Ellis County Kickoff

Ellis County
PIR (Paper Inventory Reduction)
RiskMAP Project
Kansas Dept. of Agriculture –
Division of Water Resources
THANK YOU FOR COMING!
• This is the Kickoff to the Ellis County floodplain mapping project.

• Project scope includes mapping all areas within unincorporated Ellis County, as well as the Cities of Ellis, Hays, Schoenchen, and Victoria.

• The project will develop all new engineering. New detailed studies will take place in Hays and Ellis, and a 2D model will be developed for the entire county.

• This meeting should be informal and interactive.
AGENDA

• Intro
• Project Overview
• Floodplain Mapping 101
• Project Scope
• Project Timeline
• Working Group Tasks
• Q&A
WHY?

• Outdated Engineering
  – LiDAR
  – Hydrology
  – Invalid in CNMS (FEMA database)

• It’s an old paper map for crying out loud!
Kansas Floodplain Mapping Projects

February 6, 2018

- Preliminary
- Mapping Update Underway
- Discovery FY17
- FY18 Proposed
- FY18 Proposed BLE (Advisory Data)

Mapping updates not applicable in all areas of each watershed; see scoping maps where available on project pages for stream level project scoping.
RiskMAP Phased Approach

PHASE ONE
Kansas River

PHASE TWO
Neosho River and Marais Des Cygnes

PHASE THREE
Arkansas River
Paper Inventory Reduction

• Replacement of paper-based FIRMS (Flood Insurance Rate Maps) with modern digital FIRMS

• National FEMA priority

• Will result in dramatically improved accuracy and ease of use
Why Have Floodplain Maps?

• Determine where flood insurance is needed and rate its cost.
  – Flood Insurance Rate Map (FIRM)

• To provide the basis for executing community floodplain management ordinances.

• Understand flood risk so communities can make informed planning decisions.
What Is Risk MAP?

- Risk Mapping Assessment and Planning

- Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens.

- It’s what they call the floodplain mapping program at the moment
Project Goals

• Update floodplains in the watershed with modern mapping.

• Produce the highest quality mapping that we can.

• Leave a map that communities BELIEVE.

• Help communities and residents better understand and prepare for their flood risk.
How Will This Map Be Different?

• Digital Floodplains

• New Engineering
  – 2D methodology in Zone A

• LiDAR Topography

• Non-Regulatory Products (depth grid, WSE grid)
Floodplain Mapping 101
Data Development Tasks

- Acquire Base Map
- Acquire Topography
- Perform Field Survey
- Develop Hydrologic Data (Hydrology)
- Develop Hydraulic Data (Hydraulics)
- Perform Floodplain Mapping
- Develop DFIRM Database
Hydrology

How Much Water

The Hydrology study determines the peak discharge for the 10, 4, 2, 1(-), 1, 1(+), 0.2% events.

So.....how much water is flowing down the stream during flood events.
Hydrology Methods

• **Detailed Hydrology**
  - **Gage Analysis**
    - Statistical analysis of a stream’s flow history.
    - What has happened in the past.
  - **Rainfall Runoff Modeling**
    - Models that mimic the characteristics of a watershed.
      - NWS Rainfall History
      - Infiltration (soils, pervious surfaces)
      - Storage (dams or other sinks)
      - Timing / Routing (how fast does water get from A to B)
      - HEC-HMS (software used for hydrologic modeling)
Hydrology Methods

• **Approximate Hydrology** *(no longer needed)*
  – Regression
    • Uses equations developed for specific regions to estimate stream discharge.
    • Variables include Drainage Area, Soils, Annual Precipitation
  – **Weighted Regression**
    • Uses same equations as regular regression
    • Result is compared to results of detailed hydrology in same location or similar location
    • Result is weighted to match detailed results.
The Hydraulic study determines the water surface elevations on streams during the 10, 4, 2, 1(-), 1, 1(+), 0.2% events.

So.......hydraulics models the interaction between the water and the channel/ground surface. Determines where water goes and what the floodplain boundaries will be.
There are two types of modeling that will be utilized in this study

- 1 Dimensional (1D)
- 2 Dimensional (2D)

Modern computer models that consider variables affecting water conveyance

- Slope, Friction, Structures (culverts and bridges) (detailed studies), Sinuosity, Areas of Non-Conveyance (ineffective flow)
Hydraulics

2D Modeling

- Limited Detailed Studies
- Approximate Studies

A 2D hydraulic mesh is used for the modeling.

Out of ~1,400 stream miles being modeled for the project, only about 50 will be 1D.
Hydraulic Methods

• **Detailed Hydraulics** (Zone AE)
  – Utilizes Cross Sections
  – Structure openings and elevations are surveyed
  – Typically done in urban areas
  – Floodway included on map
  – More Expensive

• **Limited Detailed Studies** (Zone AE)
  – Utilizes a 2D Hydraulic Mesh
  – Structures are field measured
  – No Floodway on map

• **Approximate Hydraulics** (Zone A)
  – Utilizes a 2D Hydraulic Mesh
  – Structures are not included in models
  – Typically in rural areas
  – No Floodways
Ellis County Project Overview

• New Detailed Hydraulics (Zone AE with floodway)
  - 3.4 miles (Big Creek Tributaries 1, 2, and 3)
    • Rainfall Runoff Hydrology
    • 1D Hec-Ras Hydraulic Modeling
  - 30.9 miles (Big Creek near Cities of Hays and Ellis, Big Creek Overflow)
    • Gage Analysis Hydrology
    • 1D Hec-Ras Hydraulic Modeling

• New Detailed Hydraulics (Zone AE with floodway or AH)
  - 15.7 miles (City of Hays Stormwater Network)
    • PC-SWMM modeling

• Limited Detailed Hydraulics (Zone AE w/o floodway)
  – 16.5 miles (North Fork Big Creek, North Fork Big Creek & Big Creek Tributaries)
    • Rainfall Runoff Hydrology
    • 2D Hec-Ras Hydraulic Modeling
Ellis County Project Overview

• Approximate Hydraulics (Zone A)
  – 1058 miles
    • 2D HEC-RAS Hydraulic Modeling
Scoped Studies

New Zone A - Gage Analysis
New Zone A studies will be developed for these streams using Gage Analysis calibrated hydrology and Hec-Ras 2D hydraulics.

New Zone A - Rainfall Runoff
New Zone A studies will be developed for these streams using Rainfall Runoff hydrology and Hec-Ras 2D hydraulics.

New Zone AE - Limited Detailed Study (LDS) - Gage Analysis
New Zone AE without floodway studies will be developed for these streams using Gage Analysis hydrology, and field-measured structure data will be included in the 2D Hec-Ras model. No floodways will be shown on the map, but Base Flood Elevations will be shown.

New Zone AE - Limited Detailed Study (LDS) - Rainfall Runoff
New Zone AE without floodway studies will be developed for these streams using Rainfall Runoff hydrology, and field-measured structure data will be included in the 2D Hec-Ras hydraulics model. No floodway will be shown on the maps, but Base Flood Elevations will be shown.

New Zone AE - Gage Analysis
New Zone AE studies will be developed for these streams using Gage Analysis hydrology. Survey data will be collected and 1D Steady State Hec-Ras will be used for hydraulics. Floodways will be developed.

New Zone AE - Rainfall Runoff
New Zone AE studies will be developed for these streams using Rainfall Runoff hydrology. Survey data will be collected and 1D Steady State Hec-Ras will be used for hydraulics. Floodways will be developed.

New Zone AE - Urban Streams connected to Closed Systems
New Zone AE studies will be developed for these streams. The hydrology will be developed from PC SWMM (EPA SWMM compatible). The hydraulics for combined open channel/closed systems will be developed using PC SWMM, and steady-state HEC-RAS will be used for those systems that are completely open channel. HEC-RAS unsteady flow or 2D hydraulics may be used if there are significant overflow areas with 2 dimensional flow. Floodways will be developed for open channel streams.

New Zone AH - Urban Streams connected to Closed Systems
New Zone AH studies will be developed for these streams. The hydrology will be developed from PC SWMM (EPA SWMM compatible). The hydraulics for combined open channel/closed systems will be developed using PC SWMM, and steady-state HEC-RAS will be used for those systems that are completely open channel. HEC-RAS unsteady flow or 2D hydraulics may be used if there are significant overflow areas with 2 dimensional flow. No floodway will be developed for AH areas.
LEVEES

• Hays
  – Big Creek
  – Currently Unaccredited on FIRM

• Any levees we haven’t identified?
Project Scope Review

• Look at and understand the scope planned for your community.

• You have a 30 day period to review and comment on the scope if necessary.

• Is the scope appropriate?

• Are we missing anything?
Project Phases

• Kickoff Meeting
• Data Development
  – Early 2018 thru Early 2019
• Flood Study Review Meeting (Summer 2019)
• Community / Public Review
  – Summer 2019 thru late 2019
• Preliminary and Post-Preliminary
  – Late 2019 to 2021
Preliminary Map Status

• VERY IMPORTANT!!!!!
  – Things change when status changes from DRAFT to PRELIMINARY.

• DRAFT = OUR MAP
  – Changes can be made to mapping through simple cooperation.

• PRELIM = FEMA’s MAP
  – Changes can only be made through official appeal.

• NEED TO BE SOLID BEFORE PRELIMINARY

• Preliminary Date Estimate
  – Late 2019
  – We have control over Prelim Date (within reason)
Post-Preliminary Process

- Post-Prelim lasts 15-18 months in general
- Changes to mapping can only happen during a 90-day appeal period following Prelim status.
- Official meetings with community officials to explain timeline and appeal period. (CCO)
- Letter of Final Determination (LFD)
  - Point at which no more changes can be made
  - “Pencils Down” – map is final
- 6-month official adoption period between LFD and the Effective Date.
Why Working Groups?

- To ensure your community is represented
- To ensure your residents are aware
- To make the best map possible
- To provide local knowledge and input
- To address problems or inaccuracies early
- To ensure YOU BELIEVE THE MAP
- To work towards mitigating risk
- To improve floodplain management locally
What Should Working Groups DO?

• Stay aware of the project
• Identification of Areas of Concern and provide any existing information (first task)

• ENGINEERING AND MAP REVIEW

• PUBLIC REVIEW NOTIFICATION
  – Inform public of map review opportunity
  – Encourage public participation

• PLAN PUBLIC OUTREACH
  – Public Open House
    • When, where, how, get the word out
  – Long Term Outreach
Communication to Working Groups

• Email List
  – Get me names, addresses, and titles
  – Will be main source of project updates

• Project Updates
  – Minimum of quarterly
  – When important milestones are reached
  – When action is necessary (reminders)

• Meetings
  – In person as needed

• Newsletters

• Community Assessment

• DON’T HESITATE TO CALL, WE ARE AVAILABLE
Online Project Info

• Project Website
  – Scoping Maps, Project Timeline, Meeting Presentations, Newsletters, Technical Reports, Web Review Map

• Web Review Map
  – Project Scope Review
  – Draft Floodplain Review

• Story Maps
  – Project Info
  – “Floodplain Current”: Mapping Process ‘Nuts and Bolts’
Ellis County Story Map - Use this site to access more project specific information.

Ellis County Review Web Map - use this map to view and comment on the scoping lines of the project.

Ellis County Estimated Timeline

Unsure which watershed you are in? Use the following link to find out.
Kansas HUC B Watershed Map

**Project Reference Map**

Use this map to reference information for floodplain mapping projects within the project.
What Should You Be Doing?

• Project Scope Review
  – Provide comments if necessary
  – 30 days to comment
  – Call me if you need a better understanding

• Provide Areas of Concern and Existing Data
  – What areas concern you? Why?
  – Do you have drainage studies, stormwater plans, capital improvement plans, upcoming projects?

• Project Kickoff Survey
  – Follow up email, please fill out and return

• Organize Working Groups
If You Only Remember A Few Things

• Process is going to take time
  – Maps will not be Effective until 2020 or 2021

• Get it right before Preliminary!
  – Foster public review next summer
  – Get out the word and encourage participation

• You need ownership of your regulatory map and to believe what it says

• We are available to answer your questions
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