AGENDA FOR THE KERRVILLE CITY COUNCIL WORKSHOP

TUESDAY, AUGUST 13, 2019, 4:00 P.M.

KERRVILLE CITY HALL, COUNCIL CHAMBERS

701 MAIN STREET, KERRVILLE, TEXAS

KERRVILLE CITY COUNCIL AGENDA
WORKSHOP, AUGUST 13, 2019, 4:00 PM
CITY HALL COUNCIL CHAMBERS
701 MAIN STREET, KERRVILLE, TEXAS

1. CALL TO ORDER

2. INFORMATION AND DISCUSSION

2.A. Presentation of the Fiscal Year 2020 Proposed Budget

3. RECESS

4. RECONVENE

Workshop will reconvene in the Upstairs Conference Room.

5. PRESENTATION

5.A. Kerr Basin Paleozoic Groundwater Definition Project: Headwaters Conservation District Exploration Activity

Attachment:

20190813_Report_Kerr Basin Paleozoic Groundwater Definition Project.pdf

6. ADJOURNMENT

TO BE CONSIDERED BY THE CITY COUNCIL
CITY OF KERRVILLE, TEXAS

SUBJECT: Presentation of the Fiscal Year 2020 Proposed Budget

AGENDA DATE OF: August 13, 2019 **DATE SUBMITTED:** Jul 29, 2019

SUBMITTED BY: Mark McDaniel

EXHIBITS:

Expenditure Required:	Remaining Budget Balance in Account:	Amount Budgeted:	Account Number:
Various	N/A	N/A	Various

PAYMENT TO BE MADE TO: N/A

Kerrville 2050 Item?	No
Key Priority Area	N/A
Guiding Principle	N/A
Action Item	N/A

SUMMARY STATEMENT:

As required by City Charter, the annual proposed budget for Fiscal Year 2020 (FY20) that was officially filed on July 31, 2019, will be presented.

RECOMMENDED ACTION:

None at this time. Actions will follow in regular session.

TO BE CONSIDERED BY THE CITY COUNCIL
CITY OF KERRVILLE, TEXAS

SUBJECT: Kerr Basin Paleozoic Groundwater Definition Project: Headwaters Conservation District Exploration Activity

AGENDA DATE OF: August 13, 2019 **DATE SUBMITTED:** Aug 06, 2019

SUBMITTED BY: Stuart Barron

EXHIBITS: 20190813_Report_Kerr Basin Paleozoic Groundwater Definition Project.pdf

Expenditure Required:	Remaining Budget Balance in Account:	Amount Budgeted:	Account Number:
N/A	N/A	N/A	N/A

PAYMENT TO BE MADE TO: N/A

Kerrville 2050 Item?	Yes
Key Priority Area	W - Water / Waste-Water / Drainage
Guiding Principle	W2. In the development of the long-range water plan, anticipate growth, consider all sources and plan for future droughts
Action Item	W2.1 - Evaluate the possible installation of more aquifer storage and recovery (ASR) wells and try to capture river water that is being lost downstream

SUMMARY STATEMENT:

RECOMMENDED ACTION:

No action.

KERR BASIN PALEOZOIC GROUNDWATER DEFINITION PROJECT

PRIMARY TARGETS ARE THE ELLENBURGER GROUP OF ORDOVICIAN AGE AND THE WILBERNS AND RILEY FORMATIONS OF CAMBRIAN AGE

DEFINE AREAS FOR PRODUCIBLE FRESHWATER

MAINTAIN RECOVERABLE FRESHWATER VOLUME PROBABILITY CURVES FOR TARGET RESERVOIRS

DEFINE WATER STORAGE POTENTIAL

SECONDARY TARGET IS BRACKISH WATER FOR FUTURE DESALINATION PROJECTS FROM THE CANYON AND BEND GROUP OF PENNSYLVANIA AGE, PLUS MORGAN CREEK UNIT OF CAMBRIAN AGE

JULY 29, 2019

HEADWATERS GROUNDWATER
CONSERVATION DISTRICT
125 Lehmann Drive, Ste 202 • Kerrville, Texas 78028

July 29, 2019

Kerr Basin Paleozoic Groundwater Project

Kerr Basin Paleozoic Groundwater Exploration Team
Digger Grey
Robbie Hurt
Bobbie Joines
Ed Warren
Bryant Williams
Geologist- Technical Advisor- William Feathergail Wilson PG 21
Gillespie County interpretation after Paul Tybor

Project Goal:
Define areas for producible freshwater, water storage, and brackish water for future desalination projects in the Paleozoic section of the Kerr Basin. Primary targets are the Ellenburger Group of Ordovician age, the Wilberns and Riley Formations of Cambrian age, and the Canyon and Bend Group of Pennsylvanian age.

Data Base:
- Kerr Basin Residual Gravity Map
- Approximately 97 miles of Petroleum Industry Seismic Coverage
- 280 Oil and Gas Tests
- 95 water wells that reached the Paleozoic
- Llano Uplift Aquifers Report by Daniel B. Stephens and Associates
- Previous Workers:
  Dan Brennan, Feathergail Wilson, Gillespie County interpretation after Paul Tybor.

General Process:
Secure all available well logs and test data on all Oil and Gas tests and water wells that reached Paleozoic formations in the basin.

Review available Geophysical data and acquire where possible.

Review reports of previous workers and integrate concepts (D. Brennen, F. Wilson, Paul Tybor, and Daniel B. Stephens & Assoc).

Porosity Calculations and summation of porosity greater than 8% on all available well logs.

Construct and maintain structural and stratigraphic cross-section grid with well data to formulate structural fabric interpretation.

Construct Base of Cretaceous Structure map (sub crop Pennsylvanian and Ellenburger) integrating the cross-section grid, available seismic data to test structural fabric interpretation. (12-16) (update with new data).

Interval isopach the Upper Paleozoic section to confirm basin configuration and to highlight Potential Target Areas for Project Goals.

Structure map first Ellenburger 1"= 8,000' (500 million year unconformity) .

Construct 1"= 2000' data package (maps, cross-sections, and recoverable volumes of freshwater) for the City of Kerrville with six recommended drill sites.

Structure map on Riley formation 1"= 8,000' to assist in middle Cambrian brackish water volumes.

Data Map for Porosity thickness greater than 8% in primary reservoirs based on B. Joines formation Evaluation. (Pending).

Construct recoverable fresh water volume probability curves for east Kerr County drainage area. (Update and expand as needed).

Construct recoverable fresh water volume probability curves for west Kerr County drainage area.

Recommend well test program to confirm project team interpretation. HGCD MW #17 was drilled and tested as the first successful fresh water well from the Ordovician and Cambrian sections in Kerr County.

Evaluate structural interpretation for MW# 18 which established down dip limits for Cambro/Ordovician fresh water reservoirs.

Expose recoverable fresh water potential to those parties that could initiate the control of Paleozoic ground water rights for the City of Kerrville in the prospective areas. (**Very High Priority).**

Volumetric probability interpretation for Upper Paleozoic and Middle Cambrian brackish water reservoirs using well data and regional interval isopaches.

Recommend areas for fresh water production, storage, and desalination projects in the Kerr Basin. (Ellenburger Group of Ordovician age, Moore Hollow Group of Cambrian age, and Canyon and Bend groups of Pennsylvanian age.

Plan program, maintain interpretations, draft conclusions of the "Project" and recommendations for future efforts.

7-29-19

Stratigraphic Column

Era	Period	Group	Formation/Unit		Description
Mesozoic	Cretaceous	Fredericksburg	Edwards		Karstified limestone
		Trinity	Hensell		Silt to pebble-sized sediments derived from Paleozoic rocks
	Pennsylvanian	Canyon	Undivided		Limestone, sandstone, shale alternating
		Bend	Smithwick		Sandstone, claystone, siltstone
			Marble Falls Limestone		Limestone with spiculite, oolites
	Ordovician	Ellenburger	Honeycut		Alternating limestone and dolostone; highly karstified
			Gorman		
			Tanyard		
Paleozoic	Cambrian	Moore Hollow	Wilberns	San Saba	Dolomite, limestone; moderately glauconitic
				Point Peak	Siltstone with stromatolic bioherms
				Morgan Creek	Limestone; glauconitic; trilobites common
				Welge Sandstone	Non-glauconitic sandstone grades up to Morgan Creek
			Riley	Lion Mountain	Quartzose green sand; highly glauconitic
				Cap Mountain	Limestone; sparingly glauconitic
				Hickory Sandstone	Red sandstone, eolian and fluvial. Contains Precambrian sediments.
Proterozoic	Precambrian				Pink coarse-grained and aplite granite; Quartzofeldspathic gneisses

Present Production

Not Present

Objective Section

Strong Geophysical log correlation surface

Geophysical log correlation surface

Aquifer

Geologic Unit (Simplified Geology, Geological Atlas of Texas (GAT), Figure 1)

- Primarily Cretaceous Carbonates
- Cretaceous Paluxy Formation
- Cretaceous Hensell Sand
- Cretaceous Cow Creek Limestone
- Cretaceous Sycamore Formation
- Pennsylvanian Smithwick Shale
- Pennsylvanian Marble Falls Fm.
- Mississippian - Devonian - not present everywhere
- Ordovician Ellenburger Group
- Cambrian San Saba Member
- Cambrian Point Peak Member
- Cambrian Morgan Creek Member
- Cambrian Cap Mountain Member
- Cambrian Hickory Member
- Combined Precambrian

Source: Modified after Preston and others, 1996
Modified from Hoh and Hunt, 2004

LLANO UPLIFT AQUIFERS

Study Area Stratigraphy

Daniel B. Stephens & Associates, Inc.

10-31-07

Figure 2

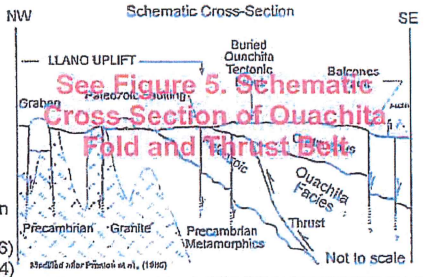
TECTONIC TIME CHART

Millions of Years Ago	TIME SCALE		TECTONIC CYCLES	SELECTED TECTONIC EVENT
0	CENOZOIC	T	(Balcones)	To the east: Subsidence & Progradation
100	MESOZOIC — Cretaceous	K	GULFIAN	Magmatism, uplift
	Jurassic	J		Gulf subsidence
200	Triassic	R		Tethys Ocean rifting
	Permian	P		To the west: Permian Basin subsidence
300	PALEOZOIC — Pennsylvanian	IP	OUACHITAN	
	Mississippian	M		
400	Devonian	D		Nearly complete erosion of Siluro-Devonian in uplift area
	Silurian	S		Minor deformation; Ellenburger erosional surface
500	Ordovician	O		
	Cambrian	C		Morgan Creek unconformity Cap Mountain unconformity
600	PROTEROZOIC — Late		(quiescent)	peneplanation; intrusion cores weathered out
700				
800				
900				
1000				

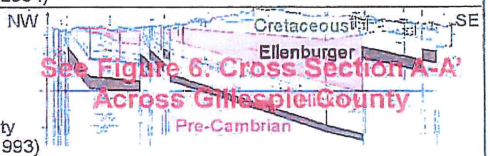
Series	Formation/Group/Erosion West	Formation/Group/Erosion East	Deformation
Missiourian	Canyon	Canyon	Westward Tilting
Des Moines	Strawn, Erosion	Strawn	
Atoka	Smithwick, Erosion Upper Marble Falls, Erosion	Smithwick	Faulting
	Erosion	Erosion	
Morrow	Lower Marble Falls Barnett?	Upper Marble Falls Lower Marble Falls	

Foreland deformation
Thrust faulting

Marble Falls to Austin
(Preston and others, 1996)
(from Hoh and Hunt, 2004)

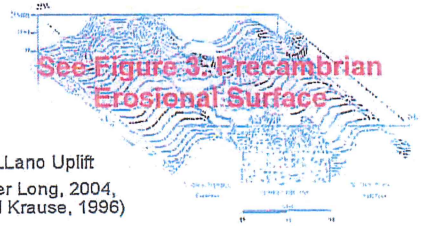


See Figure 5. Schematic Cross-Section of Ouachita Fold and Thrust Belt



See Figure 6. Cross Section A-A' Across Gillespie County

Gillespie County
(A-A' after Tybor, 1993)



See Figure 3. Precambrian Erosional Surface

LLano Uplift
(after Long, 2004, and Krause, 1996)

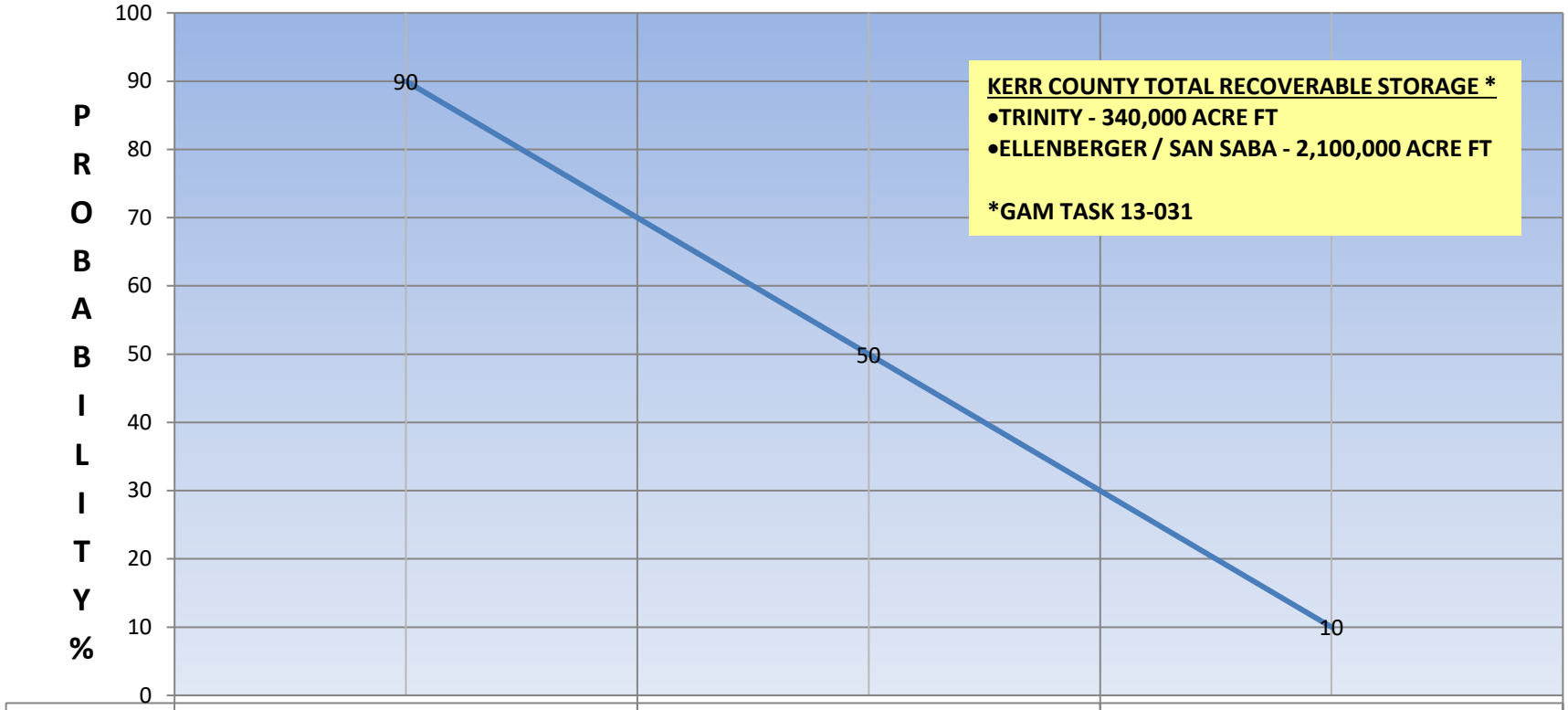
Source: From Ewing, 2004

Daniel B. Stephens & Associates, Inc.
10-31-07

LLANO UPLIFT AQUIFERS
Tectonic Time Chart

Figure 4

PROBABLE FRESH WATER RECOVERY, EAST KERR COUNTY (ELLENBURGER & MOORE HOLLOW GROUPS)



POST M18	177,961	1,673,553	3,500,000
POST M17	177,961	1,673,553	4,248,595
PRE M17	8606	189049	1262121
PROB	90	50	10

ACRE-FEET POTENTIAL RECOVERY (JULY 29, 2019)