Southeast Texas Subsidence Adjustment Project

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SUMMARY

To modernize the National Spatial Reference System (NSRS), the United States of America is replacing the North American Datum of 1983 (NAD83) from and North American Vertical Datum of 1988 (NAVD88) with a new terrestrial reference frame and geopotential datum in 2022. The new reference frames will depend mainly on Global Navigation Satellite Systems (GNSS), such as the Global Positioning System (GPS), as well as on a gravimetric geoid model.

As part of this effort, particularly in subsidence areas, a new, reliable, and improved geodetic network, including vertical network, with GPS observations is needed to be used in a variety of surveying, geodetic, geospatial, and engineering projects and applications (e.g., rebuilding and improving the infrastructure). A reliable geodetic network, particularly a vertical control network, will also help in flood plain management, flood hazard and risk evaluation, and providing elevation certificates.

Additionally, the United States will also adopt the North American-Pacific Geopotential Datum of 2022 which will provide more accurate orthometric heights related to the latest published Geoid models. Vertical datum is specifically important to maintaining base flood elevations for areas identified as flood inundation zones used for flood insurance rates and emergency management.

Recently, in the southeast region of Texas (USA), the National Geodetic Survey (NGS) suppressed vertical heights (orthometric heights) on published control due to irregularities in datum caused by subsidence. The Conrad Blucher Institute, with support and facilitation of the Texas Spatial Reference Center, initiated a GPS on Benchmarks (GPSonBM) campaign to occupy and observe primary control and benchmarks in areas identified by NGS. This work was done over a period of several months in late 2021 following a guideline to submit data to NGS and update the geodetic

coordinates and orthometric heights for the observed marks.

All marks that are observed during this GPSonBM campaign will have 2020.0 Reference Epoch Coordinates automatically computed and released as part of the modernized National Spatial Reference System (NSRS). In addition, the newly published NAVD 88 orthometric heights will be utilized by NGS to create and improve the transformation grids (transformation tools) between NAVD 88 and the new vertical datum, the North American-Pacific Geopotential Datum of 2022 (NAPGD2022).

This paper will cover a collaborated effort from state and local agencies alongside the private professional surveying industry to ensure geodetic datum accuracy for the protection of the safety and welfare of the public.