids (TDS), gross alpha, and uranium are shown on [Plates 3-5](#). The frequency and history of sampling varies somewhat between parties and from well to well. Water quality data was retrieved from the California State Water Resources Control Board, Division of Drinking Water (DDW) website, the United States Geological Survey (USGS) National Water Information

System (NWIS), and the MWA Water Resources Data Management System (MWA DMS).

Changes to the Monitoring Program Plan should be noted for CSA 70 W-4 as of July 27, 2019, as the County no longer extracts water from the Basin after implementation of the CSA 70 W- 4 Pioneertown Pipeline Project. The State paid to have five (5) wells abandoned in CSA 70 W-4 however four (4) wells are still accessible to monitor static groundwater levels. No active wells for water quality sampling are available for CSA 70 W-4, and economic resources to activate the wells for sampling are limited.

## 5.1 TDS

TDS concentrations above the Secondary Maximum Contaminant Level (MCL) for TDS of 500 mg/L have been reported from some of the CSA 70 W-4 production wells in Pioneertown. TDS concentrations reported from other Ames-Reche Monitoring Program Wells between 2012 and 2022 range from 200 to 430 mg/L, below the Secondary MCL for TDS.

## 5.2 GROSS ALPHA

Concentrations at or above the MCL for gross alpha of 15 picocuries per liter (pCi/L) have been reported from CSA 70 W-4 production wells in Pioneertown, from 02N05E27K03 (BDVWA Well #3) in the Flamingo Heights area, and 02N05E24H01 (HDWD Well #24) in the Landers area. Gross alpha concentrations reported from other Ames-Reche Monitoring Program Wells between 2012 and 2022 range from not detected above the reporting limit (ND), to 13.8 pCi/L, (13.8 pCi/L is below the MCL of 15 pCi/L for gross alpha). It should be noted that there is a relationship between gross alpha concentrations and uranium concentrations (discussed below) and that gross alpha results should be considered within the context of uranium.

## 5.3 URANIUM

Elevated uranium concentrations above the Maximum Contaminant Level (MCL) for uranium of 20 pCi/L have been reported from some of the CSA 70 W-4 production wells in Pioneertown. Uranium concentrations reported from other Ames-Reche Monitoring Program Wells between 2012 and 2022 range from ND to 18 pCi/L, which is below the MCL for uranium.

## 5.4 WATER QUALITY DISCUSSION

As previously discussed, the Monitoring Program Plan calls for collection of samples from Monitoring Program Production Wells and analysis for Title 22 constituents by well owner “in accordance with their own California Department of Public Health requirements.” The Monitoring Plan also calls for sampling from all the 22 production wells listed for TDS, uranium, and gross alpha for the first five years of the

program; however, several of the production wells are inactive and not equipped with pumps and are not sampled.

Changes to the Monitoring Program Plan should be noted for CSA 70 W-4 as of July 27, 2019, as the County no longer extracts water from the Basin after implementation of the CSA 70 W- 4 Pioneertown Pipeline Project. The State paid to have five (5) wells abandoned in CSA 70 W-4 however four (4) wells are still accessible to monitor static groundwater levels. No active wells for water quality sampling are available for CSA 70 W-4, and economic resources to activate the wells for sampling are limited.

Prior to construction of the Ames-Reche Recharge Facility, a monitoring well 02N05E24P01 (BDVMW-1) was installed in Pipes Wash and sampled in 2010 ([see Plate 1](#)). Construction of the recharge facility was completed in March 2014 and the monitoring well 02N05E24P01 (BDVMW-1) is located downgradient of the facility. A stiff diagram generated from 2010 water quality data collected from the monitoring well 02N05E24P01 (BDVMW-1) prior to any artificial recharge at the site is shown in the lower left portion of [Figure 1](#) as a baseline. Stiff diagrams were also generated for water quality data available from the California Department of Water Resources (DWR) for SWP water at Check-66 and are shown in the top left portion of [Figure 1](#). Stiff diagrams generated from water quality data collected at downgradient monitoring well 02N05E24P01 (BDVMW-1) after initiation of recharge activities are shown in the lower right portion of [Figure 1](#). These stiff diagrams show the groundwater chemistry at the downgradient monitoring well is influenced by the SWP water, and there may be about a one-year lag between infiltration at the pond and response in groundwater.

Water quality data available from active production wells and monitoring wells across the management area suggest current data collection efforts provide adequate coverage for the existing production wells in the Ames-Reche Management Area. Locations away from production wells might need to be investigated for water quality and depth specific sampling.

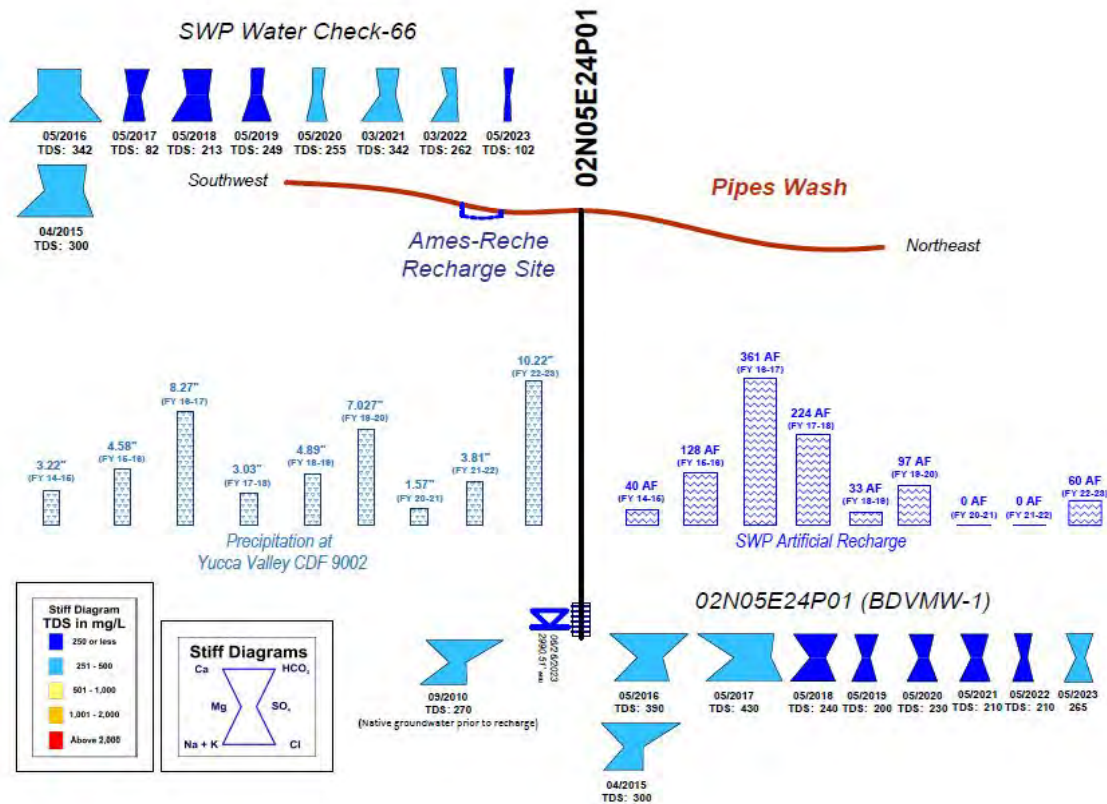


Figure 1 Stiff Diagram showing SWP water quality influences on a monitoring well next to the infiltration basin.

## 6 GROUNDWATER BUDGET

The groundwater budget describes the inflow to and outflow from the groundwater system. Inflow and outflow can occur from the boundaries of the system, from various sources such as rainfall, streams, various forms of artificial recharge, and from the exit points or sinks such as wells or drainage systems. Estimating the components of the groundwater budget is one way to assess the health of the basin and provide recommendations for best management practices. Hence, this section presents the components of the groundwater budget in the Ames-Reche area, along with their updated estimates where available.

### 6.1 OUTFLOWS

Outflows include production reported from the program partners, and underflow outflow estimates.



### 6.1.1 PRODUCTION

Production amounts in acre-feet (AF) for the Ames-Reche Management Area are shown below in [Figure 2](#) and [Table 1](#). The production across the Ames-Reche Management Area is shown graphically in [Figure 2](#). Production has consistently been below the ABA total of 1,646 AF for all the Ames-Reche Program partners combined, however declining water level trends continue. Over the years, production has ranged from a maximum of 1442.81 AF in FY 2022-23 to a minimum of 886.3 AF in FY 2018-19. Since FY 2012-2013, a total of 13,701.12 AF has been produced from the Ames-Reche Management Area by the project partners resulting in continued decline of groundwater levels in the basin. A reduction in production and or an offset of respective production with increased recharge to the Ames-Reche basin is recommended for basin health.

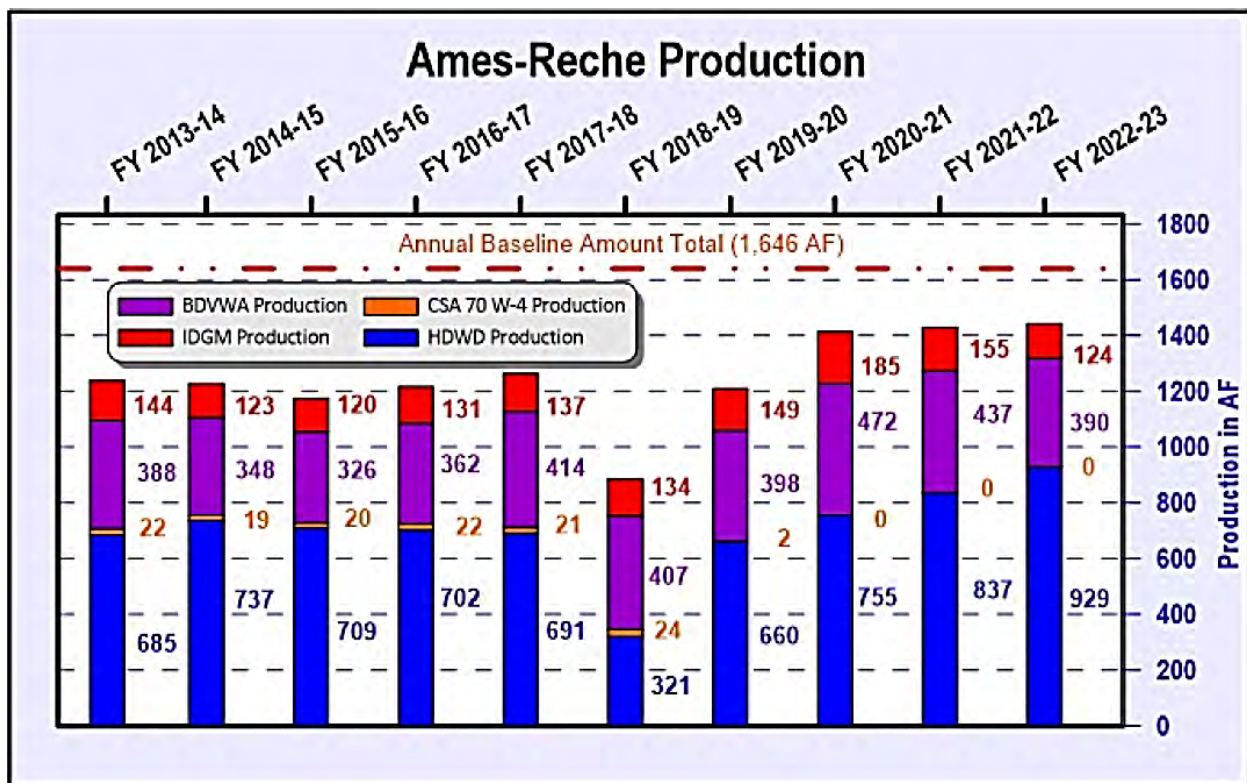


Figure 2 Ames-Reche Production

### 6.1.2 UNDERFLOW OUTFLOW

Most of the potential outflow happens between the Ames-Reche subbasin and Giant Rock. Based on groundwater levels contour constructed by Todd (2007), the Emerson Fault acts as a natural flow barrier between these two (2) subbasins, hence the outflow is probably low. Future investigative efforts (modeling and monitoring) will help determine the amount of outflow.



## 6.2 INFLOWS

Inflows include areal recharge, natural precipitation, mountain front recharge and artificial recharge.

### 6.2.1 AREAL RECHARGE AND NATURAL PRECIPITATION.

For the Ames area, the Yucca Valley County Department of Forestry (CDF) Station, located approximately four (4) miles (mi) to the south of the Ames-Reche Management Area, has the longest period of record and the most complete dataset of the area weather stations. Precipitation data from Yucca Valley CDF Station for the period of 1958 through FY 2021-2022 are presented in [Figure 3](#).

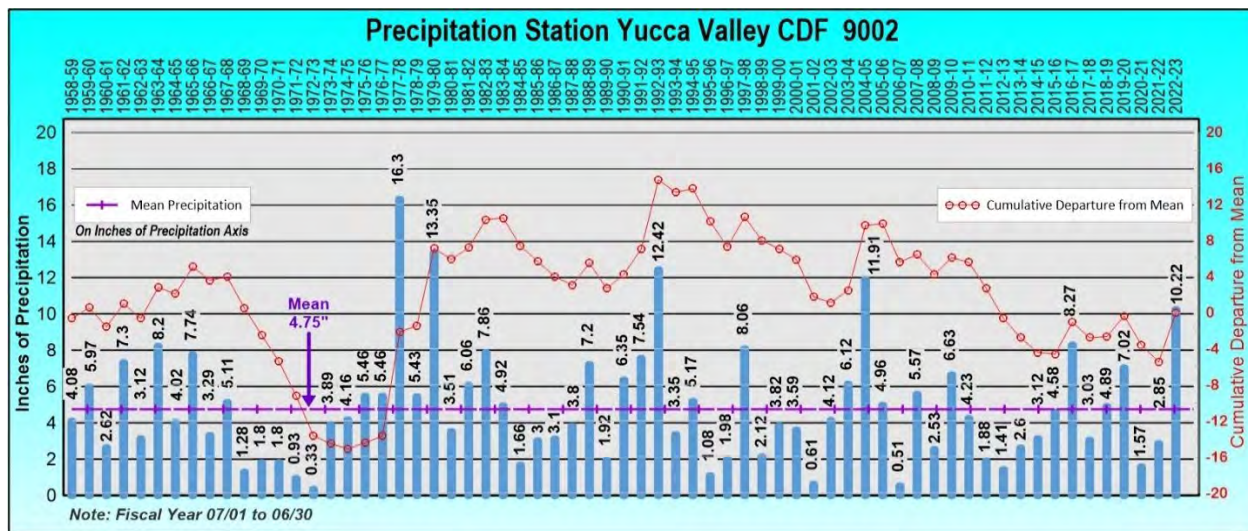


Figure 3 Precipitation showing cumulative departure over mean.

The average precipitation from 1959 to 2022 is 4.75 inches (in). Cumulative departure from the mean on [Figure 3](#) shows that the longest wet period was from 1976-77 to 1982-83. The area has been in drought since 2010. Due to the low average precipitation and the high potential evapotranspiration, areal recharge which is when precipitation from rain or snowfall infiltrates into the soil and contributes to the recharge of the aquifer, is assumed to be negligible (Todd Engineers, 2011).

MWA is actively engaged in the replacement and installation of advanced meteorological stations to enhance the hydrological understanding of natural recharge within the management area. In 2022, the Bighorn Desert view station was successfully converted to a new station. The Pioneertown station is currently pending replacement, with anticipated installation in the Fall of 2023.

All the MWA hosted weather stations can be found at:

<https://mojave.westernweathergroup.com/>

Through a collaborative effort with the USGS, MWA has taken proactive initiatives to enhance the comprehension of hydrological data concerning natural precipitation and runoff in the Pipes wash. In FY 23/24 funding has been allocated in the USGS program letter to reactivate the Pipes wash gage which was previously decommissioned in 1979. The National Water Information System (NWIS) will host this data at:

[https://nwis.waterdata.usgs.gov/ca/nwis/inventory/?site\\_no=10260200&agency\\_cd=USGS](https://nwis.waterdata.usgs.gov/ca/nwis/inventory/?site_no=10260200&agency_cd=USGS)

### 6.2.2 MOUNTAIN FRONT RECHARGE

Most of the natural recharge in the Ames-Reche area results from precipitation in

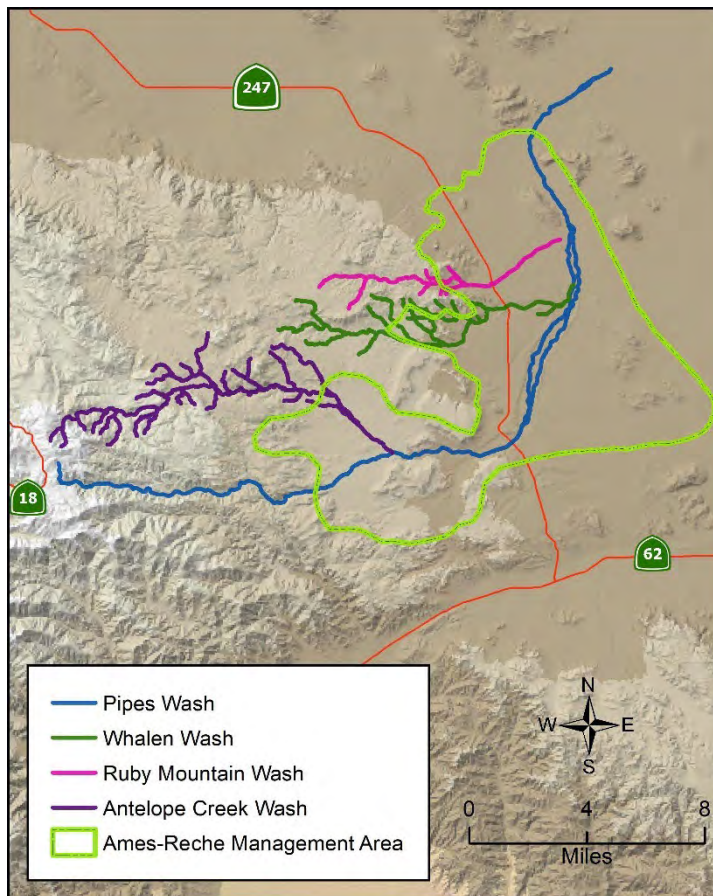


Figure 4 The major washes that provide mountain front recharge to the Ames-Reche area.

surrounding mountains via surface and subsurface flow within three major washes: Pipes Wash, Whalen Wash, and Ruby Wash. This groundwater inflow originates from runoff of rainfall in the San Bernardino Mountains and recharge to the alluvium in the wash channel valleys east of the Pipes Subbasin. Runoff from rainfall infiltrates through the vadose zone to the water table prior to entering Pipes Subbasin as subsurface inflow. Subsurface inflow rates from bedrock along the rest of the mountain-front are unknown, but the amount is assumed to represent a small portion of subsurface inflow (Todd, 2011). Average mountain front recharge was estimated to be 512 AFY from water year 1994 to water year 2022 using the approach outlined in the 2011 Todd Engineers feasibility report.

### 6.2.3 ARTIFICIAL RECHARGE

.Construction of the Ames-Reche Recharge Facility was completed in March 2014. This facility allows for State Water Project (SWP) water deliveries for groundwater storage and banking. The primary pond is approximately 0.22 acres and secondary

pond is approximately 0.28 acres for a total of approximately 0.5 acres . In November 2016, MWA measured the wetted area at 210 feet by 75 feet and estimated the percolation rate for the Ames-Reche Recharge Facility. The site can accommodate flow of approximately 5 cubic feet per second (CFS) and percolates at approximately 3.7 feet per day.

From FY 2013-2014 to FY 2022-2023, a total of 953 AF of SWP water was recharged at the Ames-Reche Recharge Facility as documented below in [Figure 5](#) and [Table 2](#). In FY 2022-23 60 AF has been recharged into BDVWA's balance.

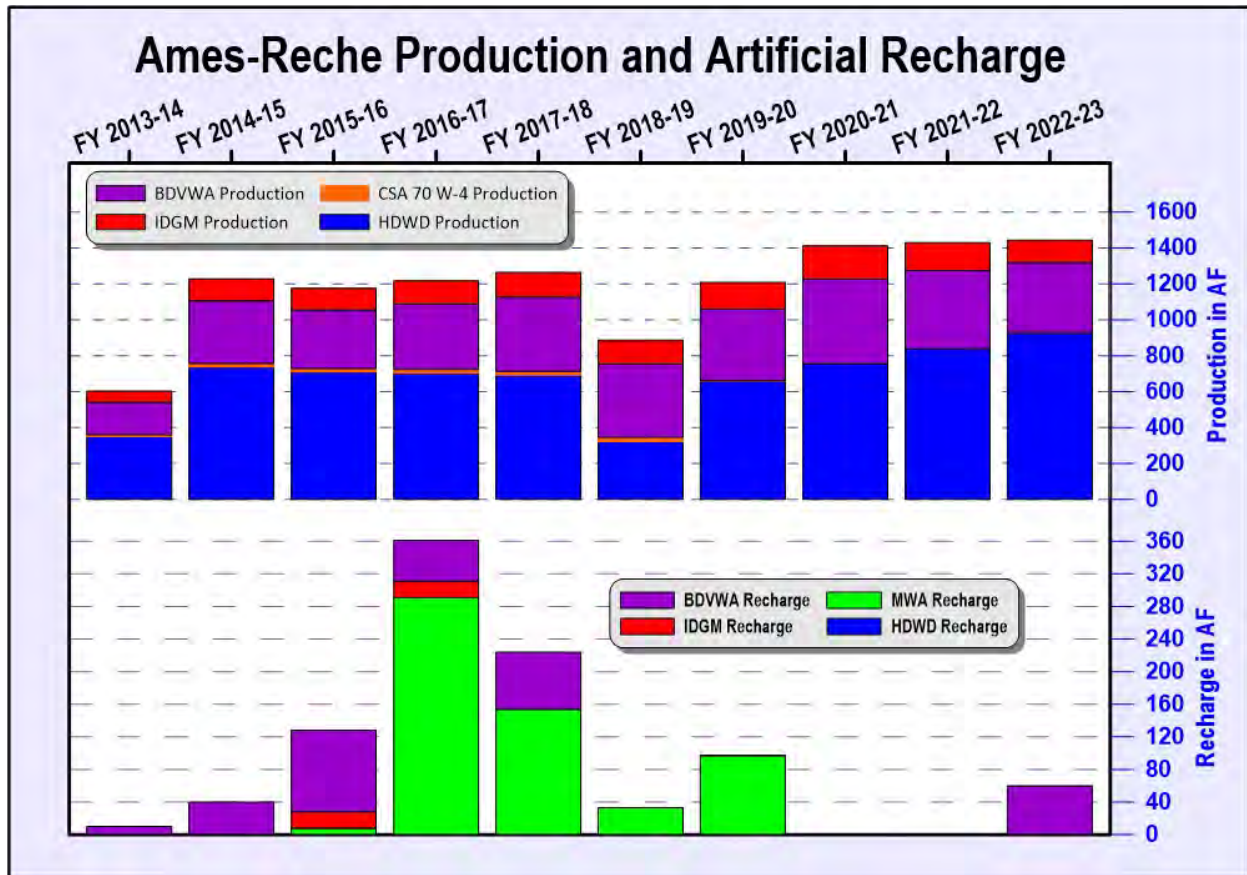


Figure 5 Ames-Reche Production and Artificial Recharge with SWP.



## 6.2.4 SEPTIC RETURN FLOWS

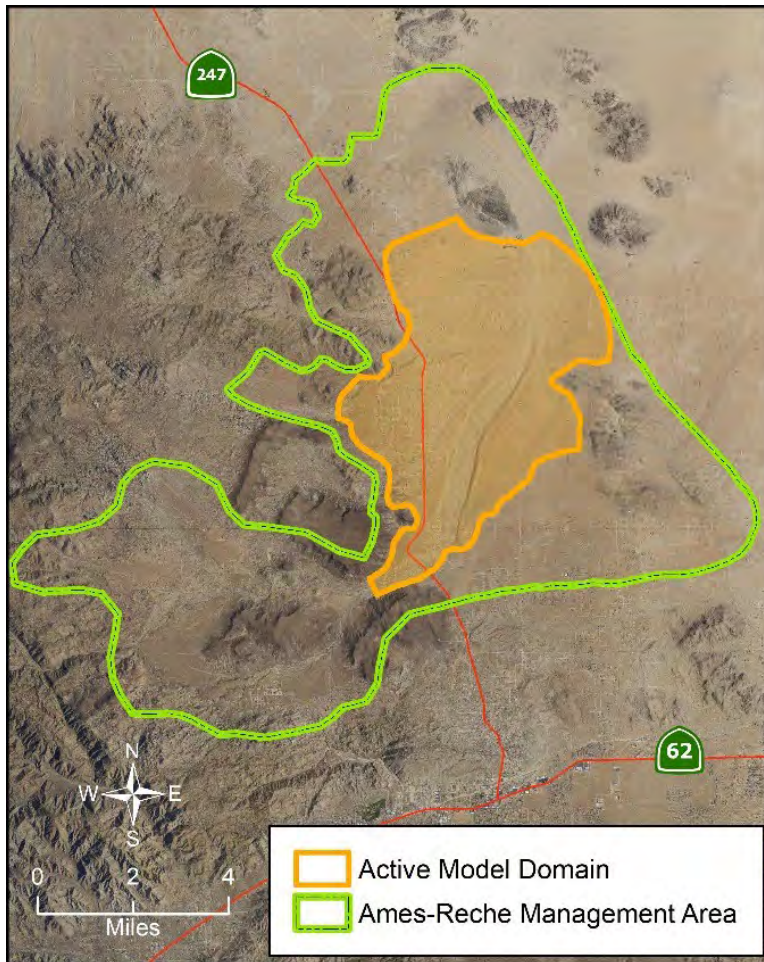


Figure 6 Ames Reche Management Area and the Active Model Domain

rates and directions) in the Pipes and Reche groundwater subbasins and adjacent areas where BDVWA and others operate groundwater supply wells. The model was also used to evaluate hydraulic impacts (water table mounding, groundwater flow paths) associated with future operation of the proposed Reche groundwater recharge spreading basin (now fully constructed and operational). The model was calibrated for the period from WY 1995 through WY 2009. The model does not cover the full extent of the Ames-Reche area, the active domain of the model is shown on [Figure 6](#).

Another source of recharge is the return flow from septic systems in the area. Septic return flow was estimated from billed consumption data provided by BDVWA. It is assumed that 80% of the volume consumed per parcel is returned to the groundwater system. The average septic return flow from WY 2012 to WY 2022 is estimated to be 344 AFY. It should be emphasized that the return flow was estimated only at locations where it was assumed that there was an alluvial aquifer in the subsurface, hence most of the HDWD service area was not included.

## 7 GROUNDWATER MODELING

Todd Engineers (2011) built a numerical groundwater flow model to aid in the characterization and evaluation of groundwater flow conditions (sources, sinks, flow

## 7.1 GROUNDWATER MODEL UPDATE

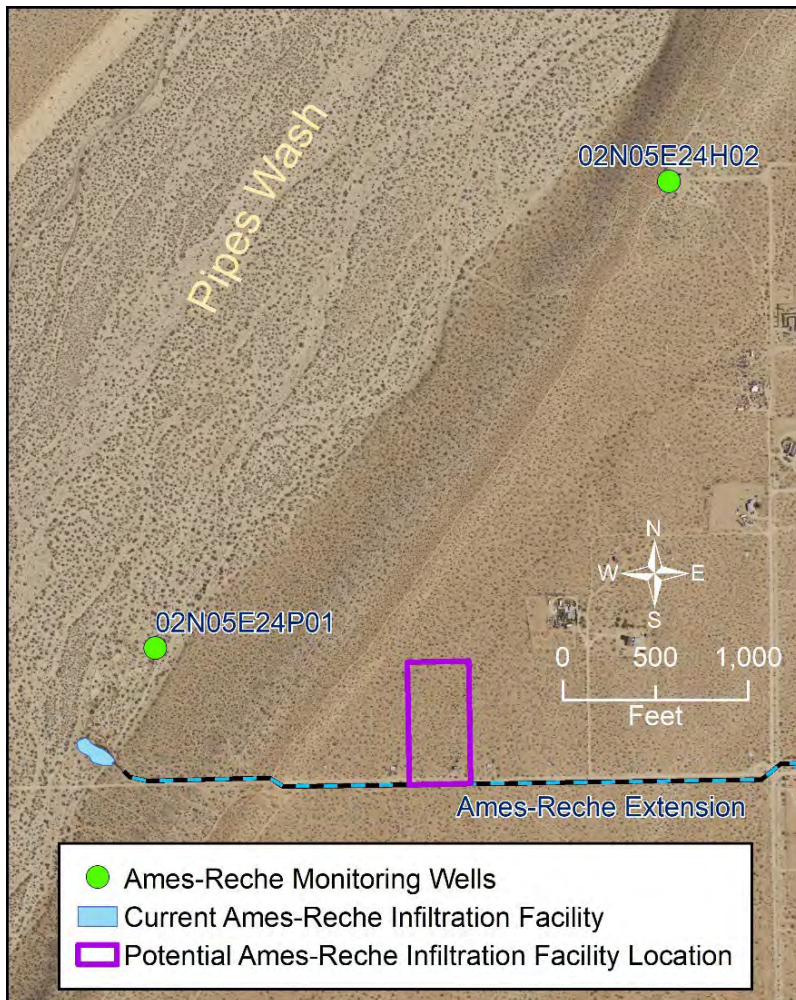


Figure 7 Potential new Ames-Reche Infiltration Facility Location

MWA staff updated the Todd Engineers model calibration period to cover the period from water year (WY) 1995 through WY 2022. This was accomplished by calculating water budget components (recharge, pumping, etc.), and estimating model boundaries for the additional extension period (2009-2022) using the approach initially devised by Todd Engineers. The details of the model construction including conceptual model, assumptions, spatial and temporal discretization can be found in [Appendix A](#)

Once the model was updated, the calibration was checked to make sure it was still acceptable. Overall, calibration remained statistically the same, but additional calibration was conducted to improve the model calibration in the vicinity of Ames-Reche recharge facility.

## 7.2 MODEL RESULTS

The main purposes for the model update were to assess the impact of the Ames-Reche recharge facility on water levels since its inception in 2014 test a potential replacement recharge site being considered to improve recharge functionality and reduce operational constraints at the existing site. ([Figure 7](#)) shows the MWA owned parcel being considered as a potential recharge site replacement for the current recharge facility. The new parcel will provide a larger infiltration area to increase capacity and provide operational flexibility. For the current assessment it was assumed that the same footprint of the current recharge facility was maintain at the proposed site for comparative purposes.



### 7.2.1 ESTIMATED IMPACT OF ARTIFICIAL RECHARGE

The estimation of the impact of the Ames-Reche recharge facility on water levels was conducted by running the calibrated model without the recharge facility and comparing the water level to the model run with the recharge facility. The impact on water levels is shown as time series hydrographs at three monitoring locations to account for temporal and spatial variation. The locations shown on [Figure 7](#) consist of the recharge facility itself, and two monitoring wells downstream of the recharge facility (02N05E24P01 and 02N05E24H02). The results are shown in [Figure 8](#). The hydrograph showing the water level in green with an active Ames-Reche infiltration facility is in red, the hydrograph representing the water level if the Ames-Reche infiltration facility was never built is in blue. The infiltration volume of the facility is also shown on the chart in red.

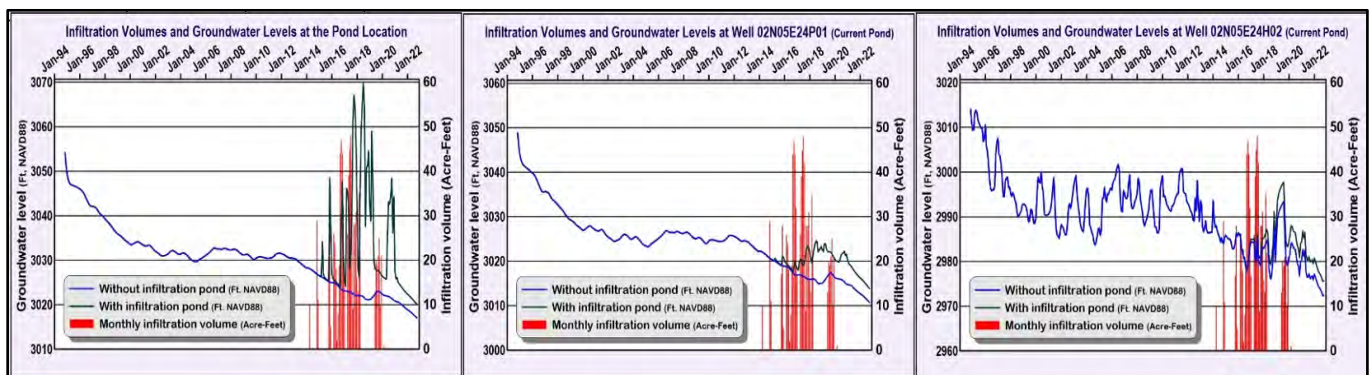


Figure 8 Impact of the Ames-Reche Infiltration Facility on Water Levels

[Figure 8](#) shows that beneath the infiltration facility, water level rose by as much as 30 feet (ft), but due to the intermittent nature of the recharge these high-water levels were not sustained over time. At well 02N05E24P01 (BDVMW-1) located 0.13 miles downstream of the infiltration facility the maximum change in water level was about 5 ft and ultimately 0.9 mi away at well 02N05E24H02 (BDVMW-2) the change was 3 ft or less. For these changes to be sustained more frequent recharge is needed. Also, a delay of one year or more is observed between an infiltration event and its impact on the groundwater levels. This is consistent with the observed impacts of SWP on the water quality discussed in [section 6.4](#) of this report.

### 7.2.2 IMPACT OF POTENTIAL NEW INFILTRATION SITE

To compare the existing facility to the potential new location, the model was run with the same historical infiltration regime recorded at the current facility but moved to the new location. Comparison was conducted at the same locations used in [section 7.1.1](#). The results are shown in [Figure 9](#).

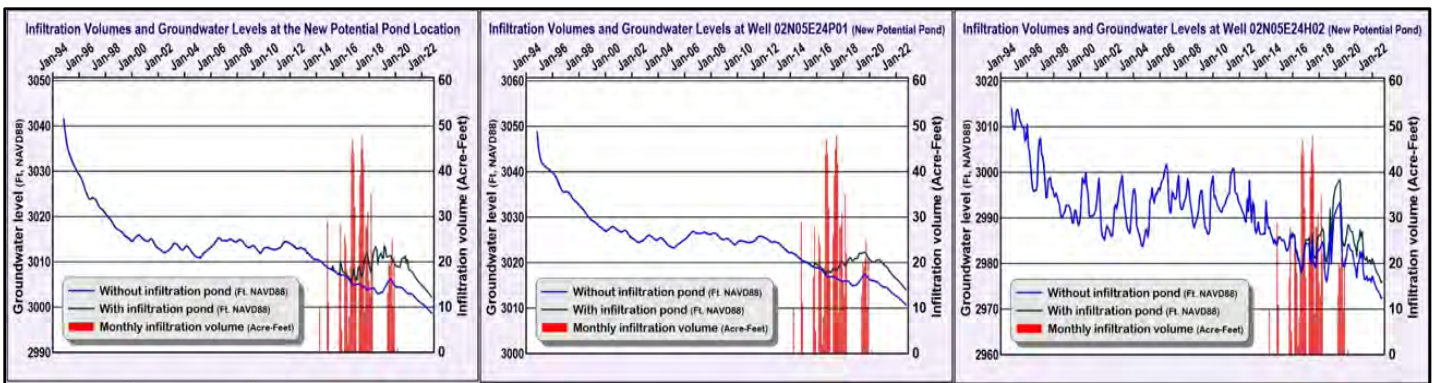


Figure 9 Impact of Potential New Ames-Reche Infiltration Facility on Water Levels

Figure 9 shows that assuming that the current recharge was applied at this new location, the water levels beneath the newly proposed pond would have risen by 12 ft. This is lower than the current facility because the hydraulic conductivity of the aquifer in the model is higher at this location compared to the existing pond. Higher hydraulic conductivities tend to generate lower water level changes on site but more extensive spatially. Wells 02N05E24P01 (BDVMW-1) and 02N05E24H02 (BDVMW-2) exhibit very similar water level changes compared to the existing pond. Overall, no significant differences at the basin level exist between both sites, only negligible local variations are noted.

### 7.3 MODEL DISCUSSION, RECOMMENDATION AND LIMITATIONS

As demonstrated by the results shown in sections 8.2.1, 8.2.2, and the Todd feasibility study, the groundwater model is a useful management tool that can support planning and feasibility studies in the Ames-Reche area for future projects. This iteration of the model focused on updating the model input parameters and water budget components (production, recharge, return flows...etc.) to make it current. No effort was made to fully revise or update the conceptual model due to time and budget constraints.

The net average yearly recharge (total inflow) from WY 1995 to WY 2022 estimated using the model is 1,054 AFY. Of the 1,054 AFY of recharge, 737 AFY is from mountain front recharge and 316 AFY from a combination of septic return and SWP infiltration efforts. This number drops to 937 AFY if the recharge estimate is limited to the period from WY 2014 (inception of the Ames-Reche Recharge Facility) to WY 2022. For the same period the average production is 1,163 AFY, this explains the continuous decline observed in water levels. Production should be below the net recharge, or any production in-excess-of the net recharge should be offset by importing water.



The prescribed baseline of 1,646 AFY is the ABA agreed upon in the Amended and Restated Judgement based upon 135% of production during the period between 2004-2008. It should be noted that this period was relatively wet in comparison to the long-term average rainfall for the area. Therefore, the prescribed ABA of 1,646 AFY appears to be unsustainable and should be adjusted by approximately 30% or more; closer to 1,163 AFY average long-term production. More data collection and analysis are needed to refine these numbers, but the observed declining water level trends support this.

More data needs to be collected to refine the conceptual model. The active monitoring wells shown in [Map 2](#) do not exhibit sufficient spatial distribution to help characterize the flow barriers (faults) present in the basin. Also, subsurface lithology information is lacking. Targeted studies using geophysics to focus on specific areas with complex geology and more monitoring wells (multi-completion) to provide more water levels and lithology would help alleviate the model uncertainty. The current model has limited vertical discretization as it consists of a single confined layer across the basin. Groundwater level pattern analysis suggest that more vertical resolution will be needed to fully characterize the Ames-Reche Basin.

## **8 FINANCE TRACKING**

As part of the Agreement, MWA is responsible for maintaining the Ames-Reche Groundwater Accounting Spreadsheets that record production and artificial recharge activities by the Project Partners. Spreadsheets for each of the Project Partners are provided in [Tables 3 through 7](#) (attached).

MWA began pre-storing SWP water at the Ames-Reche Recharge Facility in FY 2015-2016. In subsequent years, this banked water has been used to provide groundwater storage transfers for BDVWA annual SWP delivery requests. A blank copy of the Ames-Reche Groundwater Storage and Recovery Program Transfer Form is provided as [Attachment 4](#).

In FY 2020-21 MWA revised the finance tracking spreadsheets to better account for water balances within the active management area. In addition, as of July of 2017 CSA 70 W-4 entered into a water exchange agreement with HDWD known as the Pioneertown Water Exchange. Within this agreement HDWD allows CSA 70 W-4 access to groundwater within the Warren Valley Sub-basin in exchange for equal transfers from CSA 70 W-4's annual baseline amounts. CSA 70 W-4 transferred 23 AF to HDWD in FY 2021-22, copies of the transfer forms are included as attachments.

## 9 BASIN MANAGEMENT CONSIDERATIONS

This report constitutes the annual report of the Monitoring Program for FY 2022-2023. Final versions of the previous reports can be obtained by contacting MWA. Every five (5) years as required by the Amended and Restated Judgement MWA will “make recommendations on the Parties” regarding their production of Annual Baseline Amounts commencing in the following fiscal year and any other recommendations for actions which MWA believes are required to protect Basin water supply based on the Ames-Reche Groundwater Management Plan. This report includes the following recommendations:

### 9.1 RECOMMENDATIONS

Items that the Project Partners may want to implement in support of future management activities include the following:

1. Reduce production and/or offset respective production with increased recharge to the Ames-Reche basin.
2. Continue to develop hydrogeologic understanding to support management efforts (numerical model and conceptual model refinement).
3. Estimate the water budget so that future production offset and ABA can be refined.
4. Reduce the ABA. Per the Amended and Restated Judgement, this requires unanimous agreement of the General Managers of the area partners and an equal percentage decrease for a specified period of time. Prior to a recommendation to reduce the ABA, additional analysis is necessary to determine the extent of reduction both in volume and space. Review of water levels suggests that a more refined look at aquifer properties, well construction and location, geology, faulting, pumping patterns, will provide a better basis for setting a new ABA. We note that pumping less than the current ABA coincides with water level declines, but these declines are not consistent everywhere. As stated in [section 8.3](#), “More data collection and analysis are needed to refine these numbers, but the observed declining water level trends support this” (adjusting the ABA). We recommend further analysis of the declining water level trends, regional wet and dry climate cycles, and the impacts of natural groundwater recharge. A recommendation for the considerations of the Parties will be developed based on the results of these investigations.
5. Review existing wells within the management area make necessary revisions to the monitoring program. Increase the number of monitoring wells in the network.
6. Continue measuring and monitoring groundwater levels. Report water levels in production wells quarterly.

## **10**REFERENCES

Kennedy/Jenks/Todd LLC (2007) Basin Conceptual Model and Assessment of Water Supply and Demand for the Ames Valley, Johnson Valley, and Means Valley Groundwater Basins. April.

Todd LLC (2011) Reche Spreading Ground Recharge Feasibility Study .February.

## 11 TABLES

Table 1 Production for Ames-Reche Management Area by Fiscal Year and Project Partner.

Production by Project Partner	BDVWA	IDGM	HDWD	CSA 70 W-4	Totals (AF)
Annual Baseline Amount (AF)	641	267	703	35	1646
<b>FY 2012- 2013 (AF)</b>	422.7	155.3	596.9	23.2	<b>1198.1</b>
<b>FY 2013- 2014 (AF)</b>	388	143.7	684.7	22.4	<b>1238.8</b>
<b>FY 2014-2015 (AF)</b>	348.5	123.1	737	19.1	<b>1227.7</b>
<b>FY 2015- 2016 (AF)</b>	326.4	119.9	708.9	19.8	<b>1175</b>
<b>FY 2016- 2017 (AF)</b>	362.2	130.7	701.6	21.9	<b>1216.4</b>
<b>FY 2017- 2018 (AF)</b>	414.3	137	691.2	21.4	<b>1263.9</b>
<b>FY 2018-2019 (AF)</b>	407.3	133.7	321.1	24.3	<b>886.4</b>
<b>FY 2019- 2020 (AF)</b>	398.3	149.4	659.5	2.1	<b>1209.3</b>
<b>FY 2020- 2021 (AF)</b>	472.4	185.9	755.3	0	<b>1413.6</b>
<b>FY 2021- 2022 (AF)</b>	437.14	155.24	836.73	0	<b>1429.11</b>
<b>FY 2022- 2023 (AF)</b>	389.77	123.7	929.34	0	<b>1442.81</b>

Table 2 Ames-Reche Recharge Facility SWP recharge amounts.

SWP Recharge by Project Partner	BDVWA	IDGM	MWA	HDWD	Totals (AF)
FY 2013-2014 (AF)	10	0	0	0	10
FY 2014-2015 (AF)	40	0	0	0	40
FY 2015-2016 (AF)	100	20	8	0	128
FY 2016-2017 (AF)	50	20	291	0	361
FY 2017-2018 (AF)	70	0	154	0	224
FY 2018-2019 (AF)	0	0	33	0	33
FY 2019-2020 (AF)	0	0	97	0	97
FY 2020-2021 (AF)	0	0	0	0	0
FY 2021-2022 (AF)	0	0	0	0	0
FY 2022-2023 (AF)	60	0	0	0	60
<b>Total Recharged (AF)</b>	<b>330</b>	<b>40</b>	<b>583</b>	<b>0</b>	<b>953</b>

**LANDSTEDT CONSULTING**

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*Professional Services in Grant Administration and Water Resources*

September 24, 2023

Marina West  
General Manager  
Bighorn-Desert View Water Agency  
622 Jemez Trail  
Yucca Valley, CA 92284  
Email: [mwest@bvdwa.org](mailto:mwest@bvdwa.org)

**Proposal to Perform Grant Agreement Administration for SWRCB Agreement Number D2102065, Project No. 3610009-002C, Potable Water System Improvements Consolidation of Water Systems**

Dear Ms. West:

Thank you for the opportunity to submit this letter proposal to assist the Bighorn-Desert View Water Agency (BDVWA/Agency) with grant agreement administration for the State Water Resources Control Board (SWRCB) Agreement Number D2102065, Project No. 3610009-002C - Potable Water System Improvements Consolidation of Water Systems (Project).

This letter proposal includes the Project understanding, approach and assumptions, scope of work, billing rate/invoicing, and term to provide grant agreement administration for the Project beginning in October 2023.

## PROJECT UNDERSTANDING

The SWRCB awarded the Agency \$11,000,000 for implementation of the Project. The funding is for the purpose of physically consolidating the BDVWA – Improvement District Goat Mountain water system No. CA3610060 with the BDVWA water system No. CA3610009 (both systems currently owned and operated by the Agency) to increase reliability, resiliency, and functionality of the two service areas.

The Project is to be completed in four phases:

Phase 1: Install a new pump; replace a booster station and install a metered supply; construct a new pump station; and construct a block wall to enclose Well No. 2.

Phase 2: Construct 9,300 feet of 6-inch distribution pipeline and pressure reducing stations to consolidate the systems.



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September 24, 2023  
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Phase 3: Construct 21,500 feet of 6-inch transmission and distribution pipeline to convey water.

Phase 4: Construct 9,900 feet of transmission pipeline to blend water.

The SWRCB/Agency agreement was executed April 20, 2023, with a term through March 31, 2026. The eligible work start date was January 1, 2018 and eligible construction start date was August 26, 2022, with construction completion (all grant administration also complete) by March 31, 2026.

## APPROACH AND ASSUMPTIONS

Denise Landstedt of Landstedt Consulting will perform grant administration activities for the Agency for the SWRCB/Agency Funding Agreement.

Landstedt Consulting will establish a coordinated approach among the Agency, SWRCB Project Manager, and Denise Landstedt for the organized and timely preparation of required reporting and invoicing. Reporting includes Quarterly Progress Reports with copies of deliverables as available. Quarterly Invoicing includes SWRCB Forms 260 and 261, Reimbursement Request (line item detail) and Reimbursement Request Invoice (funding source level), respectively. Invoices will always be supported with backup documentation and be accompanied by a Progress Report. Landstedt Consulting will also assist the Agency in preparing the required Project Completion Report at the end of the Project.

Landstedt Consulting anticipates beginning grant administration assistance in October 2023 to begin reporting/invoicing for the next schedule period. Therefore, the schedule proposed herein begins in October 2023 and continues for the grant term ending March 31, 2026.

If reporting and invoicing requires access to the SWRCB's FFAST system, the Agency will provide authorization for Denise Landstedt to access the FFAST system for uploading reports, invoices, and deliverables.

Successful implementation of the projects and grant reporting and invoicing assists the Agency to maintain eligibility for future grant funding.

## SCOPE OF WORK

Grant Agreement Administration includes quarterly reporting and invoicing, coordination of successful submission of deliverables, assist with preparation of the Project Completion Report, and assist the Agency with SWRCB funding agreement amendments, as requested.

This scope of work is based on a partnership with the Agency to work collaboratively to gather, prepare and submit reports and invoices in accordance with the SWRCB funding agreement.

### Grant Agreement Administration

#### Task 1: Project Set up and Initial Meeting

- **Communication.** Confirm contact information for Agency staff and the SWRCB Project Manager. Establish communication and a relationship with the SWRCB Project Manager for clarification of anything related to the funding agreement, reporting, and invoicing. Communication/meetings will be by email, phone, or video conferencing. Coordination meetings will be scheduled as needed.
- **Initial Meeting:** Participate in an Initial Meeting with Agency staff to obtain Project reporting and invoicing documents developed/submitted to date, project status understanding, and agree on a collaborative process to meet the reporting/invoicing requirements. Confirm the submission schedule to the SWRCB and agree on a schedule and process for information to be submitted to Landstedt Consulting. The Agency will provide authorization for Denise Landstedt to access the SWRCB FFAST system, if necessary, for uploading reports, invoices, and deliverables on behalf of the Agency.
- **SWRCB Agreement Amendments:** Maintain copies of the initial SWRCB agreement and any amendments thereafter. Assist with Agreement Amendment Requests, as needed and requested by the Agency, participate in discussions with the SWRCB Project Manager, and adjust reporting and invoicing documents where appropriate.

#### Task 1 Deliverables:

- Initial Meeting Agenda and Supporting Documents

#### Task 2: Quarterly Progress Reports and Invoices

- **Quarterly Progress Reports.** At the end of each quarter, prepare and submit a draft Quarterly Progress Report (using a Word template and information from the prior report) to the Agency for input and update. During the Initial Meeting, a collaborative process for this effort will be established.

Each Quarterly Progress Report will follow the requirements in the SWRCB funding agreement and include the following information: 1) Summary of progress to date

including progress since the prior report, percent construction complete, percent contractor invoiced, and percent contract elapsed. 2) Description of compliance with environmental requirements. 3) Listing of change orders with detail. 4) Problems encountered, proposed resolution, schedule for resolution, and status of previous problem resolutions. The Progress Report will also list any attachments and deliverables, and a cost summary showing costs to date and noting any costs included from prior periods.

Review and edit the draft Progress Report as received from the Agency and finalize. Progress Reports will include sufficient information for the SWRCB Program Manager to understand work accomplished during the reporting period, any prior work currently being reported, and how problems are being addressed.

Organize deliverables in the format required by SWRCB, and upload reports and deliverables to the SWRCB FFAST system or email to the SWRCB Project Manager, as directed.

- **Quarterly Invoices.** Quarterly invoices will accompany each Quarterly Progress Report. At the end of each quarter, request project expense documentation from the Agency to be included for reimbursement. Prepare and submit draft Invoice Forms 260 and 261 with backup to the Agency for review.

Receive Agency input and finalize Forms 260 and 261 with back up in the required format for submission to the SWRCB, either to FFAST or to the Project Manager, as directed

Communicate with the SWRCB Project Manager, as needed, to discuss reported/invoiced information and adjust as needed.

- **Original Reports/Invoices to the Agency.** Provide the Agency with electronic copies of original progress reports, invoices and backup, and deliverables for its files.

#### **Task 2 Deliverables:**

- Draft and Final Quarterly Progress Reports
- Draft and Final Quarterly Invoices and Backup Documentation
- Copies of Deliverables

#### **Task 3: Project Completion Report**

Upon completion of the Project, Landstedt Consulting will assist in the development of the required Project Completion Report. The Project Completion Report will follow the requirements in the SWRCB funding agreement and include all final deliverables, and submitted no later than March 31, 2026.

Marina West  
 September 24, 2023  
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### Task 3 Deliverables:

- Draft and Final Project Completion Report

## BILLING RATE/INVOICING

Landstedt Consulting Person/Project Role	Classification	Rate Per Hour
Denise Landstedt, Project Manager, Senior Grant Administrator	Principal	\$195

- *Hourly rates include salary, overhead and profit. Landstedt Consulting reserves the right to adjust its hourly rates at the beginning of the calendar year for all ongoing contracts.*
- *As a standard practice, Landstedt Consulting does not charge other direct costs. These direct costs, such as copying, printing, etc., are low; therefore, Landstedt Consulting can pass on these savings to clients.*

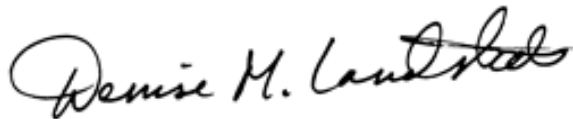
Costs are billed hourly and invoiced monthly. Each invoice will include a brief description of activities detailed by task and date. In addition, if the contract is set up as a not-to-exceed amount, the invoice will include the total contract amount, the current billing amount, and the balance remaining. If the contract includes costs by task, the total amount will be flexible to use across all tasks, which makes the contract most efficient.

## TERM

It is anticipated that the grant administration assistance work will begin in October 2023 to begin reporting/invoicing for the next schedule period. Therefore, the schedule proposed herein begins in October 2023 and continues for the grant term ending March 31, 2026. The contract term and total amount will be agreed on by the Agency and Landstedt Consulting.

Thank you for the opportunity to assist BDVWA with its grant agreement activities. I can be reached at (760) 560-7557 or landstedtconsulting@gmail.com to discuss this proposal.

Sincerely,



Denise M. Landstedt  
 Principal  
 Landstedt Consulting