



MEMORANDUM

TO: Chuck Lesniak, Environmental Commissioning Lead
Watershed Protection Department

FROM: David A. Johns, P.G.
Watershed Protection Department

DATE: September 2, 2010

SUBJECT: Investigation of Bull Creek Tributary 4 near Spicewood Springs Road

Watershed staff examined the reach of Bull Creek Tributary 4 from the crossing with Spicewood Springs Road to the confluence with the main stem of Bull Creek (Photo 1). The reach is adjacent to a potential shaft site (PARD site) for the Jollyville transmission main. We walked approximately 900 feet of the tributary channel examining the area geology, checking for spring discharge, and looking for Jollyville Plateau Salamanders. Flow at the upstream end of the culvert under Spicewood Springs Rd. was approximately 10 gpm on August 24, 2010 and had not changed significantly prior to our visit.

The geologic setting is uncertain at this time. Published maps show this reach to be underlain by the Glen Rose Formation. However, recent mapping by Watershed staff and observations during this investigation suggest that the overlying Walnut Formation may be exposed in the tributary channel but additional work is needed to draw a final conclusion. In each case, the tributary is either in the lower part of the Walnut, perhaps Bull Creek member or the upper part of the Glen Rose.

Several interesting features were identified in this creek reach. A zone of maidenhair fern was observed on the east bank of the channel (Photo 2) about midway downstream of the culvert. Water was pooled on the bedrock surface but no flowing water was seen. This feature probably qualifies as a Critical Environmental Feature by City of Austin standards. A knob of rock on the west bank adjacent to a plunge pool about 20 feet downstream may indicate seepage from the west bank at the same horizon but does not appear to qualify as a CEF.

A second zone of potential seepage was identified further in a shallow pool downstream (Photo 1) on the west bank consisting of an alluvial bank with maidenhair and wood ferns with an overhanging bank at the water level. The channel floor was relatively flat bedrock with local tight fractures trending N33°E and numerous pits (Photo 3). Elevation of the channel here is approximately 712 ft. This area is similar in appearance to a site in Balcones Canyonlands Preserve with a significant spring containing salamanders. No water was discharging and no salamanders were observed (Photo 4). This bedrock character extended to the confluence with Bull Creek. The two channels contained numerous small travertine dams at the confluence (Photo 5). The zone of ferns is likely a CEF but the channel pits do not appear to be at this time.

A small spring was identified on the west bank about 100 feet downstream of the stream confluence characterized by maidenhair fern, travertine deposition and a small amount of water dripping off the ledge (Photo 6). This spring qualifies as a CEF. The spring appears to originate from a burrowed layer of limestone about 2 ft thick. A bluff about 100 ft downstream shows the same intervals seen in the tributary channel with two zones of seepage highlighted by ferns (Photo 7). The lower zone appears to correspond to the small spring and the upper zone with the seepage area first seen downstream of the culvert. A description of a core taken from hole JT-120 at the intersection of Spicewood Springs Rd and Old Lampasas Trail between 300-800 ft away from the seepage locations (Photo 1) encountered burrowed dolomitic limestone and dolomite beginning at an elevation of 712.2 ft, about the same elevation as the creek channels. This boring also noted a water table at an elevation of 706.8 ft which could be the same zone as the springs and seeps are located in.

The discharge from the springs and seeps appears to be confined to specific geologic horizons, discharging in a diffuse manner rather originating from localized solution conduits, likely migrating from higher elevations toward the channel bottoms. Interception of this zone by bores or shafts should not result in significant diversion of groundwater, either in volume or direction. In a shaft, this is probably best accomplished by sealing off the horizon completely and allowing the water to flow around the shaft opening. If a significant volume of water is discharging from this horizon in a shaft, a porous ring around the shaft could be constructed to allow water to flow around the shaft and continue toward the channels.

Nate Bendik, a City of Austin salamander biologist conducted a cursory survey of the reach and did not find any salamanders. He noted a large number of predatory fish, crayfish, large areas of bedrock without gravel cover, debris from road construction and abundant algae. He concluded that due to overall conditions salamanders were unlikely to be present and, if present, would be in low abundance.

In summary, the geology of this reach is unclear at this time but it appears to be either the base of the Walnut Formation or top of the Glen Rose Formation. There are horizons where groundwater seepage is present which correlate with the water table in a nearby monitoring well. Some locations and horizons qualify as CEFs and would have a buffers to protect them from further development. Note that the typical spring buffer of 150 ft would not impact much of the site but that no buffers have been delineated at this time.

Let me know if you have any questions.

David A. Johns, P.G.



A handwritten signature in black ink that reads "David A. Johns". The signature is written in a cursive style and is positioned below the professional seal.



Photo 1. Aerial image showing Tributary 4, Bull Creek, area examined, and features discussed in this memo.



Photo 2. Seepage horizon on east side of Tributary 4.



Photo 3. Tributary 4 channel showing pits in limestone bedrock.



Photo 4. Watershed staff checking pit areas in channel bedrock for salamanders.



Photo 5. Confluence of Tributary 4 on right with Bull Creek at center and left.



Photo 6. Small spring on west bank of Bull Creek downstream of confluence.

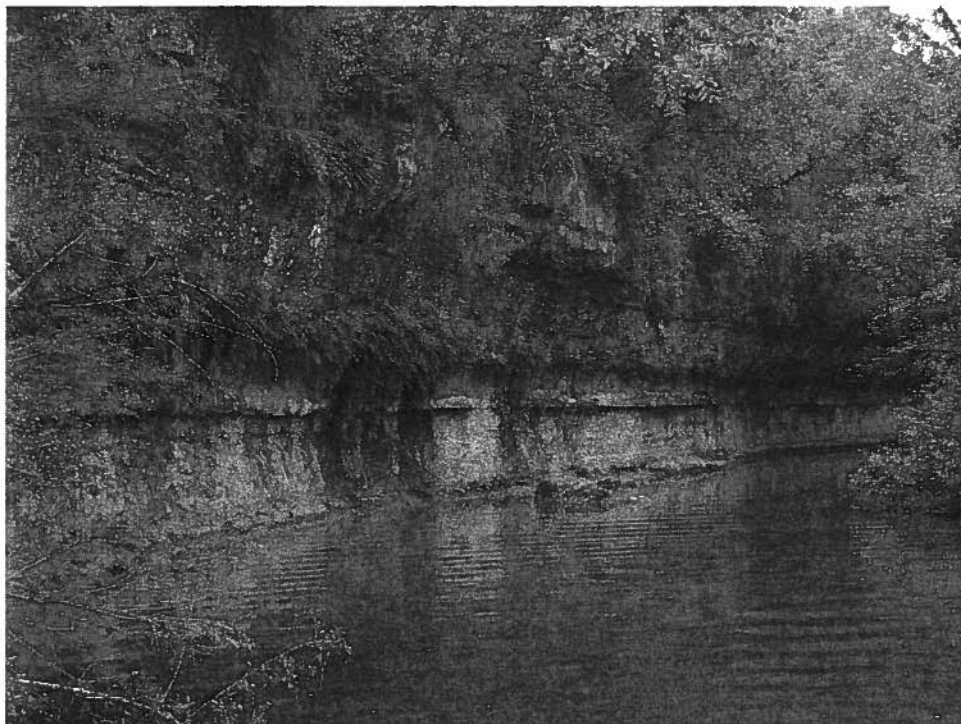


Photo 7. Bluff downstream of confluence with seepage horizons highlighted by ferns. Geologic units are either base of the Walnut or top of the Glen Rose Formations.

