Medina County Groundwater Conservation District Groundwater Management Plan

Adopted March 30, 2022

Board of Directors:
Scott Saathoff, President Pct. At Large
John Persyn, Vice President Pct. 2
Robert J. Rothe, Secretary/Treasurer Pct. 3
Curtis Boehme, Pct. 1
Michael Mello, Director Pct. 4

General Manager:
David Caldwell

District Office Location:
1607 Ave. K
Hondo, TX 78861

Phone: (830) 741-3162
Fax: (830) 741-3540
E-mail: gmmcgcd@att.net
Web: https://medinagwcd.org

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Groundwater Conservation District
Management Plan

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Medina County Groundwater Conservation District Background

District Mission

The Medina County Groundwater Conservation District (GCD) strives to achieve conservation, preservation, and the efficient, beneficial, and wise use of water for the benefit of the citizens and economy of Medina County.

About the District

The District boundaries are coterminous with those of Medina County. The Medina County Commissioners Court originally created the District on July 17, 1989, following the petition process. Confirmation and election of permanent directors was held on November 11, 1989. The District was then validated by Act of the Legislature under Section 59, Article 16, of the Texas Constitution. The District was validated by the 72nd Legislature in 1991, Senate Bill 1058.

The District Board of Directors is composed of five members elected to staggered four-year terms. Elections for Directors are held in November. A Director is elected from each of the county precincts and one Director is elected from the County at-large. The Board of Directors holds regular monthly meetings at the District offices located at 1607 Ave. K, Hondo, Texas. Meetings of the Board of Directors are public meetings noticed and held in accordance with public meeting requirements.

Since the creation of the Edwards Aquifer Authority, the District's jurisdiction is limited to those aquifers other than the Edwards Aquifer found in Medina County. The District revised its programs and rules to reflect these changes. The Edwards Aquifer continues to be the major source of water for the citizens of Medina County and therefore information, education, and coordination between the District and the Edwards Aquifer Authority remains a priority to the District Board of Directors.

With pumping limitations now in effect for the Edwards Aquifer, the other aquifers within Medina County are becoming a supplemental supply. The District anticipates demand increasing in these aquifers. Additional interest in aquifer storage and recovery projects also exists, as does the potential of transport of these groundwater resources outside the District boundaries.

The District is located in three Groundwater Management Areas (GMAs): 9, 10 and 13. Chapter 36 of the Texas Water Code requires the Medina County GCD to coordinate its management of groundwater with other GCDs in its GMAs. Medina County GCD is unique in that it is in three management areas requiring coordination with many other GCDs. Should the relevant GMA boundaries change, the District will adjust its coordination in accordance with that change.

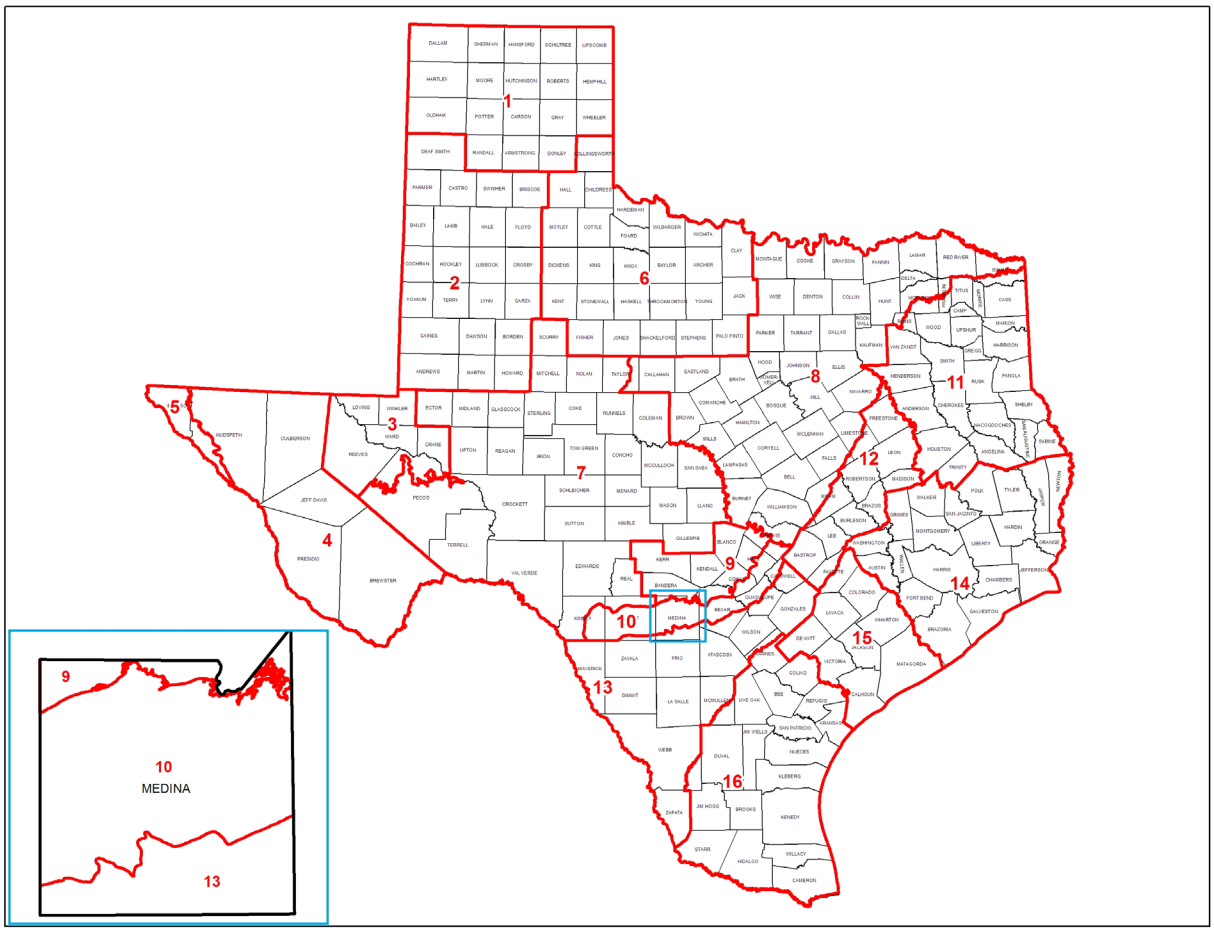


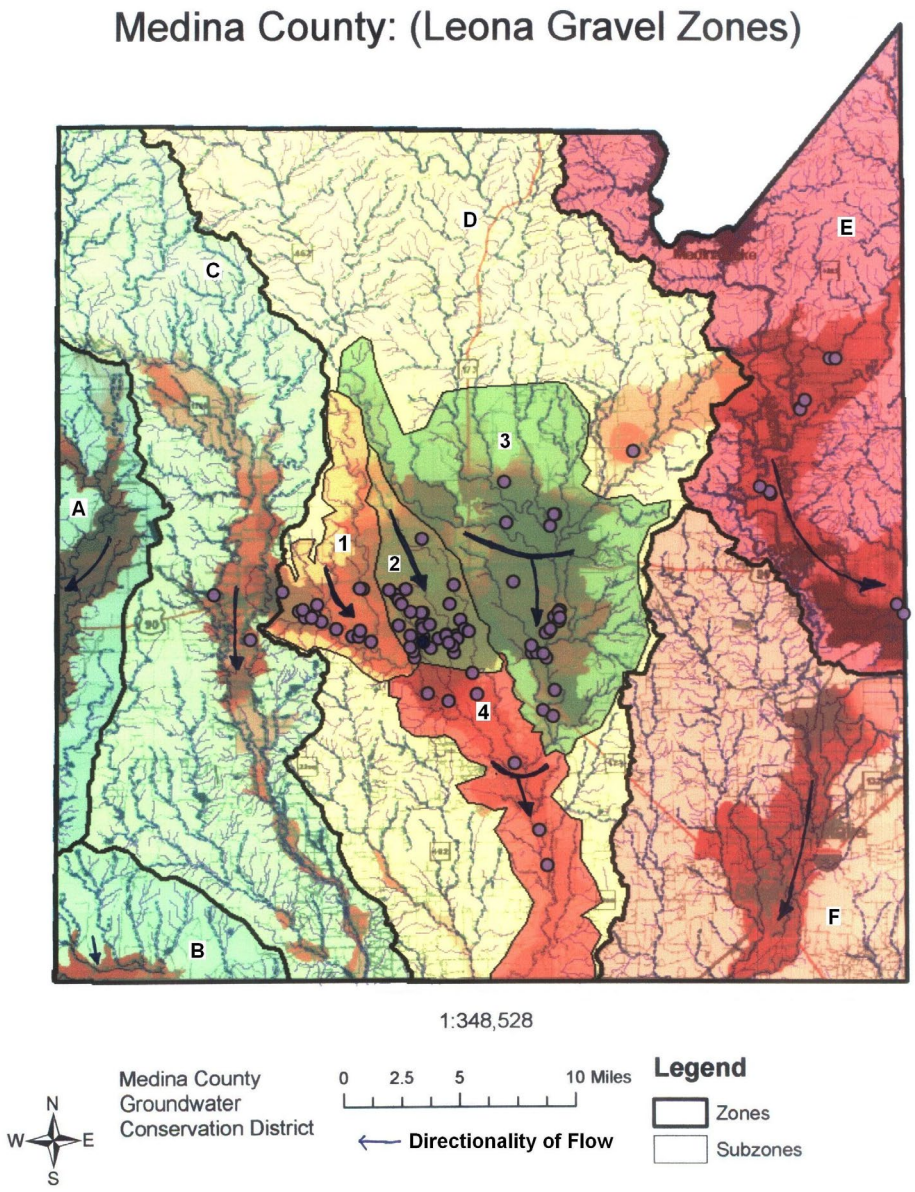
Figure 1. Groundwater Management Areas in Texas the location of the Medina County Groundwater Conservation District

The District will coordinate with the surrounding GCDs and surface water management entities within Medina County by providing written notification via email or U.S. Postal Services when the Medina County GCD considers for revision and adoption by the Board of Directors the groundwater management plan, rules, and other policy related matters that impact the operation and management of the groundwater within Medina County. The other GCDs in the three GMAs, surface water management entities, and other interested parties are encouraged and invited to provide information and written or oral comments on issues of concern to them to the Medina County GCD Board of Directors. The District's standard practices will be used for posting public notice as established by the Board of Directors and in accordance with the Texas Open Meeting Acts and related requirements for GCDs in Texas.

Groundwater Resources of the District

The aquifers within the jurisdiction of the District include the Carrizo-Wilcox, Trinity (including the Glen Rose), Leona Gravel, and Anacacho. Additional information on these aquifers is available from TWDB's Aquifers of Texas (Report 380, 2011). However, specific information on pumping, availability, and recharge are limited to the Carrizo-Wilcox and Trinity Aquifers. This plan, therefore, focuses on those aquifers.

Leona Gravel Aquifer



The dots on the depiction above are Leona Gravel wells utilized for irrigation. The dark lines are ridgelines which separate the direction of runoff from rainfall (labeled zones A-F). The three areas encompassed by lighter lines are pools of Leona Gravel (labeled sub-zones 1-3) that seem to be separate from one another, but which join up in the fourth area south of them (labeled subzone 4). Interestingly, sub-zones 1 and 2 seem to have a very limited area where runoff recharges them.

The Leona Gravel Aquifer had been treated as one aquifer when it was in the desired future conditions process, but this treatment did not match up with the physical characteristics. As such, the Leona Gravel Aquifer in the District is managed locally. The Leona Gravel Aquifer did have a MAG, but given the physical separation between zones, and given actual pumping versus drawdown/recharge information and observations, the overall assumptions about the aquifer when developing the MAG seem insufficient as

part of a management strategy. As such, the District needs to continue to study the aquifer and collect data in order to develop an understanding by which to generate a more sound management strategy.

Management Plan Purpose and Actions, Procedures, Performance, and Avoidance for Plan Implementation and Management of Groundwater Resources

Time Period for the Plan

This plan becomes effective upon adoption by the Medina Groundwater Conservation District Board of Directors, and approval by the Texas Water Development Board (TWDB).. The plan will be effective for five years.

Guiding Principles

The District recognizes that the groundwater resources of this region are of vital importance to the residents and that these resources must be managed effectively. A basic understanding of the aquifers and their hydrogeologic properties, as well as a quantification of resources is the foundation from which to build prudent planning measures. This management plan is intended as a tool to focus the programs and plans of the District.

Implementation

In consideration of developing or implementing District rules, the District will take into account the need to afford each owner of groundwater in a common, subsurface reservoir, a fair share. The District may deny a well construction permit or limit groundwater withdrawals in accordance with the guidelines stated in the rules of the District. In making a determination to deny a permit or limit groundwater withdrawals, the District will consider the public benefit against individual hardship after considering all appropriate testimony.

The District will use the management plan to guide the District in its efforts to preserve and protect the groundwater resources of Medina County and for determining the direction and priority of district activities. Operations of the District, agreements entered into by the District, and planning efforts in which the District may participate, will be consistent with the provisions of this plan.

Medina County GCD will implement the provisions of this management plan through the application of rules consistent with the management plan, using it as a guide to its principles and policies. Rules adopted by the District shall comply with Chapter 36 of the Texas Water Code and the provisions of this management plan. Such Rules may include the limiting of the pumping of groundwater to a quantifiable amount over a timeframe. Promulgation and enforcement of the rules will be based on the best technical evidence available to the District. The District may amend the rules as necessary to ensure the best management practices of the groundwater in the District and/or to comply with changes to Chapter 36 of the Texas Water Code. A copy of the District rules are available at the following website address: http://www.medinagwcd.org/information.htm.

The District will seek cooperation from municipalities, water supply companies, irrigators, and all other users of groundwater pumped in Medina County in the implementation of this plan and the management of groundwater supplies within the District. Medina County GCD also will seek to cooperate and coordinate with state and regional water planning authorities and agencies and adjacent groundwater conservation districts. Medina County GCD is committed to work and plan cooperatively with other

GCDs in GMAs the GCD is a part of, currently GMA 9, GMA 10, and GMA 13. While managing the supply of groundwater within the district, Medina County GCD will account for the desired future conditions and modeled available groundwater derived from the planning process of GMAs the GCD are part of.

Taking into account the Estimated Historical Water Use And 2017 State Water Plan Datasets, much of the management strategy comes from a reduction in need of irrigation groundwater by a net decrease of 10,840 acre feet, from 2020 through 2070, combined with almost half of the strategy being based on Edwards transfers of around 920 to 2,170, from 2020 through 2070, respectively.

The District may amend the District rules as necessary to comply with changes to Chapter 36 of the Texas Water Code and to ensure the best management practices of the groundwater in the District. The implementation of the rules of the District will be based on the best available scientific and technical data, and on fair and reasonable evaluation.

Methodology to Track District Progress in Achieving Management Goals
The General Manager of the District will prepare and present an annual report to the Board of Directors evaluating the impact of the District's activities on its goals, management objectives, and performance standards. The annual report will be presented 180 days following the completion of the District's fiscal year.

Technical Information Required by Texas Administrative Code

Estimated Modeled Available Groundwater in the District Based on the Desired Future Conditions established under Section 36.108;

MAG Numbers

(in acre feet, per year)	MAG GMA 9	MAG GMA 10	MAG GMA 13	MAG Sum
Trinity	2,500	6,661		9,161
Carrizo-Wilcox			2,657	2, 657
Totals	2,500	6,661	2,657	11,818

Please refer to Appendix A- GTA Aquifer Assessment 10-07 MAG, Appendix B- Aquifer Assessment 10-41 MAG, Appendix C- GAM Run 16-023 MAG, Appendix D- GAM Run 16-033 MAG, and Appendix E- GAM Run 17-027 MAG

Current MAG for Trinity and Carrizo-Wilcox aquifers, combined with last published MAG numbers (by the Texas Water Development Board) for the Leona Gravel aquifer in Medina County before removing the DFC for that aquifer:

(in acre feet, per year)	MAG GMA 9	MAG GMA 10	MAG GMA 13	MAG Sum
Trinity	2,500	6,661		9,161
Leona Gravel		16,382	5,635	22,017
Carrizo-Wilcox			2,657	2, 657
Totals	2,500	23,043	8,292	33,835

Please refer to Appendix A- GTA Aquifer Assessment 10-07 MAG, Appendix B- Aquifer Assessment 10-41 MAG, Appendix C- GAM Run 16-023 MAG, Appendix D- GAM Run 16-033 MAG, and Appendix E- GAM Run 17-027 MAG

Amount of Groundwater Being Used Within the District on an Annual Basis
Please refer to Appendix G

Annual Amount of Recharge from Precipitation to the Groundwater Resources within the District
Please refer to Appendix F

Annual Volume of Water that Discharges from the Aquifer to Springs and Surface Water Bodies
Please refer to Appendix F

Annual Volume of Flow into and out of the District within Each Aquifer and Between Aquifers in the District
Please refer to Appendix F

Projected Surface Water Supply in the District
Please refer to Appendix G

The Projected Total Demand for Water in the District
Please refer to Appendix G

Water Supply Needs
Water supply needs exist for the cities of Castroville, Devine, Hondo, Lacoste, Lytle, Natalia, San Antonio, and Yancey, and for the group Medina irrigation livestock. For all the cities, except Devine, the reliance is on the Edwards Aquifer. Devine supplements its water supply from the Carrizo-Wilcox Aquifer. Medina irrigation livestock meets its' needs from the Trinity Aquifer (in the north), Edwards Aquifer (central and south) and the Carrizo- Wilcox Aquifer (south).

The Trinity shares consumption use with mining use, though this mining use is low activity, in consideration of the pumping, versus the MAG in the district.

In those areas where Leona Gravel Aquifer is present, it is higher in nitrates than is recommended for human consumption. It is also heavily pumped by irrigators, providing little likelihood of it supplementing human consumption needs of cities, especially in times of drought.

The Carrizo-Wilcox Aquifer is up dip outcrop, meaning if water levels fall they will fall here. There have been reports that water availability has begun to reduce. Given likely growth projections, and the DFC, the long term availability of the aquifer for reliance by growth in the district, is unlikely. Given that water needs in the area, for instance Region L of 200,000 acre feet in 2020, to 483,000 in 2070 (State Water Plan 2017, Ch. 7 P. 79, Table 7.2), additional methods of acquiring additional water will need to be pursued. For more information, please refer to Appendix G.

Water Management Strategies
As the State Water Plan indicates, the dollar cost associated with water management strategies, for Region L is:

(utilized from the State Water Plan 2017, Ch. 8 P. 99, Table 8.5, dollars per acre-foot),

Water management strategy type	L	Texas

Other direct reuse	$356	$423
Texas Aquifer storage & recovery	$442	$450
New major reservoir	$596	$470
Other surface water	$606	$380
Seawater desalination	$611	$1,431
Municipal conservation	$652	$373
Groundwater wells & other	$667	$493
Groundwater desalination	$698	$713
Direct potable reuse	$743	$1,134

In consideration of the long term, and in terms of financial feasibility/cost, it is notable the cost of desalination of seawater is less cost prohibitive than desalination of groundwater, and has a 38% greater cost than ASR.

Of note also, is the "Estimated Historical Water Use And 2017 State Water Plan Datasets."

In further consideration, the Leona Gravel aquifer with Medina County GCD consists of five distinct bodies, most readily identifiable by separating elevational cartography, forcing surface water from rainfall into sets of valleys. Two of these bodies, in the West, have little water available. Two central bodies are heavily utilized by agriculture. The northeastern body is heavily utilized by agriculture. And the Southeastern body has insufficient amounts of water available for use. The areas' three bodies with any substantial groundwater, are the two central, and the one northeast. The agricultural use of these three bodies leaves insufficient groundwater from the Leona Gravel aquifer for additional use. Which means the development of that aquifer, as presented in the State Water Plan of 2017, including 225 acre feet, is unlikely to occur.

Further in consideration, the Edwards aquifer is beyond the jurisdiction of the GCD. All of the municipal groundwater within Medina County comes from the Edwards aquifer, with the exception of the city of Devine. Until recently, Devine has supplemented its' primarily Edwards Aquifer municipal water from the Carrizo-Wilcox aquifer. With the exclusion of that supplemental for Devine, municipal water conservation falls under the jurisdiction of the Edwards Aquifer Authority.

In further consideration, the primary telling numbers of water supply needs are those of irrigation, which will continue, and the surplus of groundwater available in mining. Given that mining in Medina County is expected to increase, with a real world increase in pumping of the Trinity aquifer, the mining numbers of a -need or +surplus of 0 for 2030, and of +50 in 2040, are of a math involving aquifers beyond the GCD jurisdiction, and are as such, in terms of actual pumping, not useful or relevant for the GCD, in terms of a Management Plan or management strategy of the GCD.

The useful aspect, in consideration, is the recognition of the savings increasing from meeting 10% of the needs in 2030 (-30,527 AF and +2,142 AF), to 20% of the needs in 2070 (-23,445 AF and +4,918 AF). In other words, if there is a surplus related to mining, and there is an increase in pumping for mining, the numbers utilized are not strictly limited to the Trinity aquifer numbers. Pumping + increased pumping = greater surplus, requires a factoring in of availability from an additional and different supply.

For additional Information, please refer to Appendices G and H.

Management Goals

(1) Providing the Most Efficient Use of Groundwater

a. Objective: Develop and maintain a Water Well Permitting Program for tracking all permits authorizing water well operation and groundwater production.
b. Performance Standard: Each year, after receiving all relevant annual use surveys administered by the District, the District will include a summary about groundwater production volume from operating permits approved by Medina County GCD and present it in the annual report?

(2) Controlling and Preventing Waste of Groundwater

a. Objective: Develop and maintain a Conservation Education Program
b. Performance Standard: Each year the District will include a summary within the annual report explaining the educational activities the District engaged in which portend to control and prevent waste of groundwater.

(3) **Controlling and Preventing Subsidence**

a. This goal is not applicable to the Medina County Groundwater Conservation District. Based on *Final Report: Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping – TWDB Contract Number 1648302062, by LRE Water: https://www.twdb.texas.gov/groundwater/models/research/subsidence/subsidence.asp* , the 3d Quartile Substance Risk Value (SRV) for most of the Carrizo Wilcox is at 3 or less, with only the unconsolidated clastic being 4, with no higher values. The Trinity having no values over 3. Such as described on pages 1-2, 1-3, 4-12, and 4-78. The district will investigate any observations or reports of subsidence that may occur in the future. Please refer to Appendix I.

(4) Conjunctive Surface Water Management Issues

a. Objective: Participate in the regional water planning process by attending at least one South Central Texas Regional Water Planning Group (Region L) meeting per year
b. Performance Standard: Report annually to the Board the attendees, dates and the number of meetings attended.

(5) Natural Resource Issues

a. Objective: Develop and maintain a Well Monitoring Program, consisting primarily of measuring static water levels of particular wells.
b. Performance Standard: Each year, the District will provide a summary within the annual report about the most recently completed monitoring activities, including the number of wells measured.

(6) Drought Conditions

a. Objective: Drought can impact the availability of groundwater, and so must be considered in both long and short term availability strategies.
b. Performance Standard: At least once a quarter, the District will download the updated National Oceanic and Atmospheric Administration (NOAA) U.S. Seasonal Drought Outlook map and check for periodic updates.

(7) Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control

a. Objective (Conservation): At least once annually, the District will submit at least one article regarding water conservation for publication to at least one newspaper of general circulation in Medina County.

b. Performance Standard (Conservation): A copy of the article submitted will be included in the Annual Report given to the Board of Directors
c. Objective (Recharge Enhancement): The district will investigate methods for enhancing recharge.
d. Performance Standard (Recharge Enhancement): At least once annually, the Board will be presented with an informational report on potential recharge enhancement opportunities.
e. Objective (Rainwater Harvesting): At least once annually, the Board will be presented with an informational report on rainwater harvesting.
f. Performance Standard (Rainwater Harvesting): At least once annually, the District will include a summary within the annual report, on all efforts made in promoting rainwater harvesting including providing educational links to the district website and any other educational avenues.
g. The goal of Precipitation Enhancement is not applicable to Medina County GCD. The district does not have precipitation enhancement equipment, and procurement would be cost prohibitive.
h. Objective (Brush Control): At least once annually, the District will evaluate the Texas Water Supply Enhancement Program (formerly the Texas Brush Control Program), to determine whether projects within the District will increase the groundwater resources of the District.
i. Performance Standard (Brush Control): Upon review of a newly revised Texas Water Supply Enhancement Program the District's Annual Report will include a copy of the most recent brush control information pertaining to the District.

(8) Addressing the Desired Future Conditions

a. Objective: At least once annually, the Board will be presented with an informational report on conformance with the DFC's adopted by the District.
b. Performance Standard: Each year, the District will include a summary in the annual report pertaining to the groundwater monitoring activities and compare the measured groundwater levels to the adopted DFC levels. The District will also record the estimated annual production from each aquifer and compare these amounts to the MAG.

Definitions from Texas Administrative Code, Chapter 356

- Conjunctive use - The combined use of groundwater and surface water sources that optimizes the beneficial characteristics of each source, such as water banking, aquifer storage and recovery, enhanced recharge, and joint management.
- Most efficient use of groundwater - Practices, techniques, and technologies that a district determines will provide the least consumption of groundwater for each type of use balanced with the benefits of using groundwater.
- Natural resources issues - Issues related to environmental and other concerns that may be affected by a district's groundwater management plan and rules, such as impacts on endangered species, soils, oil and gas production, mining, air and water quality degradation, agriculture, and plant and animal life.
- Recharge enhancement - Increased recharge accomplished by the modification of the land surface, streams, or lakes to increase seepage or infiltration rates or by the direct injection of water into the subsurface through wells.
- Surface water management entities - Political subdivisions as defined by Texas Water Code Chapter 15 and identified from Texas Commission on Environmental Quality records that are granted authority under Texas Water Code Chapter 11 to store, take,

divert, or supply surface water either directly or by contract for use within the boundaries of a district.

List of Appendices

Appendix A - GTA Aquifer Assessment 10-07 MAG Leona Gravel Aquifer in Medina County Modeled Available Groundwater estimates, GMA 10

Appendix B - Aquifer Assessment 10-41 MAG: Aquifer Assessment for the Leona Gravel, GMA 13

Appendix C - GAM Run 16-023 MAG: Modeled Available Groundwater For The Aquifers In Groundwater Management Area 9

Appendix D - GAM Run 16-033 MAG: Modeled Available Groundwater For The Aquifers In Groundwater Management Area 10

Appendix E - GAM Run 17-027 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, And Yegua-Jackson Aquifers in Groundwater Management Area 13

Appendix F - GAM Run 20-003: Medina County Groundwater Conservation District Management Plan

Appendix G - Estimated Historical Water Use And 2017 State Water Plan Datasets: Medina County Groundwater Conservation District

Appendix H - Water Management Strategies from the 2017 State water Plan, Chapter 8

Appendix I - Final Report: Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping – TWDB Contract Number 1648302062

Appendix J - Additional Documentation