

ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT SUSTAINBLE GROUNDWATER MANAGEMENT ACT

AUGUST 23, 2018

CONCEPTUAL DRAFT MEMORANDUM FOR DISCUSSION PURPOSES ONLY

A MENU APPROACH TO THE DEVELOPMENT OF MANAGEMENT ACTIONS

I. Introduction and Purpose

In 2014, California enacted legislation known as the Sustainable Groundwater Management Act (SGMA), which provides a framework for sustainable management of groundwater supplies by local authorities like Rosedale-Rio Bravo Water Storage District (Rosedale or District). The act requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local groundwater basins and adopt locally-based Groundwater Sustainability Plans (GSP's). The act requires GSAs to implement plans and achieve long-term groundwater sustainability within 20 years.

As the undesirable results detailed in SGMA are largely the result and symptoms of overdraft, the foundation of a GSP is a balanced water budget. While Rosedale has demonstrated an ability to provide a balanced water supply since 1995, projected reductions in the reliability of the State Water Project (SWP), recent historical drought conditions and their impact on local water resources, and increased competition for scarce water resources, has prompted Rosedale to re-evaluate its ability provide a balanced water budget through the SGMA planning period (2020-2040).

Rosedale's primary objective in developing a GSP and balancing its water budget is to be a resource to its landowners and to provide maximum flexibility in meeting the requirements of SGMA. Rosedale staff feels this is best accomplished through the development of a "Menu" approach to water management. The Menu will identify water management options available to the landowner so the landowner may select that option which best suits their particular need and is the most cost effective. Ultimately Rosedale's intervention to meet the requirements of SGMA is structured as a backstop in the event the landowner is unable or unwilling to manage their consumptive use within the supplies available.

The purpose of this Conceptual Draft is to facilitate discussions at the Rosedale Board of Directors level. Nothing in this draft shall be binding on the current or future Boards of Directors, unless and until appropriate notice has been given and decisions have been made. It is the intent of Rosedale to facilitate discussion among the District Board and affected landowners, and that any future actions discussed in this draft be taken in an open, transparent manner.

II. The Rosedale Project

Formed in 1959, the Rosedale-Rio Bravo Water Storage District ("District" or "Rosedale") encompasses about 44,000 total acres of the San Joaquin Valley portion of Kern County, immediately to the west of the City of Bakersfield. Property within Rosedale includes lands developed to irrigated agricultural uses, predominantly in the western portion of the District, and lands developed to industrial and residential uses, predominantly along the eastern edge of Rosedale, and some lands which remain undeveloped. Of the acreage developed to irrigated agriculture, about one-half is currently planted to permanent crops --- predominately almonds.

A. Water Supplies-Safe Yield

There are many definitions of safe yield, legal and otherwise; however, for the purposes of this memorandum, it refers to any groundwater benefit available to landowners that does not relate to Rosedale's efforts to import surface water supplies that are recharged into the groundwater aquifer underlying the District, a simple example being rainfall. While it is anticipated that this benefit will be evaluated and established in the Groundwater Sustainability Plan to be adopted by Rosedale pursuant to SGMA, it will not be determined unilaterally; rather, it is subject to regional agreement among the overlying users of the Kern County Subbasin of the San Joaquin Valley Groundwater Basin. Until such time as this occurs, or the Board of Directors determines otherwise based upon available information, a non-precedent-setting unit value of 0.3 acre-feet per acre will be used in the calculations described herein. This is the value used by AECOM in the District's 2016 Operations Report.¹ By definition, this unit value is intended to reflect a long-term average; the actual safe yield in any given year is dependent upon hydrology, which is highly variable from year to year in the region.

B. Water Supplies - Project Water

Project Water is considered to be that which is recharged within or by the District for the benefit of its landowners, all of whom have access to the underlying groundwater reservoir for overlying use. The nature of the District's Project is such that recharge is highly variable from year to year, ranging from zero to about 275,000 acre-feet within the District (with more managed outside of the District²), and there can be several consecutive years with little to no recharge. Accordingly, it is appropriate to consider an average annual recharge amount. Therefore, in determining "Project Water" for the purpose of comparing water supplies to water uses, it is proposed to utilize the average annual net recharge attributable to the District's Project over the last 20-year period (1997-2016), where "net" refers to the gross volume of water diverted into the District less estimated losses to evaporation. For this purpose, the allowance for

¹ While the unit value of 0.3 acre-feet per acre has been used locally from time to time; the District expects it to change as SGMA is implemented in the basin.

² Based on the District's Operational Log for 2017, more than 275,000 acre-feet was physically brought into the District out of almost 400,000 acre-feet which the District controlled, with the remainder managed outside of the District.

evaporation will be 3 percent, which is consistent with the Kern Fan MOU. While the 20-year period extending from 1997 through 2016 will be used initially, a rolling 20-year average will be used going forward. Tables included in the District's 2016 Operations Report provide the basis for determining the average annual amount for 1997-2016, which is approximately 65,600 acre-feet per year. Based on Assessed Acres totaling around 39,468, this results in "Project Water" amounting to 1.66 acre-feet per acre per year, which amount will be used for purposes of calculating the Water Charge below.

C. Water Use

As used herein, Water Use is defined as the total annual consumptive use of water (also referred to as total evapotranspiration or "ET") and transfers under the District's water management programs. The total ET is intended to reflect the ET of applied water, as well as the ET of rainfall. In recent years, ET has been estimated by applying remote sensing techniques, and it is proposed that these techniques, or other functionally equivalent means, be used to estimate ET for the purposes described in this memorandum, as opposed to using a metering device at each well. Though not the only provider, one such provider of these data is the Irrigation Training and Research Center ("ITRC") located at Cal Poly San Luis Obispo. ITRC has been retained by the Kern Groundwater Authority³ to develop estimates of historical ET for several years. By applying GIS techniques to the ET images generated by ITRC, the estimated ET corresponding to a specific area can be extracted on an annual (or more frequent) basis. In this manner, Assessor's parcel boundaries will be applied to the ET images for the purpose of developing an estimate of the total annual ET for each parcel for a given year, in addition to the total annual ET for the District as a whole.⁴ The projected long-term average Water Use for the District under existing conditions has been estimated from data in the District's 2016 Operations Report at about 105,000 acre-feet annually.⁵ Going forward, this will be updated annually as the average of the last five years.

D. Water Supply Deficiency

The average annual water supply deficiency is the amount by which District-wide projected average annual Water Use exceeds total water supplies. The table below shows the average annual water supply deficiency which is implied by comparing Water Use under existing conditions (2012-2016) with the average annual total water supplies (sum of safe yield, Project Water, and rainfall) for the last 20 years (1997-2016). As shown, this amount is indicated to be on the order of 9,000 acre-feet annually.

E. Allocation of Project Water

³ Rosedale-Rio Bravo Water Storage District is a member of the Kern Groundwater Authority.

⁴ Annual ET for each parcel and the District will be determined for the calendar year (January 1 to December 31).

⁵ This estimate is based on existing conditions (represented by the average of the last five years; 2012-2016) and is based on data included in the District's 2016 Operations Report (AECOM 2017).

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The District collects revenues through an annual assessment collected through the property tax bill. The assessment is set on a per acre-basis and collected proportional to the acreage owned. Accordingly, the District allocates the benefits of the Project Water proportional to acreage. For example, if there are 100 acres within Rosedale and the average annual Project Water supply benefit is 100 acre-feet, each acre of ground within Rosedale would receive an allocation of 1 acre-foot per acre. This allocation extends to parcels that have had historic agricultural and/or urban demand as well as parcels which have been and remained fallow. The reasoning is that each parcel pays a proportional cost to the District in support of its water management efforts, including the purchase and maintenance of its SWP and Kern River contracts as well as its water management programs, and receives a proportional special benefit from the District's efforts.

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	Total Amount (af/yr)	Unit Amount (af/ac/yr)	Notes	Report Refs.
(+) Safe Yield	12,936		(a)	Sec. 3.1.1
(+) Rainfall	17,481		(b)	
(+) Project Water	65,616		(c)	Sec. 3.1.2
(=) Water Supply	96,033	2.43	(d)	
(-) Water Use	105,069		(e)	Sec. 3.1.3
(=) Water Supply Deficiency	9,036			Sec. 3.2.1

Notes:

- (a) Amount reported for 2016 in RRBWSD's 2016 Operations Report (AECOM November 2017) [Table 1: Col. 4c]
- (b) 1997-2016 average annual rainfall recorded at Meadows Field as reported in RRBWSD's 2016 Operations Report (AECOM November 2017) [Table 1: Col. 4a]
- (c) 1997-2016 average annual water supplies as reported in RRBWSD's 2016 Operations Report (AECOM November 2017) [(Table 1: "Total Supplies" - Cols. 4a and 4c) - (Table 2: Cols. 2b, 2c, and 2d)].
- (d) Unit amount based on 39,468 Assessed Acres.
- (e) 2012-2016 average annual water use as reported in RRBWSD's 2016 Operations Report (AECOM November 2017) [Table 2: Col. 1c + Col. 2a]

III. Management Actions – Menu Approach

The District desires to facilitate landowner based solutions to ensure that water resources are maximized and the impacts of any demand reductions necessary for SGMA implementation are negated. Accordingly, the proposed menu approach will enable landowners to choose from a list of options, which are being evaluated in the context of SGMA, to best manage their demand within the supplies available. Alternatively, if the list of options detailed herein are not of interest, or acceptable to the landowner(s) they may default to the District's Water Charge. The primary purpose of the water charge is to generate sufficient revenues that, ideally, can be used to develop additional water resources. Absent the development of additional water supplies, the revenues from the water charge may be used to aggregate the supply deficit of many landowners into a land retirement/management strategy, administered at the District level. This aggregation of demand management prevents diffuse and inefficient fallowing actions throughout the District and potentially provides opportunities to combine land retirement with supply augmentation through strategic acquisition of ground which may be utilized by the District for groundwater recharge.

A. Landowner Initiated

For each of the assumptions below it is assumed that Rosedale has allocated 2.0 acre-feet per acre (AF/Acre) of "Project Water". It is also assumed that each landowner has .3 AF/Acre of "Safe Yield". At this time it is not clear whether a landowner will be able (or allowed) to transfer Safe Yield from one property to another.

- i) Landowners may aggregate their parcels within the District for management of the Project Water allocated to each. For example, if a landowner owns 100 acres of permanent crops and 100 acres of fallow ground, the landowner may utilize the Project Water allocated to the fallowed ground in support of the permanent crops.
- ii) Landowners may lease ground or water from others within the District to receive the benefit of the net Project Water allocated to that land. Net project water is water which is available to the land after adjustment for any consumptive use measured on the land. For example, if the land is planted with a row crop and utilizes 1.0 AF/Acre, the "net" available to lease is 1.0 AF/Acre. In the alternative, a landowner could lease the ground of another landowner who agrees to fallow the ground and allocate all of the Project Water associated with the lessor's land to the lessee.
- iii) Landowners may acquire, either directly, or through the District, additional water supplies which may be banked on their behalf. These banking arrangements, to date, have been non precedential but provide an additional vehicle for landowner driven actions to ensure their ability to fully utilize their land and maximize its value.
- iv) The Landowner may voluntarily fallow their ground to stay within the district allocation of 2.3 AF/Acre (Safe Yield + Project Water). For example, if the landowner has 100 acres of irrigated agriculture but can only support 80 acres based

upon the total supply available, they may voluntarily reduce the irrigated acreage to 80 acres and fallow the remaining 20 acres.

B. The Water Charge

Rosedale may implement a "Water Charge" based on the volume of water used over and above the amount that the District's Project historically generates plus safe-yield on a per-acre basis within the District boundaries. This is driven by the goal of preventing overdraft in the District and to manage the underlying groundwater aquifer in a sustainable manner for the benefit of the District's landowners.

The Water Charge discussed herein is intended to fund the District's efforts to ensure a sustainable water supply available to all District landowners in the future. The Project, as currently existing, provides all lands within the District with a pro-rata share of groundwater benefit, based on acreage. However, certain landowners within the District need or elect to utilize an amount of water in excess of that provided by the Project in any given year. In order to meet such demands, thereby minimizing overdraft conditions and sustaining the groundwater aquifer, the District must either augment water supplies and/or manage demands. The Water Charge is proposed to fund the costs of augmenting water supplies and/or managing demands. To date, the District has focused on supply augmentation; however, demand management is a water resource management strategy which should be employed going forward in view of the significant dependence on imported water and the reduced reliability of these water supplies; the recent period of extended and severe drought and the uncertain role of "climate change" with regard to future water supply availability and reliability; and the increased competition for "available" water supplies in the wake of passage of the Sustainable Groundwater Management Act.

C. The Water Charge Unit Calculation

Since the cost of a new water supply, assuming it could be found, is highly variable and speculative, it is proposed to initially base the Water Charge on a demand-management strategy. Under this approach, and assuming that long-term average water supply is less than long-term average water use, it is intended that the Water Charge generate revenue to buy land(s) within the District for the purpose of retiring it from water-using purposes (and potentially for use as recharge facilities).⁶ Over time, it is intended that enough land be purchased and retired in this manner such that long-term water supply and water use are in relative balance. The unit Water Charge is a function of the water use which will be avoided for each acre retired; land cost; and the demand-management planning horizon. In particular, the land cost per acre is divided by the avoided water use per acre, which yields a cost per acre-foot of avoided water use. The initial unit Water Charge is equal to this amount divided by the planning horizon in years. While this strategy is the basis for the Water Charge, the District will place a high priority on and endeavor

⁶ If water supplies become available, the District may also use Water Charge revenues to acquire additional water supplies in lieu of implementing the demand management strategy described in this memorandum.

to develop additional water supply programs to minimize the amount of land retirement which may be required.

i) Avoided Water Use

For each acre retired, a certain amount of water use will be avoided and, for purposes of this memorandum, this amount is the evapotranspiration of applied water ("ETAW"). While this amount depends on the crop and other factors, an average amount will be used for the purposes of this memorandum. The total crop ET divided by the total irrigated acreage on a District-wide basis provides an average crop ET per acre. This amount is then reduced by the ET of rainfall to get the ET of applied water. The District has estimated this average unit amount to be about 2.6 acre-feet per acre.⁷

ii) Land Cost

Stating the obvious, agricultural land costs fluctuate with changes in market conditions. With that said, after consultation with a licensed real estate appraiser familiar with the District, it is proposed that the cost be initially set at \$25,000 per acre, which is reflective of anticipated average prices in the District for agricultural lands in the near term.

iii) Demand Management Planning Horizon

For the purpose of setting the Water Charge under a demand-management strategy, it is assumed that it will take 20 years to generate the revenue necessary to retire enough land to bring water supplies and water use into balance.⁸

iv) Initial Water Charge

Recall that the unit Water Charge is calculated as the land cost per acre (\$25,000) divided by the avoided water use per acre (2.6 af/ac) divided by the planning horizon in years (20 yrs). Accordingly, the maximum initial unit Water Charge is calculated as \$480 per acre-foot.⁹

D. Calculation of Water Charge

The District will calculate Water Use on a parcel-by-parcel basis for the year prior to the year in which landowner-by-landowner Water Charges are to be set and sum these parcel-by-parcel amounts for each landowner, along with the Assessed Acres for each landowner. If the annual Water Use for a given landowner is equal to or less than the available Water Supply

7 [Crop ET (86,035 af based on 2012-2016) divided by irrigated acres (28,491)] minus ET of rainfall (0.41 feet).

8 SGMA empowers the District to achieve sustainability within 20 years.

9 \$25,000/acre divided by 2.6 acre-feet/acre divided by 20 years.

(calculated as the unit Water Supply [from Table 3] multiplied by the landowner's total Assessed Acres), then there is no Water Charge. If the Water Use is more than the available Water Supply, then the Water Charge will be imposed on the amount of water used in excess of the landowner's pro rata portion of the Water Supply.

The following is an example of the implementation of the Water Charge and is based on a hypothetical landowner with several parcels which collectively total 500 acres, and for which the previous year's annual total Water Use was estimated to be 1,300 acre-feet.

- Determine the amount of the Water Supply available to the landowner in this example.

$$= 2.43 \text{ af per acre} \times 500 \text{ acs} = \mathbf{1,215 \text{ af}}$$

- Determine amount of Water Use (for prior year) which is in excess of Water Supply (if any).

$$= 1,300 \text{ af} - 1,215 \text{ af} = \mathbf{85 \text{ af}}$$

- Determine the total Water Charge.

$$= \$480 \text{ per af} \times 85 \text{ af} = \mathbf{\$40,800}$$

The Water Charge would only be imposed upon lands that are used for irrigated agricultural purposes. Based on available recent data, water use for urban lands or lands zoned commercial/industrial will generally be less than the average annual water supply described above. Accordingly, it is unlikely that these lands would trigger the Water Charge. Further, the large number of such parcels (currently in excess of 7,000) and the small size of most of these parcels would make the required effort of determining, monitoring and reporting use on a parcel-by-parcel basis cost prohibitive.

