

## Chapter One

### WATER MEASUREMENT & METERING

The landowners within the GSA utilize both surface water and groundwater to meet the needs of the business operations and producing agricultural products. A key component to manage the sustainability of groundwater is to measure quantitatively the total amount of water used by each landowner within the GSA. This will allow the GSA to track groundwater water usage by landowner which can then be correlated to the amounts allowed to achieve sustainability.

The GSA will utilize satellite imagery to determine crop demands at the landowner level as described in more detail below:

#### Calculate Groundwater Pumping using Evapotranspiration

To calculate the amount of groundwater pumped and then actually consumed by the crop, the following equation is applied:

$$\text{Total Applied Surface Water} - \text{Total Crop Demand (Evapotranspiration or ET)} = \text{Total Net Applied Groundwater}$$

Assumptions:

1. Total Applied Surface Water is supplied and metered by the Irrigation District.
2. Total Crop Demand (Evapotranspiration or ET) is calculated by multiplying the crop type by a published ET value (which considers evaporation and crop demand). The crop type will be determined by using satellite aerial imagery each month along with determining the density of the crop grown.
3. Total Net Applied Groundwater is the difference between the surface water applied and the amount of water consumed by the crop.
  - a. If surface water applied is less than ET, the formula results in groundwater pumped by the landowner to meet crop demand not met by surface water or precipitation. This may not be the entire amount of groundwater pumped, any additional amount pumped is over application and returns to the underground.
    - i. The groundwater deficit calculated using this equation will be tracked and will decrease the landowner groundwater account managed by the GSA.

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- b. If surface water applied is more than ET, the landowner will receive a credit for over application of surface water according to the following schedule:

### Over Application of Surface Water for Irrigation Purposes

- During wet season (flood control), 75% of credit goes to the landowner's account, 25% to the GSA
- During dry season (irrigation season, pro-rate period), 50% of credit goes to the landowner's account, 50% to the GSA
  - i. The credit calculated using this equation will be tracked and will increase the landowner groundwater account managed by the GSA.
  - ii. For all groundwater credits issued to the landowners from over application of irrigation water, the credits will be available and carried over to subsequent years. The term of the credits will be perpetual. The groundwater credits can also be transferred, sold, or leased to other landowners based upon the GSA groundwater transfer criteria.

The satellite imagery used to determine crop types, along with the ET values, will be audited by the GSA through spot checking land use for cropping patterns and the values will be compared to District meters on wells throughout the District.