

## City of Arnold, Missouri

**Work Session  
Council Chamber**

**May 09, 2019  
7:00 p.m.**

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### **Agenda**

1. Walters Group
2. Hilltop Securities
3. Flood Update
4. Army Corps of Engineers Report
5. Adjournment

**Next Regular City Council Meeting May 16, 2019  
Next Work Session June 13, 2019**



## CITY COUNCIL AGENDA ITEM STAFF REPORT

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<b>MEETING DATE:</b>	May 2, 2019
<b>TITLE:</b>	Floodplain Analysis Study (Staff Update)
<b>DEPARTMENT:</b>	Community Development
<b>PROJECT MANAGER:</b>	Christie Hull-Bettale, EIT, Community Development Engineer
<b>ACTION:</b>	No Action Required
<b>ATTACHMENTS:</b>	(1) Executive Summary; (2) Letter from Corp of Engineers with Analysis Summary, January 2019

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### **EXECUTIVE SUMMARY:**

The City of Arnold was approached by the St Louis Branch, US Army Corps of Engineers (COE) following the 2015/2016 Flood Event. COE gave details related to various programs that could further support the City relative to flood zones, negative impacts, mitigation and potential resolution for these areas that burden the community. In October 2016, the City was selected to receive services of a Floodplain Analysis Study by the COE paid in full through a federal grant. The COE provided the finalized report January 2019.

The purpose of the Floodplain Analysis Study was to provide a holistic floodplain analysis for the structures and population located within the jurisdictional limits of the City of Arnold.

### **SUMMARY OF ANALYSIS:**

The study identified flood-prone structures and each structure's key characteristics. Economic, social, and environmental considerations were incorporated in the form of analyses in support of a comprehensive floodplain recommendation. The report did not include a detailed economic analysis, but did recommend specific nonstructural mitigation approaches based on flood-prone structure characteristics, such as dry flood proofing, structure acquisition, mobile home relocation, and floodplain restoration. Ultimately, the report will help the City of Arnold hone in on projects with grant funding potential to mitigate and reduce future flood risk for the city and its residents. Aside from the this specific Analysis report, Staff remains involved with the Corp of Engineers with the Continuing Authorities Program to explore options for funding mitigation projects.



**DEPARTMENT OF THE ARMY  
ST. LOUIS DISTRICT CORPS OF ENGINEERS  
1222 SPRUCE STREET  
ST. LOUIS, MISSOURI 63103-2833**

REPLY TO  
ATTENTION OF:

**JAN 04 2019**

**Programs and Project Management Division  
Project Management Branch**

**Mr. David Bookless  
Community Development Director  
City of Arnold  
2101 Jeffco Boulevard  
Arnold, Missouri 63010**

Dear Mr. Bookless:

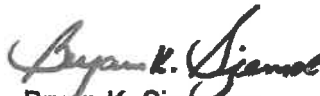
The City of Arnold Floodplain Analysis has been completed. It has been a pleasure working with the representatives from the city to provide a holistic floodplain analysis for the structures and population located within the jurisdictional limits of Arnold, Missouri.

This report examines floodprone buildings located within the City of Arnold, many of which have been damaged or threatened by recent floods of record in 2015 and 2017. This report's purpose is to build upon historic efforts in the City of Arnold of acquiring or mitigating structures to reduce the future flood risk for the city and its residents. While the majority of the city is elevated and not at risk of riverine or precipitation-based flooding, there is a large segment of Arnold's floodplain still occupied by residents. Based on 2018 preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs), there are 589 structures at risk from flooding during a 1/500 Annual Chance Exceedance (ACE) flood event. Of those structures, 269 are at risk during a more frequent 1/100 ACE flood event, also known as the Special Flood Hazard Area (SFHA), or AE Zone on FIRM maps.

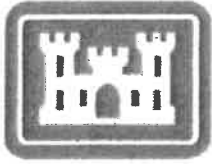
Enclosed you will find three copies of the final report.

For questions or additional information, please contact the Project Manager, Mr. Hal Graef, at (314) 331-8790 or by e-mail at [harold.w.graef@usace.army.mil](mailto:harold.w.graef@usace.army.mil).

Sincerely,

  
Bryan K. Sizemore  
Colonel, U.S. Army  
District Commander

Enclosures



**US Army Corps  
of Engineers.**

# **City of Arnold Floodplain Analysis**

**December 2018**

**Prepared by:  
U.S. Army Corps of Engineers  
St. Louis District  
1222 Spruce St  
St. Louis, MO 63103**

## Executive Summary

The City of Arnold Floodplain Analysis Study provides a holistic floodplain analysis for the structures and population located within the jurisdictional limits of Arnold, Missouri. The scope of the study was to provide an inventory of floodprone structures and determine the cost-effectiveness of various nonstructural mitigation measures that may reduce future flood damages.

While nearly all of the structures located in the floodway have been acquired since the Great Flood of 1993, the City of Arnold still has significant flood risk that was realized during recent floods in 2015 and 2017. The City of Arnold has more than 1,500 parcels that touch either the 1/100 or 1/500 Annual Chance Exceedance (ACE) floodplain. Within the affected parcels, there are 589 structures that are expected to be damaged during the 1/500 ACE flood event according to 2018 preliminary FEMA Flood Inundation Rate Maps (FIRMs).

The study utilized Esri ArcGIS (version 10.3.1) to create an inventory of floodprone structures by identifying key characteristics of each structure. In addition to economic rationale, social and environmental considerations were incorporated in the form of a mobile home relocation analysis (Appendix B) and environmental hub analysis (Appendix C) in support of a comprehensive floodplain recommendation. A detailed economic analysis with individualized benefit-to-cost ratios was not within the scope of this analysis, and instead the cost of nonstructural mitigation was balanced with the frequency of flooding to determine cost-effective flood damage reduction recommendations. The report recommends the following nonstructural mitigation approaches to reduce future flood damages:

- Dry Floodproof 112 structures
- Acquire 23 structures
- Relocate 161 mobile homes
- Restore 53.8 acres of floodplain forest

Of the structures recommended to be floodproofed (either wet or dry), 59% are expected to experience flood damages in the subfloor area of the structure and will therefore only require either sewer check valves or fill placed in the subfloor area to mitigate nearly all of the expected future damages during a 1/100 ACE flood event. The rest of the structures recommended for dry floodproofing require the structure to be rehabilitated with flood resistant veneer and watertight doors as flood depths are expected to exceed the first floor in the structure.

Structure acquisition was limited to structures classified as repetitive loss, actively participating in Arnold's Hazard Mitigation Grant process, or in an EPA designated riparian buffer zone (see Appendix C). The floodprone Starling Mobile Home Park was not recommended to be acquired, and instead relocated given social concern of existing tenants moving back into a floodprone area within the community. Finally, this report recommends extending the existing floodplain forest 53.8 acres into areas of green open space that were formally utilized as residential development or have been recommended for acquisition as part of this report.