

Open Letter to the City of Houston

October 21, 2019

Mayor Sylvester Turner

Chief Resilience Officer Steven Costello

Councilman Dave Martin

Gentlemen,

I attended the Kingwood Town Hall meeting on October 17 and was disappointed to once again hear that the City of Houston (COH) is not willing to take any financial responsibility towards restoring flow of the West Fork San Jacinto River into Lake Houston by immediately taking actions to continue dredging on the Stream Mouth Bar (SMB). In fact, the COH has not removed 1 shovel full of sediment out of Lake Houston since its impoundment in 1953 despite numerous studies through the years stating the necessity of doing so. And most disappointing, the COH continues to stand behind the results of a flawed technical report that they contracted with Tetra Tech to complete. The primary objective of the Tetra Tech analysis was *to define and quantify the sediments deposited by Hurricane Harvey in the SMB area* under the premise that FEMA is responsible for removing those sediments, not the COH.

Unfortunately, the Tetra Tech report has a significant fatal flaw – while they did a fine job of calculating the “the total surficial sand volume of the SMB”, **THEY NEVER CALCULATED A HARVEY COMPONENT to the SMB SEDIMENTS!** Let me remind you that the SMB has been in place in the current location since at least 2001.

Technical Analysis Leading to the Conclusion Stated Above

- The uncertainty of calculating Pre-vs-Post Harvey sedimentation is compounded by lack of recent pre-Harvey lake bottom surveys. A late 2016 or early 2017 survey, for instance, would have allowed a near direct comparison of Pre-vs-Post Harvey sedimentation. But unfortunately, the most recent lake bottom survey was from 2011. There have been several high-water events capable of moving sediments into the lake since then including the historic Tax Day and Memorial Day storms of 2016.
- There are four pieces of measured data that are time stamped and relevant to the Pre-vs-Post Harvey discussion:
 - 2011 Lake Bottom Elevation Map
 - 2018 Lake Bottom Elevation Map
 - Satellite images of SMB area showing emplacement and growth going back to 2001
 - Stream gage data at the 59 bridge over the West Fork

- Three parties (Kissling and Garfield, the USACE, and Tetra Tech) made attempts to calculate the Harvey component of sediments in the Stream Mouth Bar area. Of those, Kissling and Garfield and the USACE relied exclusively on the time stamped data, while Tetra Tech mostly ignored it.
- All three parties calculated the 2018-2011 volume difference showing a growth of the SMB sediment pile of $\sim 800,000 \text{ yds}^3$ during that time.
- Kissling and Garfield analyzed the growth of the subareal SMB through time and used the ratio of 2017 growth vs total growth (35%) to extrapolate the entire SMB growth due to Harvey ($\sim 300,000 \text{ yds}^3$).
- The Corps used sediment transport transforms tied to stream gage data and applied these numbers to the 2018-2011 difference volume and got $\sim 350,000 \text{ yds}^3$ attributed to Harvey.
- Tetra Tech ignored the time-stamp data and instead employed the “Stockton Protocol” which has been approved by FEMA to determine deposits due to a specific storm (technique was utilized to determine impact of Hurricane Sandy on the New Jersey coast – but they had just completed a new coastal survey just months before Sandy). Following this protocol, Tetra Tech collected 26 vibra cores and acquired 53 high resolution shallow seismic lines over the SMB area.
 - Tetra Tech determined that either 1.4 Myds^3 **or** 1.0 Myds^3 is the “surficial sand deposit” over the SMB area. This is not an uncertainty range. The 1.4 Myds^3 is calculated by using a very smoothed grid of the sparse core data that they collected. The 1.0 Myds^3 is from combining the core and seismic data sets. The Tetra Tech report explicitly states that the 1.0 Myds^3 estimate is *more refined* as it integrates both core and seismic (this is basic methodology for analyzing subsurface deposits). The COH has latched onto the 1.4 Myds^3 in order to squeeze more federal dollars into the dredging operation. **This volume number should not have been published, represents poor science and should be discarded from the Pre-vs-Post Harvey discussions.**
 - I would ask COH a simple question – how can the volume of Harvey sediments in the SMB area (recognizing the Area of Interest in the 3 studies had some small differences) be nearly twice as large as the total volume deposited in the period between 2011 and 2018 (1.4 Myds^3 vs $800,000 \text{ yds}^3$)? **IT DEFIES ALL LOGIC.**
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- As I read the Tetra-Tech report and made it through these total “surficial sand volumes” (and think that the 1.0 Myds^3 is a fine description of that), I was very excited to turn the page and read how they were then going to determine the Harvey contribution to these volumes – and guess what? **THE REPORT ENDED!**
 - Did Tetra Tech realize they had no scientific way, with the data in hand to make this determination (sand on sand on sand)? If so, why didn’t they state that – after all their stated primary deliverable was a Hurricane Harvey Sediment Isopach Map?

Where We Are Now vs Where We Should Be

- So while the COH continues to “negotiate” with FEMA to fund more dredging based on faulty analysis, the Great Lakes Dredge is preparing to de-mobilize. Costello stated at the Town Hall Meeting that plans would not be in place for continued dredging in time to prevent the de-mobilization.
- It was also stated by Costello and Turner that the COH has \$20M to contribute to the next phase of dredging. Well guess what? **\$20 will just about cover the cost of re-mobilizing a new dredging crew – a terrible waste of tax-payers money.**
- How about bringing that money forward immediately while Great Lakes is still on site and continue SMB dredging operations. I would be happy to provide the COH guidance (pro-bono) on how to best spend that money to restore flow to Lake Houston as it was obvious from Costello’s talk that there is nobody on staff that has a any knowledge about fluvial and deltaic deposition. For instance, the map he projected showing the area of recommended further dredging of the SMB to the north of the sand bar was dumbfounding and made no hydrologic sense towards restoring flow.
- **While the COH stalls, the SMB remains a major dam at the mouth of Lake Houston that is imperiling the people and property in Kingwood and surrounding communities during every flood event.**

Sincerely

Randal Kissling
Geologist-retired