RIVER DES PERES, UNIVERSITY CITY, MO

General Reevaluation Report

17 August 2021, 6-8pm

Public Meeting





Project website



Photo: University City, 2019. Inset: KSDK, 2019







- 1. Opening remarks
- 2. Presentation: Study Process & Tentatively Selected Plan
- 3. How to provide comments
- 4. Q&A

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You may also email <u>ucityfloodrisk@usace.army.mil</u> during or after the meeting, or visit the project website.



Opening remarks

Sponsor: City of University City, Missouri with support from the

Commission on Storm Water Issues









LOCAL SPONSOR: City of University City, Missouri





Metropolitan St. Louis Sewer District

AGENCY COORDINATION

















U.S. FISH & WILDLIFE SERVICE







River Des Peres Watershed Coalition



STUDY OVERVIEW

- Purpose: Reevaluate the flooding problems and potential plans to reduce flood risk and confirm the authorized project or identify a revised recommendation.
- Schedule: Started April 2020; 3 years to completion
- Study Authority Limits
 - Limited to University City Branch watershed of upper River Des Peres
 - Flood Risk Management is the only authorized purpose
- Period of Analysis
 - 50 years (roughly 2025 to 2075)





River Des Peres-University City Study Area



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IMAGES FROM THE GROUND



River Des Peres at the entrance to the Tubes (downstream end of study area)





Images (above and left): Paul Sableman (Flickr)

Flooding



2008 flooding. Image: YouTube



2014 flooding. Image: University City



lmage (right): St Louis Post Dispatch





 Risks to life safety associated with riverine flood inundation. This includes direct life loss, flooding of critical infrastructure, flooding of evacuation routes, health concerns with flooded structures (mold, etc.) Economic damage resulting from riverine flood inundation. This primarily focuses on direct structure inundation (structure, content and vehicles) but can also consider traffic disruption, emergency costs, etc. 	Recent flooding in the study area: 2008 2011
OPPORTUNITIES Increased outdoor recreation;	2013
 Improved risk communication; Reduced sewer backups; Improved water quality, including reduced sedimentation/turbidity; 	2014
 Re-established natural wildlife habitat such as wetlands; Increased community resiliency to flood events, such as reduced response/recovery time; and 	2019
 Improved mental & physical health. 	2020





- Reduce life safety risk due to flooding, including inundation of structures & public infrastructure, in the Upper River Des Peres watershed over the period of analysis.
- Reduce economic damage due to flooding in Upper River Des Peres over the period of analysis.
- Increase recreational opportunities associated with FRM features over the period of analysis.



- Start with what's been previously studied
- Stakeholder involvement throughout
- Gather evidence throughout
- Analyses:
 - o H&H analysis
 - o Structure inventory
 - Life safety
 - o Economic analysis
 - \circ $\,$ Impacts to cultural resources $\,$
- Create several alternatives
- Select Plan









Start date (funding received)	29 April 2020		
Alternatives Milestone Meeting (AMM)	25 August 2020		
Public Scoping Meeting	30 September 2020		
Tentatively Selected Plan (TSP) Meeting	26 May 2021		
Draft Report Released to the Public	July 2021		
Public Meeting	July (& August) 2021	Push to	
Agency Decision Milestone (ADM)	November 2021	Feb 2022	
Final Report Submitted for Approval	September 2022	requested	
Report Approval (Chief's Report)	April 2023		



THE IMPORTANCE OF PUBLIC INPUT



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• As part of the planning process, we need your input on:

Significant issues/impacts to be addressed Potential project features/alternatives

- People living in the affected communities have the best first-hand knowledge of flooding and flood impacts
- We don't know what we don't know!





EXISTING CONDITIONS



Study area: 5,900-acre watershed above the entrance to the Tubes

Hydrologic & Hydraulic Modeling: Model generated inundation for flood events of various sizes (2008 flood used as calibration event; high water marks provided by Commission)

Structures: 1,098 structures are impacted by 500-year flood

Minority population of University City: 52% (state average is 20%)

Critical infrastructure: Four critical infrastructure locations in the 500-year floodplain (3 schools & a fire department/EMS)

Cultural & historic resources: Two areas – University Heights Subdivision Number 1, and University City Education District

Flood damage: Estimated at \$5.8M annual damages (1% probability flood)

Other conditions examined include climate, land use, water quality, demographics



FUTURE WITHOUT PROJECT CONDITIONS



- What will the conditions be in the future (50 years) if no project is implemented?
- Conditions not shown are either no change or low concern

Existing Condition*	Future Without Project Condition
Climate (temperature and precipitation)	Upward trends in temperature, precipitation, and runoff
Future development and sewer infrastructure	Sewer authority (MSD) identified 55 proposed projects in study area
Water quality, incl. current <i>E. coli</i> concerns	Improvement in water quality due to MSD sewer improvements
Cultural resources – two areas of concern	Potential minor adverse effects to areas of concern; potential new areas of concern added within 50-yr period of analysis
Flood damage to structures	No substantial change expected
Population and socio-economics, incl. minority & low-income populations	Projected downward population trend; in 20% AEP, dilapidated structures, vacant lots, minor adverse socioeconomic impacts
Population at Risk (3,000 at 2 a.m.) & critical infrastructure (4)	PAR and existing critical infrastructure would continue to be threatened



PLAN FORMULATION PROCESS (up to this point)



Tentatively Selected Plan (TSP)



MEASURES EXPLORED



Structural

- Detention basins
- Levee/floodwall
- Channel & bridge modifications
- Modifying the Tubes
- Diversion

Non-Structural

- Floodproofing (wet & dry)
- Elevation of structures
- Relocation of structures
- Acquisition (buyouts)
- Flood warning system
- Risk communication/education
- Ordinances/regulations
- Other: Outdoor recreation

Nature-Based

- Floodplain storage
- · Removal of invasive species
- Constructed wetlands







MEASURES DEVELOPED INTO ALTERNATIVES

Measures:

- 1. Detention basins
- 2. Levees/floodwalls
- 3. Channel and bridge modification
- 4. Elevation of structures
- 5. Floodproofing
- 6. Acquisition (buyouts)
- 7. Flood warning system
- 8. Risk communication/education
- 9. Other: Outdoor recreation

STRUCTURAL

NONSTRUCTURAL





RE-EVALUATING RECOMMENDATIONS IN THE 1988 FEASIBILITY REPORT

- 1988 Feasibility Report for River Des Peres watershed
- WRDA 1990 authorized project
- University City recommended features:
 - Approx. 2.5 miles of channel modification, including bridge replacement, bank stabilization and grade control – x Confirmed measure U-12 causes downstream impacts
 - Flood forecasting and warning plan √ Rainfall gages in upper watershed; new technology can improve plan
 - Recreation features \checkmark 1.85 miles of trail alongside channel modification, incl. one small park with amenities
 - Environmental features (not much detail for U City branch) x Environmental features were compatible with channel modifications; do not mitigate downstream impacts; not complete as standalone measures





CHANNEL MODIFICATION (STRUCTURAL)





Image: 1988 Feasibility Study (USACE)





DETENTION BASINS (STRUCTURAL)



PLAN, PROFILE AND OPERATION OF A TYPICAL DETENTION BASIN (VD1)





Image: USACE

Image: USACE



LEVEES/FLOODWALLS (STRUCTURAL)









FLOODPROOFING (NON-STRUCTURAL)





Image: FEMA





Image: USACE



FLOOD BARRIERS – CLOSURE DEVICES



Dry Flood Proofing

















FLOOD RISK ADAPTIVE MEASURES Elevation & Wet Flood Proofing (Historic Structure)



Flood Vent

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FLOOD RISK ADAPTIVE MEASURES Elevated Equipment / Utilities / Appliances



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ELEVATION (NON-STRUCTURAL)





Images: USACE



Flood Risk and Flood Insurance



Elevation lowers premiums.

ZONE A" EXAMPLE

Under the Flood Insurance Reform Act of 2012, You Could Save More than \$90,000 over 10 Years if You Build 3 Feet above Base Flood Elevation*





ACQUISITION/BUYOUTS (NON-STRUCTURAL)









Images: USACE



FLOOD WARNING SYSTEM (NON-STRUCTURAL)



- Commission developing municipal system for University City
- Data available:
 - >20 years of 5-minute-interval data from USGS stream gage at Purdue Ave
 - >10 years of mostly 5-minute-interval data from 6 MSD rain gages in or proximal to the watershed
- Database and statistical protocols for flood prediction based on the actual measurements
- Warning system components: 3 rain gauges, cloud-based data center, alarms issued
- Public portal: https://www.wqdatalive.com/public/1473





2. AUTHORIZED PLAN WITH MODIFICATIONS



- Channel and bridge modifications from measure U-12 in authorized plan
- Detention basins added to mitigate downstream impacts/address induced flooding







Features:

- 5 examined, 2 determined hydraulically feasible
 - Greater effect higher upstream in the watershed
 - Greater effect from larger areas on higher ground
- DB3: 15 acres, businesses adjacent to Olive Blvd
- DB4: 9 acres, dog park at Woodson Rd Park
- Dry detention for maximum storage during storms

Alternative 3.a. DB3 and DB4

Alternative 3.b. DB4 only





4. LEVEE/FLOODWALL



- 6 reaches identified; 1 in final alternative
- Floodwall is major component
- Avoids floodway, ties into high ground, minimizes road crossings







5. NONSTRUCTURAL - ACQUISITION/BUYOUT



- ~500 structures acquired in 4% AEP (25year) floodplain; people relocated
- Recreation & natural features (eg parks, green space) TBD
- Buyouts would be mandatory
- Includes buyouts of historic structures in University City Subdivision Number One





6. FLOODPROOFING AND ELEVATION OF STRUCTURES



- ~500 residential structures in 4% AEP (25-year) floodplain; most floodproofed, ~7 elevated
- Height of elevation/floodproofing: 1% AEP (100-yr)
- Affects historic structures in University City Subdivision Number One
- Dry floodproofing used in analysis; final floodproofing types (wet/dry, elevation of utilities, etc) TBD
- Voluntary participation



7. NONSTRUCTURAL - ELEVATION ONLY



- ~90 residential structures in 4% AEP (25year) floodplain with flood depth above first floor; all elevated
- Developed as a 'no floodproofing possible' scenario
- Height of elevation/floodproofing: 1% AEP (100-yr)
- Voluntary participation







8. COMBINATION – DB4 AND NONSTRUCTURAL



- DB4 and ~56 residential structures in 4% AEP (25-year) floodplain with flood depth above first floor; all elevated
- Height of elevation/floodproofing: 1% AEP (100-yr)
- Voluntary participation



How were the alternatives evaluated?



The "Four Accounts":

National Economic Development (NED)	Regional Economic Development (RED)
 Economic consequences of	 Regional economic impacts of project
alternatives, including flood damage	implementation including effects on
to the community	employment and labor income
Environmental Quality (EQ)	Other Social Effects (OSE)
 Impacts to threatened and	 Life safety risk, critical infrastructure
endangered species, wetlands,	protected, socioeconomic
hazardous waste sites, and cultural	consequences, recreation
resources	opportunities



ALTERNATIVES COMPARISON – COST BENEFIT SUMMARY



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Alternatives	Level of Risk Reduction (% AEP)	Total C	ost(incl. RE)	Net <u>Ann</u> (Benef	<u>ual</u> Benefits its - costs)	BCR (annual benefits/costs)	
1 - No Action	n/a	\$	-	\$	-	0	
2 - Authorized Plan with Modifications (DB3 & DB4)*	TBD - range	\$	60,768,000	\$	20,000	1.01	
3a - Detention Basins (DB3 and DB4)	50% (2-year) (filled by 10-yr, underwater by 100- yr)	\$	44,974,000	\$	724,000	1.33	
3b - Detention Basin 4 (DB4)	50% (2-year) (filled by 10-yr, underwater by 100- yr)	\$	8,689,000	\$	1,200,000	2.98	
4 - Levee/Floodwall (with DB3 & DB4)	1% (100-year)	\$	88,905,000	\$	(1,096,000)	0.73	
5 - Nonstructural - Acquisition	<mark>4% (25-year)</mark>	\$	251,928,000	\$	(3,591,000)	0.60	
6 - Nonstructural – Floodproofing & Elevation	4% (25-year)	\$	56,478,000	*	2,172,000	2.09 NED Plan: mo	pst net bei
7 - Nonstructural (elevation only)	4% (25-year)	\$	26,498,000	\$	(204,000)	0.79	
8 - DB4 + Nonstructural (elevation only) (25yr)	4% (25-year)	\$	25,650,000	\$	1,030,000	1.84	

Key questions: Do we expect these numbers to change a lot on further refinement? Do the other criteria change the TSP selection?



SELECTION OF THE TENTATIVELY SELECTED PLAN



The TSP selected is the NED Plan: Alternative 6 - Nonstructural – Floodproofing and Elevation • Highest net benefits; 2nd highest BCR

The Draft Report provides details on the planning process and all of the measures and alternatives

Further refinement of the TSP & decision on Locally Preferred Plan

- Further refinement of the TSP is needed & will happen in August/September.
- Refinement may include a different proportion of nonstructural measures applied (eg more elevation than floodproofing), and the addition of Detention Basins 3 and/or 4 (DB3 and DB4).
 - $\circ~$ Inclusion of DB4 is dependent on City of Overland.
 - \circ Types of nonstructural measure significantly impact net benefits.
- University City may choose to select a different alternative as a Locally Preferred Plan.
 - Requires a waiver to be approved by HQ USACE.



Floodproofing and Elevation Survey



Floodproofing (& Elevation) Survey

- University City survey; USACE not involved
- Responses regarding participation in voluntary floodproofing and elevation of structures will help inform participation rate

USACE participation rate analysis – will also inform scope





Public Review period

Public Review of Draft Report: 30 days - <u>extended</u>

- We want your input!!
- Report posted on USACE project website
- Submit comments to ucityfloodrisk@usace.army.mil

Comments from University City

Project website:



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 Image: US Army Corps of Engineers St. Louis District Website

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 River Des Peres-University City Flood Risk Management Study

 The purpose of a General Reevaluation Report is to reevaluate the flooding problems and potential plans to reduce flood risk and confirm the authorized project or identify a revised recommendation.

 The goal of the study is to reduce life safety risk and economic damages due to flooding of the Upper River Des Peres, and increase recreational

FAQs

- 1. What is a Flood Risk Management study?
- 2. What is the USACE project process?

https://www.mvs.usace.army.mil/Missions/Programs-Project-Management/River-Des-Peres-University-City-General-Reevaluation-Report/

opportunities associated with flood risk management features over the period of analysis.





Topics may include:

- Flood events that have impacted you
- Flood damage, road closures, and cleanup
- Interest in floodproofing and elevation, or other measures
- Anything else you would like the planning team to know!

Comments or information can also be provided to: ucityfloodrisk@usace.army.mil

Or by mail to: U.S. Army Corps of Engineers, St. Louis District C/O Mr. Matthew Jones 1222 Spruce Street St. Louis, MO 63103



Project website: <u>https://www.mvs.usace.army.mil/Missions/Programs-Project-</u> Management/River-Des-Peres-University-City-General-Reevaluation-Report/

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