

Mr. Ken Beck, Mayor  
Village of Volente  
16100 Wharf Cove  
Volente, Texas 78641

Job No. 0117-052  
February 14, 2018

**Project Memo Number 1  
Brushy Creek Regional Utility Authority (BCRUA)  
Deep Water Intake, Phase 2**

Balcones Geotechnical, LLC (Balcones) is submitting this first project memo to respond to questions you have raised and which we have discussed on the phone and in person. The intention of this memo is to record and convey our preliminary opinions about the topics addressed below.

It should be recognized that these opinions are based on our preliminary review of documents provided to us, which have been developed over several years by the BCRUA Engineering Team including HDR Engineering, Inc. and Walker Partners. Specifically, the documents upon which we have relied include:

1. Preliminary Geotechnical Data Report (May 18, 2016), BCRUA Phase 2 Deep Water Intake, Travis County Texas, Prepared by Brierley Associates, Corp. for HDR Engineering, Inc.
2. Final Technical Memorandum 6-3 (June 1, 2016), BCRUA Deep Water Intake – Preliminary Engineering, Prepared by HDR Engineering, Inc.
3. BCRUA Letters of Application for Permission to Drill Monitoring Wells addressed to Village of Volente dated August 11, and Sept 26, 2017.

In addition, we have had discussions regarding the monitoring well program with Mr. Aaron Archer, PE and Dr. Neil Deeds, PE representing the BCRUA.

### **Tunnel Alignment**

The current tunnel alignment was depicted within the HDR Final Technical Memorandum 6-3 and within the GDR prepared by Brierley Associates, Corp. The vertical alignment places the tunnel entirely within the Glen Rose formation of Cretaceous age. Based on previous experience within this formation and upon both laboratory and field pressure packer testing (conducted in the open boreholes as part of the GDR), the Glen Rose is a very tight, low permeability bedrock formation. We would expect this formation to yield limited groundwater,

except in areas exhibiting secondary structure such as faults, fractures and in areas with an overall jointed rock mass.

Based on Tech Memo 6-3, most of the 113 domestic wells within Volente's village limits are likely completed and pumping groundwater from within the Hensell Sand or the Cow Creek Limestone; both are high quality aquifers. There are several wells within the available well data bases which do not have information regarding depth or well completion, so it is possible that a few wells might be producing from the Glen Rose. Notwithstanding that, it is assumed that most Volente domestic wells are producing from the Hensell/Cow Creek. Tech Memo 6-3 indicates that the top of the Hensell Sand is located about 80 ft below the bottom of the proposed tunnel vertical alignment.

Tech Memo 6-3 also presents results of hydrogeologic modeling of the effect of the proposed tunnel on groundwater wells within the Hensell Sand. We believe the model conservatively represents possible groundwater table drawdown in the vicinity of the tunnel, which is very minor. Nonetheless, the BCRUA Team has proposed, and we concur, that as a safeguard, additional monitoring of the groundwater level is warranted. Accordingly, BCRUA and their consultants have proposed a monitoring plan which includes installation of several monitoring wells and also gaining the assistance of Volente residents to help the BCRUA gather data relative to local domestic wells. This plan will be discussed in greater detail below.

In addition to the vertical separation of the tunnel from domestic wells, the BCRUA Team has taken the effort to align the tunnel (horizontally) to avoid as many domestic wells as possible and also to align with some of the roadways so access shafts could be located in a minimally invasive fashion. "Threading the needle" with the horizontal alignment has resulted in several small bends in the alignment, which will add some cost to the tunnel.

### **Proposed Groundwater Monitoring Plan**

As previously mentioned, BCRUA has proposed a groundwater monitoring plan which includes: a.) installation of four deep monitoring wells into the Hensell Sand, and b.) working collaboratively with the Village of Volente and local residents to monitor water level and water quality in any domestic wells that fall within 400 ft of the horizontal tunnel alignment. We have discussed this plan with BCRUA Team members and believe one additional monitor well on the Atwood property would be beneficial. We agree that monitoring water levels and water quality at the existing domestic wells is a good idea. If all residents allowed BCRUA to access their wells and measure the current groundwater level and bottom of well, important baseline condition data would be available to enable residents to confirm that no impact to their wells



occurs as a result to the tunnel process. In addition, it would allow the team to determine if any wells were possibly completed in the Glen Rose as opposed to the Hensell.

**Closing**

Based on our interpretation of the reports referenced herein and the data cited therein, we believe that the current vertical alignment of the tunnel poses little risk to domestic wells. This is largely because the tunnel horizon is some 80 ft above the horizon where most of the domestic wells are believed to be completed. In addition, it seems that the BCRUA has adjusted their horizontal alignment to further mitigate possible impacts to domestic wells, even though that risk appears to be very small.

We encourage the Village of Volente to conduct an outreach program to brief domestic well owners of the importance of them participating in a program of domestic well monitoring (particularly within 400 ft of the horizontal alignment). This effort will be beneficial to all parties in knowing better the physical properties of domestic wells and which wells might be at greater risk, albeit very small. The establishment of a pre-construction baseline is also important in establishing validity of possible claims of impact after construction.

Please contact me if you would like to discuss the contents of this report.

**Sincerely,**

**Balcones Geotechnical, LLC**  
**TBPE Firm Reg. F-15624**

**John A. Wooley, P.E.**  
**Principal**