

**To the Mayor and Members of the City Council****October 4, 2022**

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SUBJECT: CUMULATIVE IMPACTS OF DEVELOPMENT ON FLOOD RISK

This report is provided in response to a request by City Council to provide an analysis on potential options for revisions to the City Code relating to allowable amounts of impervious cover. In addition, this report provides an update on the Cumulative Impacts of Development on Flood Risk Analysis (Analysis) findings and next steps.

Policy Background

Since the mid-1960's, the City of Fort Worth (City) drainage criteria has required new infrastructure to be designed to convey the stormwater runoff that would result from the full anticipated development of a drainage basin. This theoretically ensured that new infrastructure would be adequately sized well into the future, preparing for all of the developments in a basin, and preventing costly future repairs or replacements and protecting development. Drainage conditions outside public rights-of-way were historically considered to be private property concerns and not under the City's design purview.

Since 1980, Federal and local criteria have regulated development impacts to natural floodplains through the Floodplain Provisions Ordinance. Frequently, developments relocate or constrict the natural floodplains in order to suit specific projects or simply to reclaim flood-prone land for additional development value. When natural floodplains are constricted, there is less area for flood water to collect as it moves down stream. The volume of flood water storage in a stream is referred to as 'valley storage'. In 1990, the City began to participate in the regional Corridor Development Certificate (CDC) program with other communities along the Trinity River to regulate valley storage and reduce future flood damages from Trinity River flooding.

The Problem

Impervious cover tends to increase in previously developed or redeveloping areas, leading to increasing numbers of complaints about flooding impacts from new developments of virtually any size. Although current Stormwater design standards prevent new developments from increasing peak runoff rates at the property line, there is no required analysis of the additional runoff volume leaving the site.

A similar situation exists along natural floodplains across the City. Many smaller streams have been relocated or channelized to facilitate development, and flooding impacts due to those developments have been reported. Valley storage is not regulated on smaller streams, potentially exacerbating the impacts of increasing impervious cover.

Analysis, Findings, and Potential Options

To determine how significant changes to development regulations need to be, two consultant teams performed case studies to quantify the magnitude of impacts on flood risk due to: (1) increases in impervious cover over time, and (2) loss of valley storage in natural streams. The areas selected for these analyses had to be currently fully developed and experiencing rapid redevelopment trends to effectively quantify the impact from development on flood risk. Both areas also had recent detailed flood models available to reduce the engineering effort and to expedite results.

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The data driven analyses confirmed the reports of increased flooding by quantifying how much more runoff, and greater flooding depths and extents, would be due to increases in impervious cover. Loss of valley storage was confirmed to increase flood risks downstream, particularly for more frequent storm events, and it was determined that while detention effectively mitigates impacts for large storms, it is not as effective for mitigating flooding due to smaller rain events.

To address these findings, possible updates to regulations could include adjusting engineering and land use assumptions, setting caps on impervious cover, and regulating valley storage on smaller creeks and streams.

Next Steps

Since regulatory changes could affect properties of any size, careful consideration must be given to property rights for development as well as preventing foreseeable harm to downstream residents and businesses. Stormwater Management is scheduled to update the Development Advisory Committee with these findings in October 2022. A stakeholder group will be formed in Spring 2023 to evaluate potential refinements to current development regulations and finalize recommendations to regulatory revisions to be brought to Council for adoption.

Questions about this Informal Report can be directed to Clair Davis, Engineering Manager, at 817-392-5981.

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