

SPECIAL COUNCIL WORK MINUTES
JULY 6, 2022

The City Council held a special meeting on Wednesday, July 6, 2022, at 3:00 p.m. in the City Council Chambers, 10 North Main Street, Cedar City, Utah.

MEMBERS PRESENT: Mayor Garth O. Green; Councilmembers: Terri Hartley; W. Tyler Melling; Scott Phillips.

STAFF PRESENT: City Manager Paul Bittmenn; City Recorder Renon Savage; Finance Director Jason Norris; City Engineer Jonathan Stathis; Economic Development Director Danny Stewart; Public Works Director Ryan Marshall; Water Superintendent Robbie Mitchell; Executive Assistant Natasha Nava.

OTHERS PRESENT: Jay Grimshaw, Royce Nelson, Gary Player, Laura Henderson, Stacia Shipp, Kevin Kilcoyne, Margaret Kilcoyne, Andrea Nelson, Venessa Stratton, Paul Monroe, Steve Nelson, Jack Smith, Ann Clark, Teri Kenney, Marilyn Wood, Mike Stratton, Maria Engst, Stephanie Hill, Paul Cozzens, Travis Humphreys, Diana Francis

CULINARY WELL LOCATION PRESENTATION. WILLOW STICKS: Mayor – I am excited about this presentation. This is a fascinating study. I want to read three paragraphs from the report: *“In an effort to meet future water demands, Cedar City desires to identify and develop potential groundwater sources outside the influence of the valley aquifer with the exception of the Treatment Plant Study Area. High yield production wells, property placed in deep-rooted fractured bedrock systems can yield significant volumes of high-quality groundwater with minimal if any impact on the valley aquifer. There are significant hydrogeologic and geologic differences between valley fill aquifers and bedrock aquifers. Valley fill aquifers are composed of alluvial fill materials consisting of clays, silts, sands, gravels, cobbles, and boulders. When too much water is removed from these types of aquifers over extended periods of time without sufficient recharge, the pore space within the aquifers collapse due to insufficient pore pressure inside the alluvial fill, thus affecting the aquifer’s ability to recharge. In contrast, bedrock aquifers are more resistant to collapse when water is removed and remain stable under some of the most demanding withdrawal circumstances. The development and use of production wells placed in deep-rooted and fractured bedrock systems would ideally be limited only by water rights and the cost of well construction and other supporting infrastructure.”*

“Many large-scale hydrogeologic studies have concluding statements that indicate wells drilled into fractured bedrock formations tend to have far greater yields than average wells. For example, in a 2013 hydrogeologic study comparing over 90 well logs in a large Utah basin, the conclusions state that the wells with highest yield were drilled into “high fractured” volcanic rocks and “the greatest potential for water movement is where faulting has bisected the rocks at depth” (Iron Springs Corporation, 2013) in consolidated bedrock formations, open fracture systems are key.

“A significant body of evidence, exists that strongly supports the reasoning for seeking fractures and deeply connected fracture systems for prospective well targets. It has been observed, especially in mountainous regions, that aquifers can be very “hit and miss” and

may be characterized as a "plumbing system" with deeply-rooted sources in fractured bedrock systems, where the concept of "holding basin" wherein all recharge comes from above simply does not apply. In a "plumbing system" type of aquifer, precision drilling is a must. And this is what I believe.

Val Kofed, President of Willow Stick Technologies, I am a civil engineer, I have spent most of my career in water resource engineering. Mike Jessop – I am a professional geo physicist, I did geo physics and then joined Willowstick, we have done over 500 projects together. I got into groundwater and have tried to add and grow and help people that need water.

The Power Point presentation is attached as Exhibit "A".

Val – the Mayor invited us to meet with him and explained problems the community is experiencing where State Engineer ruled that the valley basin is in a critical management area, taking more water out of the ground than putting in. When you take the water out over time the ground collapses and you have had significant settlement in the valley, and you destroy the ability to recharge the aquifer. The State is trying to control that. The mayor said we have a growing community that needs water. As we drove the community we learned a few things, if you didn't drill more wells, you are in a tough place. It is important to understand that we need to stay, in our opinion, stay outside the valley fill aquifer so we don't exasperate the problem. We can't get out of the critical management area, or you will be importing water that is not sensible or reasonable. We need to get outside the core of the aquifer and concentrate our wells into aquifers that are not alluvial, so they don't collapse. You can take water out of the rock without collapsing. We want deep seeded aquifer that is high seed and quality water. Mike – it goes into the slides. Val – Willowstick did not pick the well sites, we drove around and looked at the entire city with the mayor and councilmembers. We can find water on private property, but you would not be welcomed there. We found public land, the city has water infrastructure on BLM and SITLA properties, so we picked areas surrounding the city and applied 6 techniques to identify the water.

Mike – see exhibit "A" we are combining old school with new stuff. We had geologists on the ground looking at some of this. There is published resources on Utah Geology, it comes with decent accuracy, sometimes not, so we have to refine the information. We have radiometric gamma and seismic tools, gamma gives us indication of groundwater, natural affect the earth is always in motion and the motion is the tides we know on the oceans, but it is the whole earth. The up and down motion is quite significant. The venting of water out of the areas impacts soil microbiology and gamma is used in power plants as a shield for water. We have run enough experiments where there are good wells and we see consistent, repeated patterns, places with boulders and small vibration motion. When you pass into bedrock you pick that up. Items 1-6 were reviewed. We have lightning data also. When we get all these items lining up it suggests a good spot, some are regional and some narrow it down. Val – well drilling is risky; we are trying to eliminate the risks as much as possible by putting the 6 items together.

When we drove the city, the Fumblebee site is land owned by SITLA and the city has a water tank, spring development and supply line. They did drill a well to 500 feet and got 150 gallons per minute. The city gave up, it is one area we thought was quite unique. Shurtz