

Flood Mitigation Approaches Using Drone Photogrammetry

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Abstract

Geologic mapping of drainage patterns and erosion surfaces is critical for effectively managing flood waters. UAV Photogrammetry, which is mapping from drone photography, is an innovation permitting high resolution elevation and semi-automated drainage mapping. These maps provide baseline data for drainage projects, as well as before and after comparisons of desilting and demucking maintenance operations. These data can be used to evaluate flood risk due to restricted drainage and justify public expense to proactively mitigate flooding damage through drainage maintenance and upgrade. Two case studies from the Houston vicinity are presented, White Oak Bayou in Jersey Village, and Upper Taylor Gully in Porter. Jersey Village has a history of flooding. In 2010, a large and costly study was initiated by the City of Jersey Village but produced few new findings. One area of concern not addressed by that engineering study was the efficiency of the By Pass Channel. A detailed drone photogrammetry study of the By Pass was organized by a local Citizen Committee. The drone survey generated a lot of attention and resulted in definitive data to support public clearing of obstructed drainage pathways. As a result, the Harris County Flood Control District (HCFCD) did perform “minor desilting maintenance” of the By Pass. The Upper Taylor Gully drone photogrammetry project was commissioned by the Montgomery County Commissioner Precinct 4. It was designed as a before and after assessment of drainage maintenance. This was a prototype project for the use of drone imagery data in justifying and auditing public drainage and flood mitigation expenditures. The before and after drone survey, along with associated video footage, clearly demonstrated the drainage improvements made as a result of the demucking project.