Draft Post Oak Savannah Groundwater Conservation District Groundwater Well Assistance Program (GWAP) Procedure Manual

Post Oak Savannah Groundwater Conservation District
310 East Avenue C
Milano, TX 76556
512.455.9900

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ACROYNMS AND ABBREVIATIONS

DFC	desired future condition
GAM	groundwater availability models

GCD	groundwater conservation district
GMA	Groundwater Management Area
GWAP	Groundwater Well Assistance Program
POSGCD	Post Oak Savannah Groundwater Conservation District
TWC	Texas Water Code
WAWOF	Well Assistance Work Order Form

Purpose of this manual

The purpose of this manual is to provide specifics on implementation of the GWAP.

Well Assessment, Objectives, and Evaluation Process

Primary objectives of the GWAP are to help restore a water supply to a well owner whose well production capacity is significantly impaired as a result of declines in aquifer pressure heads, and/or water level declines in unconfined areas, caused by aquifer-wide pumping in GMA 12, as well as to identify wells up to 10 years in advance which may be at risk of these impacts, and provide assistance in preventing the loss of water supply.

A secondary objective of the GWAP is to improve the POSGCD monitoring program and the POSGCD's understanding of groundwater aquifer systems in POSGCD by increasing the number of monitoring wells in the monitoring well network and by performing localized hydrogeological studies at these monitoring locations. All costs associated with this process shall be the responsibility of the District except in cases where specifically outlined in this manual. The following sections detail the steps in the well assessment and evaluation process. A simplified illustration of an idealized workflow and timeline is provided in Figure 1.

1. Tier 1 Well Assessment

POSGCD will perform a Tier 1 Well Assessment within 30 days of receiving a request from a well owner to participate in the GWAP. The District may contract with an independent third party for work on Tier 1 assessments. In emergency situations, the District, or its contractor, will respond to a request within 48 hours. In emergency situations, such as a weekend or holiday, verbal instruction by the General Manager shall be considered sufficient to begin any Tier 1 investigation effort. At the time of the request, the well owner will be asked to provide either a valid and complete Well Driller's Log, or the information in the Well Assistance Request Form, including well construction specifications and a measured water level at the well, if available. In the absence of such documentation, POSGCD staff will provide assistance in locating this information. A copy of the Well Assistance Request Form is provided in Appendix A. The well owner can provide this information by mail, by email, by completing the form on the POSGCD website, by visiting the POSGCD office, or by POSGCD staff responding to a request from the well owner to come to the well site. Upon receipt of this information, POSGCD will coordinate with the well owner to arrange timely access to the well for a water level measurement. This initial well assessment will include collecting information on the current age and condition of the well, the well construction, water level, pump condition, water quality, and a walking survey of wells within a ½-mile radius. If no well construction records are available, then POSGCD, with the well owner's permission, may perform a down-hole camera survey to determine the depth and condition of the screen and well casing.

Using the measurements and information obtained during this well assessment, POSGCD will record the results using the Tier 1 Well Assessment Form, which is provided in Appendix B. POSGCD will provide the well owner with the completed Tier 1 Well Assessment Form within 10 business days of acquiring the necessary well information.

In situations where considerable resources are required to measure the water level in the well or to obtain the well construction specifications, POSGCD may forego data collection and use information from nearby wells.

Based on the Tier 1 findings, POSGCD will determine whether the well is a candidate for a Tier 2 Well Assessment. If POSGCD decides not to pursue a Tier 2 Well Assessment, POSGCD will continue to re-evaluate the well as a candidate for a Tier 2 Well Assessment after each future measurement of water level in the well. Because the well will be a part of the POSGCD monitoring network, the water level in the well should be measured at least once every year.

If there is evidence that seasonal pumping is relevant to the Tier 1 Well Assessment, POSGCD will consider the option of collecting seasonal water level measurements in the well to support future Tier 1 Well Assessments.

2. Tier 2 Well Assessment

If the Tier 1 Well Assessment identifies a well as a candidate for assistance, a Tier 2 Well Assessment will be completed by District staff within 30 days. The purpose of the Tier 2 Assessment is to evaluate the impairment of production capacity at the applicant's well which can be attributed to pumping in GMA 12. A copy of the Tier 2 Well Assessment Form is provided in Appendix C. The District may contract with an independent third party for work on Tier 2 assessments. In emergency situations, the District, or its contractor, will respond to a request within 48 hours. In emergency situations, such as a weekend or holiday, verbal instruction by the General Manager shall be considered sufficient to begin any Tier 2 effort.

A Tier 2 Well Assessment includes assembling and evaluating information from submitted drillers reports, the POSGCD well database, and if applicable, a GAM run. The submitted driller reports will provide measured water levels, lithology profiles, and well yields for wells within at least a 1-mile radial distance of the applicant's wells. The POSGCD well database will provide reported pumping rates, permitted pumping rates, and changes in measured water levels at the monitoring wells. The GAM run will provide aquifer properties, simulated water levels, and pumping rates near the applicant's well.

In the event a GAM run is required as part of a Tier 2 assessment, that GAM run will be performed by a Professional Geoscientist registered in the State of Texas. The Professional Geoscientist will prepare and seal a report that documents the data collection and analysis.

The extent of the field portion of the Tier 2 Well Assessment will depend on aquifer conditions and the accessibility to the well. A comprehensive Tier 2 Well Assessment may include a camera survey of the well (if this was not conducted during Tier 1 assessment), additional water level data, and hydraulic testing. The camera survey will be used to confirm the well screen location and to help identify factors that could lead to impaired well production such as obstacles in the well casing, collapsed or corroded well screens, and biofouling of the well screen. Hydraulic testing will be used to help determine hydraulic connection between the well and the aquifer and the transmissivity of aquifer deposits screened by the applicant's well. In cases of a downhole camera survey or an aquifer pump test, POSGCD may work with the well owner to temporarily remove the pump for a few hours in order to conduct these activities.

The nature and extent of a Tier 2 Well Assessment will be tailored and dependent on the well construction, the local aquifer conditions, and the historical pumping in the vicinity of the well.

The Tier 2 Well Assessment report will focus on determining the maximum pumping rate and sustainable pumping rate at the well and the factors that may have contributed to a reduction of these rates over time. Some factors that could reduce well production capacity include silting in of the well, biofouling of the well screen, poor pump performance, incrustation and clogging of the well screen, corrosion of the pump or well screen, entrainment of sand, and reduction in the static water level. The report will evaluate whether or not the reduction in static water level due to pumping in GMA 12 is a primary cause for the reductions in maximum pumping rate and sustainable pumping rate reported by the well owner.

POSGCD will send a copy of the Tier 2 Well Assessment report to the well owner and will offer to meet with the well owner to discuss the report findings. During the discussion of the report, POSGCD will accept additional information and written comments on the report. After meeting with the land owner, POSGCD will determine whether or not the production capacity of the well has been

significantly impaired as a result of declines in aquifer pressure heads caused by pumping in GMA 12. If so, the District may recommend initiating a Tier 3 Well Assessment.

3. Tier 3 Well Assessment

The purpose of the Tier 3 Well Assessment is to determine the corrective action plan which will be implemented by the District, as well as the amount of expenditures for implementing this plan. As part of the Tier 3 Well Assessment, POSGCD may augment the Tier 2 Well Assessment with additional data, and/or additional analysis. In some cases, groundwater modeling may be performed to help answer questions associated with interpreting the field data. POSGCD will complete the Tier 3 Well Assessment and execute a contract with appropriate contractors within 90 days. The District may contract with an independent third party for work on Tier 3 assessments. In emergency situations, the District, or its contractor, will respond to a request within 48 hours. In emergency situations, such as a weekend or holiday, verbal instruction by the General Manager shall be considered sufficient to begin any Tier 3 effort.

If the Tier 2 Well Assessment Report determines that the primary cause for the impaired well productivity is likely low water levels caused by aquifer-wide pumping in GMA 12, the General Manager will proceed with appropriate corrective actions in a timely manner, and prepare a report detailing the corrective action taken, along with a budget and schedule, and report these to the POSGCD Board of Directors at the next regular meeting.

Recommended corrective actions may include, but are not limited to, lowering the pump in a well, installing a solar pump in a well that was previously flowing, replacing a well with a stock tank, drilling a new well, or replacing the well with a connection to local water supply corporation. Strategies for well owners where a pump cannot be lowered due to the shallow depth of the well may include properly plugging and abandoning the well and drilling a new replacement well to a deeper depth in the aquifer or in another suitable aquifer. In instances where lowering the pump is chosen as the corrective action, the pump will be lowered to a level which will exceed any water level declines predicted in a GAM run simulation for 40 years into the future. In some situations, the possibility of connecting a home to public water supply will be considered. If the General Manager identifies more than one appropriate strategy with comparable costs, the choice between the available options will be made by the well owner. For this comparison, a comparable cost would be a cost that is limited to 20% above the least expensive appropriate strategy. If the well owner requests a more expensive strategy to be implemented, the difference in cost of the two options shall be the responsibility of the well owner.

If the Tier 2 Well Assessment Report determines that there is insufficient evidence to determine whether or not the primary cause for the impaired well productivity is low water levels caused by aquifer-wide pumping in GMA 12, the General Manager has the authority to conduct additional investigation to determine if the well owner is eligible for monetary assistance from the POSGCD's other grant programs. As an example, if the assessment determines that the well is damaged, the well owner may qualify for assistance from POSGCD in plugging the well.

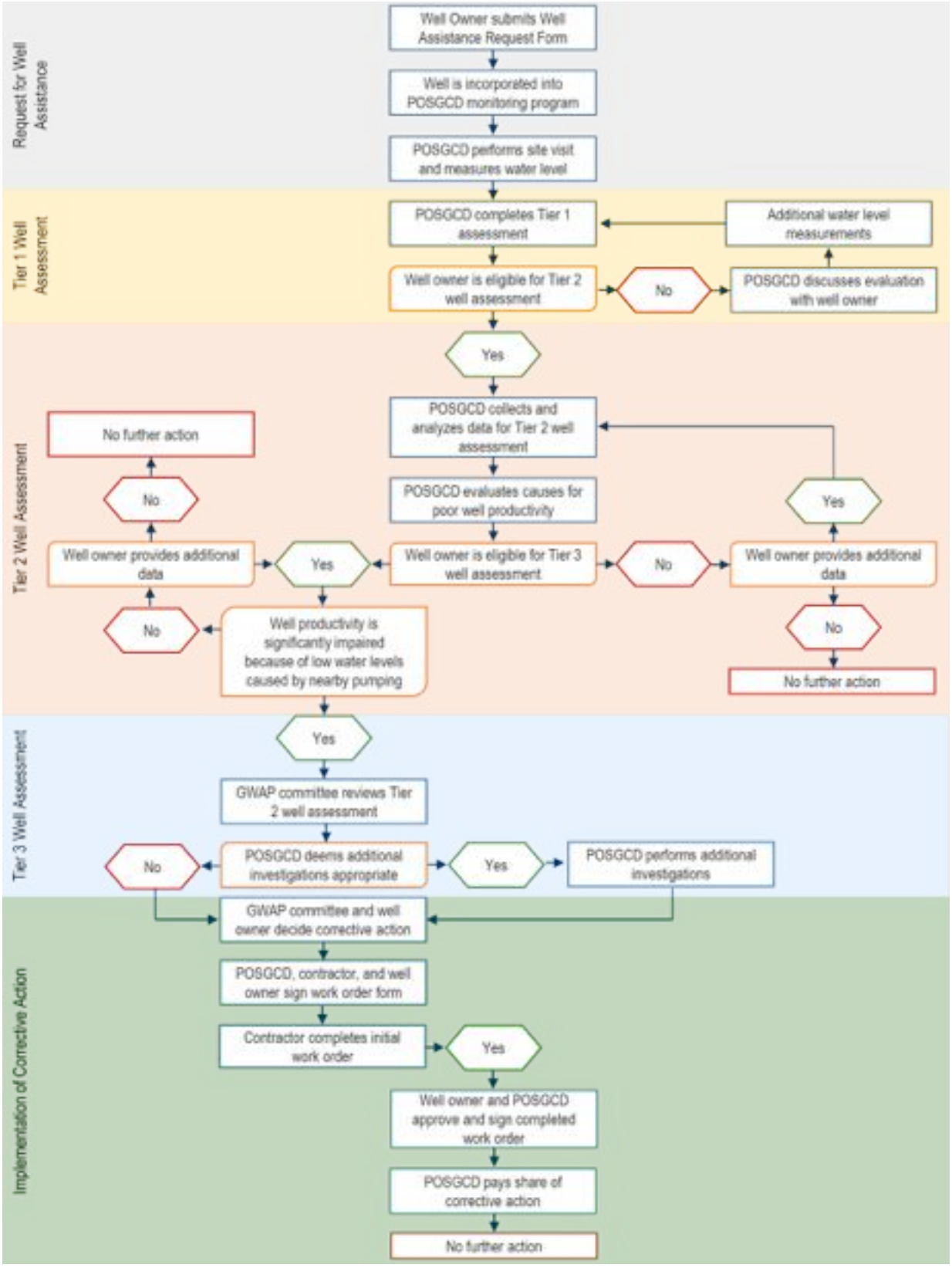

Figure 1. Process of assessment and funding for the Groundwater Well Assistance Fund.

2. Implementation

2.1. Well Assistance Agreement

Prior to beginning any well assistance work, the well owner must sign the Well Assistance Work Order Form accepting the corrective strategy selected and approved by the District. After the owner signs the Well Assistance Work Order Form, POSGCD will sign to commit funding to implement the corrective action. These funds will be released to the contractor after the work has been completed. Appendix E provides a copy of the Well Assistance Work Order Form.

2.2. Contractor Scheduling

A well owner may select from the list of pre-qualified contractors to conduct well assistance work. Contractors may be water well drillers, pump installers, or other appropriate professionals. If the selected contractor is unable to accept the work at the time of selection due to other obligations, the well owner may either select another pre-qualified contractor who agrees to the rates identified in the Unit Cost Schedule. In emergency situations contractors must be able to respond within 48 hours of contact from the District. In emergency situations, such as weekends or holidays, verbal communication from the General Manager will be sufficient to cause a contactor to begin assigned work.

2.3. Well Corrective Work

The District shall issue the selected contractor a completed Well Assistance Work Order Form (WAWOF) that describes the work to be performed and the pre-determined costs to complete the work. If, during the course of the approved work, unforeseen conditions occur that require changes in the negotiated scope of work, the contractor must first get an amendment to the WAWOF approved by the General Manager before conducting the changed scope of work. All work must be completed to the satisfaction of POSGCD in order for the contractor to receive payment.

2.4. Timeline for Starting Scheduled Work

Prior to the selection of a contractor, a timeline for performing the work will be negotiated and become a part of the contract.

2.5. Standard Practices

All contractors contracted for work with the District shall be properly licensed and use standard practices acceptable to the Texas Department of Licensing and Regulation for Water Well Drillers and Water Well Pump Installers.

2.6. Completion of Well Assistance Work

The selected contractor shall use reasonable due diligence in accordance with standard practices for water well drillers and pump installers for completing the approved work in a timely matter. Upon completion of the work, the contractor and well owner shall sign off on the WAWOF. The completed and signed WAWOF shall be submitted to the District for final approval of the work and payment.

3. Groundwater Well Assistance Fund Contracts

The District will solicit bids from and contract with several qualified water well drilling and pump installation companies (herein referred to as contractors), duly licensed in the State of Texas, to provide services under the Groundwater Well Assistance Fund Agreements. Contracting with more than one contractor will ensure that a water well driller will be available in emergency situations.

3.1. Contractor Qualifications

Contractors engaged in work for the District shall:

1. Be a company engaged in the business of providing water well drilling and pump services for a minimum of five years within the last seven years. Recent start-up businesses do not meet the requirements of this contract. A start-up business is defined as a new company that has no previous operational history or expertise in the relevant business and is not affiliated with a company that has that history or expertise.
2. Be a licensed Water Well Driller in the State of Texas with a current license issued by the Executive Director pursuant to the Texas Occupations Code, Chapter 1901 and maintain the license throughout the term of the contract.
3. Be a licensed Water Well Pump Installer in the State of Texas with a current license issued by the Executive Director pursuant to the Texas Occupations Code, Chapter 1902 and maintain the license throughout the term of the contract.
4. Be located within a 70-mile radius of the District boundaries.
5. Be in good financial standing, not in bankruptcy, current in payment of all taxes and fees as required by law.

Have sufficient personnel and equipment to handle all Groundwater Well Assistance Fund service requests from the District.

3.2. Insurance

Before being qualified to perform any work for the District, a contractor must provide and maintain a certificate of insurance, at contractor's expense, covering all the activities to be performed by contractor's company or contractor's subcontractors, as described below.

1. Statutory workers' compensation insurance valid in the State of Texas is required.
2. Comprehensive General Liability Insurance, covering liability, including but not limited to Public Liability, Personal Injury, and Property Damage, with coverage of at least $1,000,000 per occurrence.
3. All insurance shall be placed with insurance companies licensed to do business in the State of Texas, and/or acceptable to the District.
4. The Comprehensive General Liability Insurance policy must include POSGCD as an additional insured during the duration of the contract with POSGCD. Any coverage afforded the District, the Certificate Holder, as an Additional Insured shall apply as primary and not excess to any insurance issued in the name of the District.
5. Comprehensive Automobile Liability Insurance covering the use of all vehicles used by the contractor, whether owned, hired or non-owned. This insurance shall be in at least the

following amounts: bodily injury: $500,000 per person; $1,000,000 per occurrence; and property damage: $500,000 per occurrence.

Contractor shall give the District unqualified prior written notice of cancellation or diminution of said insurance coverage ten (10) days prior to the effective date of any such cancellation or diminution.

3.3. Contract Terms

The Groundwater Well Assistance Fund contracts shall be valid for a one-year period with an option to extend by both parties. A copy of the District Groundwater Well Assistance Fund Services Contract is included in Appendix F.

3.4. Unit Costs

The District will reimburse contractors for work performed under the Groundwater Well Assistance Fund based on the attached Unit Cost Schedules. These schedules shall be reviewed by the District every year and provided to qualified contractors when changes are made. Copies of the initial Unit Cost Schedules are included in Appendix G.

3.5. Payment Terms

Contractors will be reimbursed for work performed under a Well Assistance Work Order Form at the rates identified in the Unit Cost Schedule. Except in unforeseeable or emergency circumstances, no contractor costs will be reimbursed without an approved Well Assistance Work Order Form. The Well Assistance Work Order Form must be agreed to by the District and Contractor prior to beginning any work (signatures on Well Assistance Work Order Form required) and the work performed must be approved by the District (signature on WAWOF required) before any payments to the contractor will be made. Contractor payments must be approved by the District Board of Directors prior to payment. WAWOF payments will be mailed out on the following work day after approval at the monthly board meeting or the contractor can pick up the check at the District office.

3.6. Damages

The contractor is responsible for any damages to property that occurs during the course of conducting well assistance activities on behalf of the District.

4. Groundwater Well Assistance Fund Management

The District has an investment policy which is in compliance with various provisions of Texas law relating to the investment and security of funds of districts. Sections 36.155 and 36.156 of the TWC and Chapters 2256 and 2257 of the Government Code are applicable to the investment of the District's funds, including the investment funds associated with the GWAP. The investment policy addresses the methods, procedures, and practices that must be used to ensure effective and judicious fiscal management of the District's funds. The District purchases various insurance policies, including the bonding of all directors and employees of the District.

5. Recordkeeping and Reporting

The District shall maintain records and supporting documentation for all Groundwater Well Assistance Fund work in accordance with the District Bylaws. By January 31st of each year following the creation and initial funding of the Groundwater Well Assistance Fund, the District shall make available to all participating permittees an accounting of Groundwater Well Assistance Fund revenues and expenses, information regarding the water well drillers qualified to perform work on behalf of the District, and a report summarizing the well assistance claims that were inspected, evaluated or completed.

APPENDIX A:
WELL ASSISTANCE REQUEST FORM

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Post Oak Savannah Groundwater Conservation District
Well Assistance Request Form

Date: _____

Name of Well Owner: _____

Address of Well Owner: _____

_____

Phone Number: _____

Well Location:_____

_____

_____

Driller Log Available (y/n): _____

Date Drilled: _____

Well Depth: _____

Well Screen Information: _____

Aquifer: _____

If assessments by the District in Tier 1 indicate the possibility that water level changes due to GMA 12 wide pumping have resulted in this request, the District will use a groundwater availability model to further evaluate current and future water level changes. If these model assessments indicate the water level in a well has, or will in the next 10 years, drop below the pump during normal operation by the well owner, the well will qualify for Tier 2 assessment.

APPENDIX B:
TIER 1 WELL ASSESSMENT FORM

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Post Oak Savannah Groundwater Conservation District
Well Assistance Tier 1 Well Assessment Form

WARF Number: _____

Date: _____

Name of Well Owner: _____

GENERAL WELL INFORMATION

Elevation at Land Surface: _____ ft

Total Depth: _____ ft

Aquifer: _____

Condition of Well: _____

Water Level: _____ ft below top of casing Date: _____

Measuring Point: _____ ft above land surface

CASING AND SCREEN INFORMATION

Casing Type: _____

Casing Diameter: _____in from: _____ft to: _____ft

_____in from: _____ft to: _____ft

Screen Diameter: _____in from: _____ft to: _____ft

_____in from: _____ft to: _____ft

Perforations: _____in from: _____ft to: _____ft

_____in from: _____ft to: _____ft

Camera Survey (Y/N): _____ Date: _____

PUMP INFORMATION

Well Flowing (Y/N):

Depth to Pump: _____ ft

Existing Pump Size: _____ hp

Pumping Rate: _____ gpm

Existing Pressure Tank Size: _____

Distance to nearest electrical service from well _____ ft

WATER QUALITY INFORMATION

Sand Content: _____ pH: _____

Water Clarity/Color: _____ Odor: _____

Conductivity: _____ uS Temperature: _____ ^{o}C

Water Sample (Y/N): _____ Date Taken: _____

Date Submitted to Lab: _____

OTHER

Any Obstructions Around/Above Well:_____

_____

Description of Wellhead:_____

_____

General Observations:_____

_____

_____

APPENDIX C:
TIER 2 WELL ASSISTANCE REQUEST FORM

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Post Oak Savannah Groundwater Conservation District
Tier 2 Well Assistance Request Form

Date: _____

Name of Well Owner: _____

Address of Well Owner: _____

_____

Location of Well: _____

_____

By this signature I am requesting Post Oak Savannah Groundwater Conservation District conduct a Tier 2 Well Assessment.

Signature of Well Owner:_____Date:_____

APPENDIX D:
WELL ASSISTANCE WORK ORDER FORM

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Post Oak Savannah Groundwater Conservation District
WELL ASSISTANCE WORK ORDER FORM

WAWOF Number: _____

Date: _____

Name of Well Owner: _____

Address of Well Owner: _____

_____

Phone Number: _____

Well Location:_____

_____

_____

Well Assistance Work: _____

_____

_____

_____

_____

_____

_____

Contractor Signature:_____ Date: _____

District Signature:_____ Date: _____

Well Owner Signature:_____ Date: _____

By this signature I am granting the District and/or its contractor access to the property on which the water well is located to conduct the agreed upon well mitigation activities.

WELL ASSISTANCE WORK AMENDMENT

Date:

Amended Well Assistance Work: _____

_____

_____

_____

_____

_____

_____

_____

Contractor Signature:_____ Date: _____

District Signature:_____ Date: _____

WELL ASSISTANCE WORK COMPLETION

Materials Used:

Wiring:	_____	ft	Piping:	_____	ft
Blank Casing:	_____	ft	Well Screen:	_____	ft
Sand:	_____	sacks	Bentonite:	_____	sacks
Cement:	_____	sacks			
Pump Type:	_____	HP			
Mobilization/ Demobilization	_____	miles roundtrip			
Other:	_____				

Date Work Completed: _____

Contractor Signature:_____

Well Owner Signature:_____ Date: _____

By this signature I acknowledge that the above described work was completed and I approve of the work.

District Approval Signature:_____ Date: _____

APPENDIX F:
GROUNDWATER WELL ASSISTANCE FUND SERVICES CONTRACT
(contract with drillers – TBD)

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APPENDIX G:
UNIT COST SCHEDULE

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Small Capacity/Shallow Wells (4” – 6” Diameter Wells to 800 feet)

Section 1.0 Well Data Collection

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Well Data Collection (including determining well use, pump setting, well construction details, well condition and	each	
b)	Diagnostic Evaluation (pumping test, water quality)	each	
c)	Equipment and Labor to Remove/Reinstall Existing Pump	each	
d)	Downhole Camera Survey (up to 800 ft)	per foot	
e)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
f)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 2.0 Pump Removal/Installation Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment and Labor to Remove Existing Pump	each	
b)	Equipment, Labor and Materials to Install Electrical Pump to 100 ft (includes 1 HP pump w/ check valve, 1 HP control box, 1 1/4 column pipe (Sch 80 PVC), #10 electrical wire, well seal)	each	
c)	Equipment, Labor and Materials to Install Electrical Pump to 200 ft (includes 1 1/2 HP pump w/ check valve, 1 1/2 HP control box, 1 1/4 column pipe (Sch 80 PVC), #10 electrical wire, well seal)	each	
d)	Price per foot over 200 ft (includes pipe and wire)	per foot	
e)	Dole flow valve (15 gpm)	each	
f)	Pressure relief valve	each	
g)	Pressure control switch	each	
h)	PVC Electrical Conduit, Wiring, and Misc Fittings	per foot	
i)	Electrical Junction Box	each	
j)	Pre-Pressurized Tank (80 gal capacity, includes cement pads)	each	
k)	Portable Well Enclosure Panels (4)	total	
l)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
m)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 3.0 Solar Pump Installation

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment and Labor to Install Solar Pump and all associated equipment to 200 ft	each	
b)	Solar Pump System (11 gpm and 2 solar panels)	each	
c)	Add Additional Solar Panel	each	
d)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
e)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 4.0 Water Well Drilling Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment, Materials and Labor to Install 4" Dia well to 800 ft	per foot	
b)	Equipment, Materials and Labor to Install 5" Dia well to 800 ft	per foot	
c)	Equipment, Materials and Labor to Install 6" Dia well to 800 ft	per foot	
d)	Borehole seal with pelletized bentonite	per foot	
e)	Construct Concrete Well Pad	each	
f)	Equipment and Labor to Develop Wells	each	
g)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
h)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 5.0 Plugging and Abandonment Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment, Materials and Labor to Abandon 4" Dia well to 800 ft	per foot	
b)	Equipment, Materials and Labor to Abandon 5" Dia well to 800 ft	per foot	
c)	Equipment, Materials and Labor to Abandon 6" Dia well to 800 ft	per foot	
d)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
e)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 6.0 Miscellaneous

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Miscellaneous tasks (e.g. welding, electrical work)	per hour	

Large Capacity/Deep Wells (6” – 14” Diameter Wells > 800 feet)

Section 1.0 Well Data Collection

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Well Data Collection (including determining well use, pump setting, well construction details, well condition and	each	
b)	Diagnostic Evaluation (pumping test, water quality)	each	
c)	Equipment and Labor to Remove/Reinstall Existing Pump	each	
d)	Downhole Camera Survey (up to 3000 ft)	per foot	
e)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
f)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 2.0 Pump Removal/Installation Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment and Labor to Remove Existing Submersible Pump	FT	
b)	Equipment and Labor to Remove Existing Lineshaft Pump	FT	
c)	Equipment and Labor to Install Submersible Pump for Irrigation Well	FT	
d)	Equipment and Labor to Install Lineshaft Pump for Irrigation Well	FT	
e)	Pump and Associated Materials to Bid Out for Irrigation Wells	--	
f)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
g)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 3.0 Solar Pump Installation (N/A for deep wells??)

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment and Labor to Install Solar Pump and all associated equipment to 200 ft	each	
b)	Solar Pump System (11 gpm and 2 solar panels)	each	
c)	Add Additional Solar Panel	each	
d)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
e)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 4.0 Water Well Drilling Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment, Materials and Labor to Install 6" Dia well to 3000 ft (375 wall steel casing)	per foot	
b)	Equipment, Materials and Labor to Install 10" Dia well to 3000 ft (375 wall steel casing)	per foot	
c)	Equipment, Materials and Labor to Install 12" Dia well to 3000 ft (375 wall steel casing)	per foot	
d)	Equipment, Materials and Labor to Install 14" Dia well to 3000 ft (375 wall steel casing)	per foot	
e)	Construct Concrete Well Pad	each	
f)	Equipment and Labor to Develop Wells	each	
g)	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
h)	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 5.0 Plugging and Abandonment Services

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Equipment, Materials and Labor to Abandon 6" Dia well to 3000 ft	per foot	
b)	Equipment, Materials and Labor to Abandon 10" Dia well to 3000 ft	per foot	
c)	Equipment, Materials and Labor to Abandon 12" Dia well to 3000 ft	per foot	
d)	Equipment, Materials and Labor to Abandon 14" Dia well to 3000 ft	per foot	
e)	Equipment, Materials and Labor to Abandon 16" Dia well to 3000 ft	per foot	
	Equipment, Materials and Labor to Abandon 18" Dia well to 3000 ft	per foot	
	Equipment, Materials and Labor to Abandon 20" Dia well to 3000 ft	per foot	
	Mobilization/Demobilization ≤ 50 Miles Roundtrip	lump sum	
	Mobilization/Demobilization > 50 Miles Roundtrip	per mile	

Section 6.0 Miscellaneous

	ITEM DESCRIPTION	UNITS	UNIT COST ($)
a)	Miscellaneous tasks (e.g. welding, electrical work)	per hour	