

APPENDIX E2
Borrego Metering Plan

DRAFT

GROUNDWATER EXTRACTION METERING PLAN BORREGO SPRINGS GROUNDWATER SUBBASIN

Prepared for

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1 INTRODUCTION

The Borrego Springs Groundwater Subbasin (Subbasin) of the Borrego Valley Groundwater Basin (BVGB) has been identified by the California Department of Water Resources (DWR) as subject to critical conditions of overdraft (DWR 2016). As such, in accordance with California's Sustainable Groundwater Management Act (SGMA), a Groundwater Sustainability Agency (GSA) has been formed to develop and implement a basin-specific Groundwater Sustainability Plan (GSP). The general purpose of the GSP is to facilitate a long-term groundwater withdrawal rate less than or equal to the sustainable yield of the Subbasin within the maximum 20-year implementation period mandated by SGMA.

This Groundwater Extraction Metering Plan (Metering Plan) is a foundational component of the GSP that will facilitate the reporting of groundwater extraction data. Collection and reporting of these data are integral to enable proactive and adaptive management of groundwater resources and documentation of seasonal fluctuation in water demand. Agricultural pumping was identified as one of the greatest sources of uncertainty in the Borrego Valley Hydrological Model (BVHM), because the groundwater use was indirectly estimated using potential evapotranspiration, crop coefficients, and irrigation efficiencies. Collecting metered data is one of the three primary recommendations proposed to improve the accuracy of the BVHM, which in turn improves the GSA's tools for adaptive management. Furthermore, the collection of metered pumping data is a key metric for evaluating the effectiveness of four out of the six projects and management actions being undertaken by the GSA (i.e., the water trading program, water conservation, pumping reduction program, and the voluntary fallowing of agricultural land). The GSA derives its authority to require groundwater extraction metering pursuant to the SGMA § 10731.

This plan has also been prepared consistent with Borrego Valley GSP Advisory Committee (AC) Policy Recommendation #1 – Questions #1 and #2 (AC Agenda and Minutes November 2017). AC Policy Recommendation #1 – Question #1 recommended meters to be installed on all wells with the exception of wells that use two acre-feet per year (AFY) (651,702 gallons/year) or less within the Subbasin.

AC Policy Recommendation #1 – Question #2 provided two options to the AC for consideration as follows:

Option 1: The GSA inspects and monitors/reads the meter on a monthly basis and ensures the accuracy of the data including meter calibration. The GSA would provide an annual statement setting forth the total extraction in gallons from each

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well. The GSA will keep data confidential to the maximum extent allowed by law (California Govt. Code 6254(e)).

Option 2: The property owner (or third-party contractor acceptable to the GSA) monitors/reads the meter on a monthly basis. A third-party contractor acceptable to the GSA would inspect and read the meter on a semi-annual basis to verify the accuracy of data including meter calibration. On behalf of the property owner, the third-party contractor would provide an annual statement to the GSA with verification of the total extraction in gallons from each well and verification that each flow meter is calibrated to within factory acceptable limits. The GSA will keep data confidential to the maximum extent allowed by law (California Govt. Code 6254(e)).

Although the AC did reach consensus on requiring meters to be installed on all wells except those wells that use two AFY or less, consensus was not achieved for AC Policy Recommendation #1 – Questions #2 as indicated by Level 5 and 6 AC member votes. As such, that issue was returned to the Core Team without a recommendation as per the Borrego Valley GSP AC By-laws adopted and approved January 29, 2017. This Plan has been prepared under the presumption that the Core Team accepts both Option 1 and Option 2 presented in AC Policy Recommendation #1 – Question #2 as acceptable.

1.1 Applicability of the Metering Plan

An interim Monitoring Plan was prepared in support of the GSP, outlining the types of monitoring necessary to address the applicable DWR-designated SGMA sustainability indicators in the Subbasin (Dudek 2017). This Metering Plan serves to supplement the Monitoring Plan by outlining consistent groundwater extraction metering procedures required for all groundwater production wells in the Subbasin which pump in excess of two AFY. However, *de minimis* groundwater production wells that pump less than two AFY are exempt from the metering requirement defined herein pursuant to SGMA § 10721e.

Implementation and compliance with this Metering Plan will be mandatory for all non-*de minimis* wells in the Subbasin beginning 90 days from adoption of the GSP. The GSA may require metered data from any well located in the Subbasin if it is uncertain whether it qualifies as *de minimis* groundwater production.

This Metering Plan will be implemented to address the following:

- The GSA is currently relying on estimates of pumping, which is considered a source of uncertainty in the Subbasin’s numeric groundwater model at this time. Initially these data

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will be used to refine existing groundwater extraction estimates for non-de minimis groundwater production wells in the subbasin. Additionally, the data will be used to verify and refine the sustainable yield of the Subbasin.

- Groundwater extraction metering data will be integrated with other data being collected (i.e., groundwater level data) to track changing conditions in the Subbasin in order to evaluate the SGMA sustainability indicators: chronic lowering of groundwater levels, reductions in groundwater storage, and the potential for water quality impacts to municipal supply as groundwater levels decline.
- Groundwater extraction metering data will be used throughout the GSP implementation period to quantitatively track compliance with prescribed pumping allocations and reductions.

The Metering Plan outlines a procedure that will facilitate confidential collection and reporting of groundwater extraction data to the GSA, which will not be subject to public review pursuant to Government Code 6254(e).

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2 METERING PLAN

This section describes the metering objectives and acceptable approaches, meter types and installation configurations, and meter maintenance and calibration requirements for routine groundwater extraction metering activities in the Subbasin.

2.1 Metering Objectives

The purpose of this Metering Plan is to outline the procedures for the metering of all non-*de minimis* groundwater extraction wells (>2 AFY) within the Subbasin to enable proactive management of water resources. The GSA may request metered data from any well located in the Subbasin if it is uncertain whether it qualifies as *de minimis* groundwater production.

2.2 Approach

All non-*de minimis* wells will be required to register with the GSA upon GSP adoption, which will include identification of flow meter type, San Diego County Assessor’s Parcel Number (APN) for each parcel served by each well and farm identification, golf course identification or other type of water use identification. Figure 1 illustrates an example of one well serving multiple parcels within a farm:

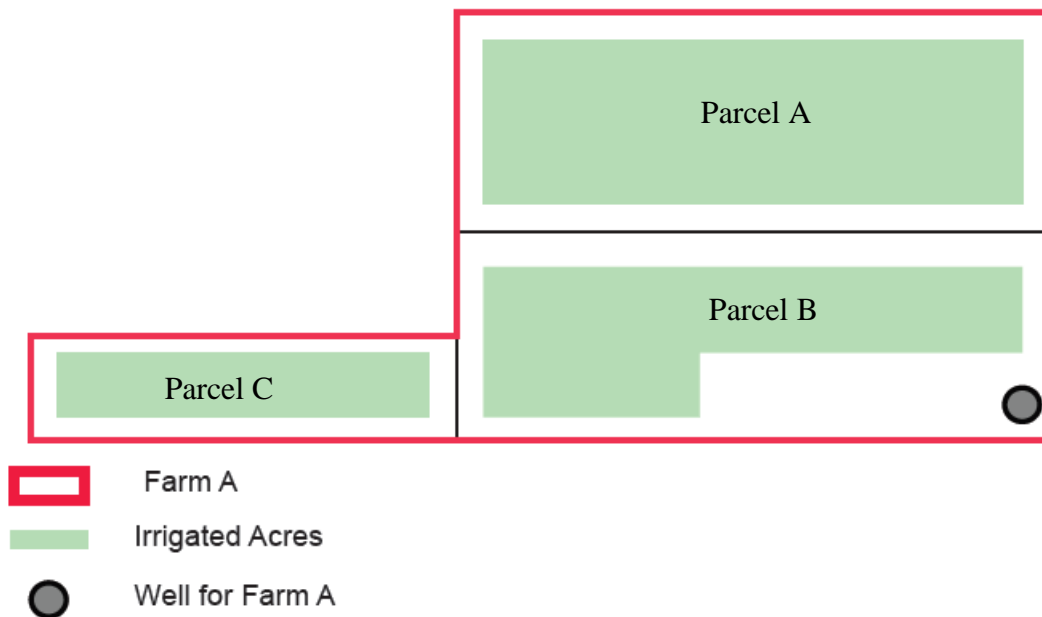


Figure 1. Example Documentation of Parcels Served by a Well for a Farm

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Registration of non-*de minimis* production wells is achieved by submittal of the registration form to the GSA and is due within 90 day of GSP adoption. A copy of the registration form is provided as **Attachment A**, which specifies details for electronic submittal of the form. At the time of form submittal, the GSA will verify parcels served by each well and current area of irrigation based on aerial photography and GIS analysis.

Subsequent to registration, each applicable well owner that does not already have an appropriate flowmeter installed (as reported on registration form and verified by GSA) will be required to have one installed near the wellhead. The registrants will be required to install the flowmeter within 60 days of registration, or as determined appropriate by the GSA at time of GSP adoption. The meter is required to be read and recorded monthly and reported to the GSA annually. Registrants will be required to begin recording groundwater production immediately following installation. A third-party contractor acceptable to the GSA would inspect and read the meter on a semi-annual basis to verify the accuracy of data including meter calibration. An annual report will be required to be submitted to the GSA to demonstrate compliance with the Metering Plan.

2.3 Meters

Historically, basin-wide monitoring has included municipal reading of Borrego Water District Wells and San Diego County Major Use Permit readings for golf courses in the basin. Additional meters are required in the Subbasin to more accurately measure and document water usage.

Flow meters must be installed on existing production wells and should be installed at easily accessible above-ground portions of the well. Flow meters should be installed according to the meter's installation specification (e.g., correct upstream and downstream pipe length). Flow meters must include both an instantaneous flow rate and a totalizer recording the total volume of water extracted from the well. Appropriate meter types are described in the following subsections.

2.3.1 Meter Types

Wells owners can select the brand of flow meter to be installed on their well(s); however, meters must be calibrated as described in Section 3 of this Metering Plan. The propeller-type flow meter is recommended for installation as part of the GSP. Propeller-type meters have been used throughout the Subbasin, and have proven to be a reliable mechanism for long term monitoring. Also, additional implementation of propeller type meters would ensure data comparability to previous historical data.

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Propeller Flow Meter:

- Propeller type flow meters use mechanical parts to record production and/or measure flow rate.
- Commonly used in agriculture and municipal settings (majority of meters in Borrego Valley are propeller meters).
- Propeller meters must be sized based on expected flow rate and pipe diameter.
- Historically reliable for long-term use.
- May require maintenance, as bearing wear can occur from the internal propeller, and calibration is also periodically required.
- Future data collected would be of comparable accuracy to historically collected flow meter data.
- Flow meter accuracy is commonly plus or minus 2%.



Figure 2. Example Propeller Type Flowmeter

Source: McCrometer 2017

Additionally, Automated Meter Infrastructure (AMI) can be implemented to remotely report measurements. AMI can be implemented to minimize visits to the wellhead, and remote

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communication options include satellite and cellular connections. Power options for AMI can include grid, battery-only, and rechargeable solar power.



Figure 3. Example Automated Meter Infrastructure

Source: McCrometer 2017

2.3.2 Typical Installation Configurations

Many wells in the Subbasin already have flow meters installed; however, many wells will require new flow meter installation, retrofits, or meter calibration. Installing each flow meter typically requires 4-8 hours, and must be performed by a licensed pump contractor. Well owners may have the option to allow installation of the flow meter through the GSA for a limited time with a subsidized program, or through an independent pump company at the expense of the well owner.

The meters must be installed in accordance with manufacturer's specifications. A typical installation configuration is depicted in Figure 4.

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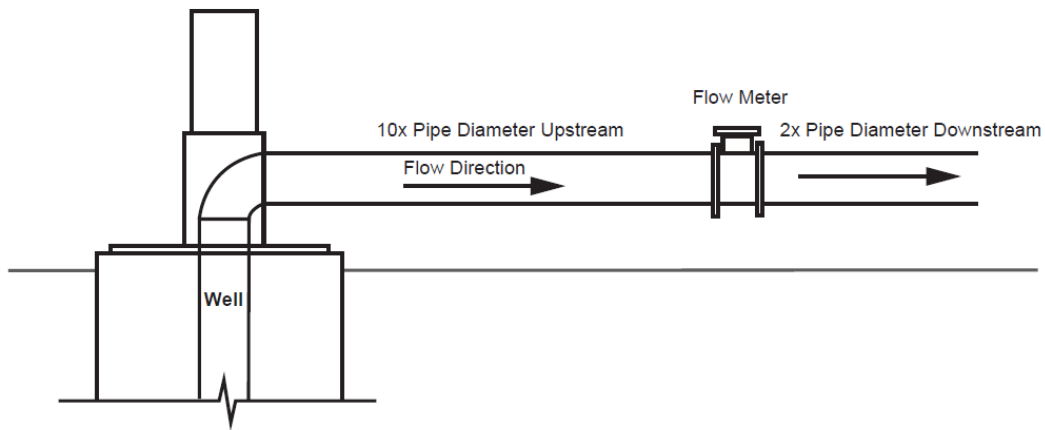


Figure 4. Typical Flowmeter Configuration

2.3.3 Maintenance and Calibration Considerations

Propeller flow meters are considered to be reliable for long-term use; however, routine maintenance of the flow meter will be required, and will be the responsibility of the well owner. Calibration will be conducted as needed semi-annually for propeller type flow meters, and annual meter accuracy checks must be conducted by a GSA-approved vendor. Calibration specifications are presented in Section 3 of this Metering Plan.

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3 GROUNDWATER METERING COMPLIANCE REQUIREMENTS

3.1 Calibration and Validation

Proper calibration and verification is important for ensuring data quality, and necessary for meeting the objectives of the Metering Plan. Well owners are responsible for costs for installation (if needed), calibration, verification, and maintenance of meters. Under certain parameters, a flow meter may be deemed “commercial.” The County of San Diego, Department of Agriculture, Weights and Measures (AWM) considers a meter to be commercial if it is being used to determine a fee or penalty charged to pumpers, and the meter is owned by the property owner. AWM requires commercial meters to be tested and sealed at the AWM testing facility prior to installation, and to be retested every ten years.

The AWM testing facility has the capability of testing flow meters up to two inches in diameter. Most of the meters subject to the Metering Plan are larger than two inches, and therefore, cannot be tested at the AWM laboratory. In lieu of AWM facility testing, flow meter testing and calibration shall be conducted by the meter manufacturer in conformance with National Institute of Standards and Technology (NIST) Handbook 44, as referenced in California Code of Regulations, Title 4, Division 9 Weights and Measures Field Reference Manual (2018) Section 3.36 Water Meters. Based on the GSA’s review of existing, accessible meters in the Subbasin, most meters are manufactured by McCrometer, based in Hemet, California. McCrometer’s calibration Standard Operating Procedure for applicable meters has been reviewed by the GSA and determined to be compliant with above-referenced NIST standards. Therefore, McCrometer’s two California calibration facilities (Hemet and Porterville) are considered acceptable for meter calibration. Other meter manufacturers may also be acceptable for calibration procedures pending confirmation of NIST compliance.

Initial Calibration/Validation of Existing Meters

New meters will require a certificate of calibration which must be provided to the GSA and recorded. Existing meters in the Subbasin will need to be inspected and validated to ensure proper function and calibration. These activities must be conducted by a California-licensed pump contractor or GSA-approved vendor. This initial calibration and validation will be conducted at the beginning of the schedule of routine metering activities, and a certificate of calibration must be produced and recorded. Certificates of calibration for new and existing meters must be submitted with the initial semi-annual report (Section 3.4 of this Monitoring Plan).

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Routine Calibration/Validation

Routine calibration checks (i.e., validation) must be conducted semi-annually. If variability exceeds 5% then manufacturer recalibration will be required. This typically involves removing the meter and having it factory calibrated. Routine validation can be conducted using either a temporary ultrasonic meter test to measure instantaneous flow rate, or other approved recalibration methods performed through professional services. Calibration can also include motor efficiency testing by the pump contractor or vendor to determine current efficiency and remaining useful life of the well motor. Replacing well motors when they become inefficient can save on electrical cost with the potential for regular maintenance resulting in cost savings to the pumper.

3.2 Meter Reads and Monthly Data Reporting

Upon GSP adoption, meter reads must be recorded monthly and submitted to the GSA team electronically on an annual basis with third party validated reports for pumpers who elect to not have GSA staff perform the meter reads. Compliance with GSA meter reading requirements can be achieved by one of two approaches:

3.2.1 Option 1 - GSA Performed Meter Reading

Provide access for the GSA to perform monthly visual meter reading. Enrollment in this approach requires execution of the access agreement provided in **Attachment A** of this Metering Plan. Currently numerous groundwater flow meters within the Subbasin are visually read and documented on a monthly basis.

3.2.2 Option 2 - Third-Party Contractor Performed Meter Reading

The property owner (or third-party contractor acceptable to the GSA) monitors/reads the meter on a monthly basis. A third-party contractor acceptable to the GSA would inspect and read the meter on a semi-annual basis to verify the accuracy of data including meter calibration. On behalf of the property owner, the third-party contractor would provide an annual statement to the GSA. Third party contractors shall possess an appropriate license, including Professional Geologist, Professional Engineer, California Well Drilling License (C-57), or other applicable professional license approved by the GSA.

3.3 Annual Reporting

Annual reports shall be submitted to the GSA on or before October 31st of each year. The reporting year will be defined as the water year from October 1st through September 30th. The water year is designated by the calendar year in which it ends.

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Annual reports must contain the following:

- **Total Annual Water Use Per Well:** Tabulated results of monthly meter reads and cumulative annual water production amount.
- **Meter Calibration/Validation Documentation:** Semi-annual validation and annual calibration certificates produced by an appropriate pump or meter company.
- **Representative Parcel Numbers:** San Diego County APN for each parcel served by each well.
- **Farm Identification, if applicable:** Name of farm or farms served water by each well.
- **Meter Reading Method and Qualification:** Description of the meter reading method (e.g., visual read by Borrego Water District, remote automated reading infrastructure with confirmation by third party, etc.) and certification that the individual collecting that data meets the minimum qualifications of the GSA.

Annual reports shall be submitted electronically to the GSA in the required format. An example annual report template is provided as **Attachment B** to the Metering Plan which also specifies submittal details.

3.4 Data Confidentiality

To address concerns regarding the confidentiality of pumping data, the raw data will remain confidential pursuant to Government Code 6254(e). These data will be maintained for use by the GSA, and only publicly available as aggregate values by water use sector (i.e., Agriculture, Municipal, and Recreation).

3.5 Enforcement and Penalties

The GSA's enforcement of compliance with the Metering Plan is imperative to ensure effective implementation. Pump owners who fail to comply with the Metering Plan or who provide inaccurate data to the GSA will be subject to penalties. Specific enforcement and penalties will be outlined in a Fees and Penalties Plan to be approved by the GSA.

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4 REFERENCES

Advisory Committee (AC) Agenda. 2017. Borrego Valley Groundwater Basin: Borrego Springs Subbasin. Sustainable Groundwater Management Act (SGMA). AC Meeting. November 27, 2017

Dudek. 2017. *Borrego Springs Subbasin, Draft Interim Monitoring Plan*. August 21, 2017.

DWR. 2016. *Best Management Practices for the Sustainable Groundwater Management of Groundwater – Monitoring Protocols, Standards, and Sites*. California Department of Water Resources, Sustainable Groundwater Management Program. December 2016.

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ATTACHMENT A
*Groundwater Extraction Facility
Registration Form*

Groundwater Extraction Facility Registration Form

Owner Information

Contact Name _____
Business Name _____
Farm/Entity _____
Address _____
City/State/Zip _____
Phone No. _____
Email Address _____

Operator Information (if different than above)

Contact Name _____
Business Name _____
Address _____
City/State/Zip _____
Phone No. _____
Email Address _____

Well Information

Owner's Well Name/No. _____
Well Location/Address _____
Public Land Survey Location; Township _____ Range _____ Section _____
GPS Coordinates; Latitude _____ Longitude _____
State Well No. (SWN) _____
State Well ID _____

Additional Well Information

County Well Permit No. _____
Date Drilled _____
Well Depth _____ feet
Casing Diameter _____ inches
Perforations _____ feet from ground surface

Groundwater Extraction Facility Registration Form

Motor Type: Submersible or Turbine (*circle one*)

Motor/Engine _____ HP

Existing Water Meter: Yes or No (*circle one*)

Manufacturer of Water Meter _____

Water Meter Size _____ inches

Water Flow Meter (state what flowmeter reads in: acre-feet (AF), gallons, cubic feet (CF))

Serial No. of Water Meter _____

Electric Meter No. _____

Assessor's Parcel No. (APN) _____

Hydrogeologic Data (If any of the below data are available, check box and please provide documentation.)

- Driller Well Completion Report Available
- Groundwater Quality Data Available
- Groundwater Level Data Available
- Geologist Log Available
- Aquifer Test Data Available
- Geophysical (E-log) Available

Well Water Use Type

- Agricultural/Irrigation (*list number of acres and crop category(ies)*) _____
- Stock Watering (*number and type of animals*) _____
- Domestic (*number of persons served*) _____
- Municipal or Industrial _____
- Other (*describe*) _____

Groundwater Extraction Facility Registration Form

Property Access for Meter Readings and Groundwater Level Monitoring

Please provide your printed name and signature to allow for monthly meter readings and approximately semi-annual groundwater level monitoring.

Contact information for property access notification:

Contact Name _____

Phone No. _____

Email Address _____

Signature _____ **Date** _____

Are additional active or inactive well located on the property? If so, provide number of well:

Number of Active Wells _____

Number of Inactive Wells _____

Please complete a separate Groundwater Extraction Facility Registration Form for each additional active well.

ATTACHMENT B

Example Data Submittal Format

**BORREGO VALLEY GROUNDWATER SUSTAINABILITY AGENCY
ANNUAL
GROUNDWATER EXTRACATION STATEMENT**

Contact: _____ **Telephone:** _____
Well Operator: _____ **Email:** _____
Address: _____ **Usage/Acreage:** _____
City, State, Zip: _____ Please check box if your well(s) is/are used for domestic purposes
 (human or animal consumption) and delineate which well(s) by
 highlighting, circling, or "*" - noting which well (if more than 1).

Please carefully fill out the fields (1 - 10) in this form. You have well(s) within the Borrego Springs Subbasin. The Borrego Valley GSA requires that this form be completed, signed and submitted by each well owner and/or operator within 45 days of the due date. If this completed form and required payment is not received by the due date, Ordinance requires that the Borrego Valley GSA charge you interest at X% per month, as well as a late penalty assessed at X% per month.

State Well Number	Flow Meter Readings								
<u> </u> N <u> </u> W <u> </u>	Current	-	Previous	=	Difference	x	Mult	=	Extraction (Units)
_____	_____		_____		_____		_____		_____
									Gallons _____
									Acre-feet _____

**** PLEASE CALCULATE ACRE-FEET (AF) TO THE 3rd DECIMAL PLACE ****
 If you get 50.0019 AF, correct entry = 50.002 AF

<u>Annual Pumping Allocation</u>	<u>Extraction Charge</u>
Baseline Pumping Allocation _____ AF	_____ AF x \$X.00/AF = \$ _____
Pumping Allocation _____ % Reduction	Interest 1.5% x Months: + \$ _____
Available Pumping Allocation _____ AF	Late Penalty: + \$ _____
Actual Groundwater Extraction _____ AF	Overpumping Surcharge: + \$ _____
	(see rate breakdown below)
	TOTAL AMOUNT ENCLOSED = \$ _____
	Overpumping Surcharge Rates
	_____ AF @ \$X = \$ _____
Payment must be received within 45 days of the date the Annual Statement is issued by Borrego Valley GSA to avoid late penalties and interest.	

I DECLARE under penalties of perjury that this groundwater extraction statement has been examined by me, and to the best of my knowledge and belief is a true, correct and complete statement.

Print Name: _____ Date: _____

Signature: _____

THIS STATEMENT IS NOT COMPLETE UNLESS ALL QUESTIONS ARE ANSWERED AND SIGNATURE PROVIDED.

