



# City of Grand Island

Tuesday, September 23, 2014

Study Session

## Item -1

### Update on Northwest Grand Island Flood Control Project

Staff Contact: John Collins, P.E. - Public Works Director

# Council Agenda Memo

**From:** Terry Brown PE, Assistant Public Works Director  
**Meeting:** September 23, 2014  
**Subject:** Update on Northwest Grand Island Flood Control Project  
**Item #'s:** 1  
**Presenter(s):** John Collins PE, Public Works Director

## Background

Sections of Northwest Grand Island experienced significant flooding during the 1967 flood. Most of the area north of Capital Avenue and west of Broadwell Avenue is within the 100 year flood plain, as well as the area between Webb Road and US Highway 281 bounded by Capital Avenue on the north and State Street on the south. There have been flood control improvements built in the area in the past, but the Moores Creek Watershed and northern Grand Island can still suffer considerable flood damage due to spill over of flood waters from two (2) other watersheds, namely Silver Creek and Prairie Creek.

The City of Grand Island has been working with the Central Platte Natural Resources District (CPNRD) for the past several years on a flood control project for the Upper Prairie/Silver/Moores Creek. This project will protect a significant portion of Northwest Grand Island from flooding.

On January 11, 2005 the Grand Island City Council approved Resolution No. 2005-15, which gave approval for the City to enter into an Interlocal Agreement with the Central Platte Natural Resources District (CPNRD), Hall County, and Merrick County. Such resolution authorized City funding of 46.25% of the \$7.8 million, or \$360,750 each year for ten (10) years, for a total amount of \$3,607,500.00. Total project cost was estimated to be \$16,400,000.00 at this time.

## Discussion

With this project approaching the ten (10) year mark it is necessary to provide an update on the status of this project.

## **Conclusion**

This item is presented to the City Council in a Study Session to allow for any questions to be answered and to create a greater understanding of the issue at hand.

It is the intent of City Administration to bring this issue to a future council meeting for the approval of a resolution for further funding of this project.

# UPPER PRAIRIE/SILVER/MOORE'S CREEK FLOOD CONTROL PROJECT (NORTHWEST FLOOD CONTROL PROJECT)

Council Study Session | Grand Island, NE | September 2014



JEO CONSULTING GROUP INC

Presented by  
John G. Petersen, PE



# Upper Prairie/Silver/Moore's

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- Presenters

- Lalit K. Jha, PE, D.WRE., CFM

- Senior Project Manager
    - Involved in this project since 2005

- John G. Petersen, PE

- Project Manager
    - Lead Designer



# Upper Prairie/Silver/Moore's

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## Project Overview

### ➤ Project Goals

- Provide 100-yr flood protection to NW Grand Island
- Reduce flood damages to crops, properties, and other infrastructure
- Removal of properties from FEMA Floodplain

### ➤ Project Benefits (Based on 2004 Feasibility Study)

- Eliminate \$59 million in damages from 100-yr event
- Protect 1500 residences and 55 businesses from flood damage
- Protect over 10,000 acres of cropland



Central Platte  
Natural Resources District



# Upper Prairie/Silver/Moore's

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## Project Sponsors

- **Natural Resources Development Fund (NRDF)**
- **Central Platte NRD**
- **City of Grand Island**
- **Hall County**
- **Merrick County**



# Upper Prairie/Silver/Moore's

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## Project Background

- **Feasibility Study Completed in 2004**
  - **Estimated Total Project Cost of \$16 Million**
- **Design Began in 2005**
- **Anticipated Project Completion 2018-2019**
- **One of the Largest NRDF Projects**
- **Estimated Total Project Cost of \$29 Million**



# Upper Prairie/Silver/Moore's

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## Background



# Upper Prairie/Silver/Moore's

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## Background



# Upper Prairie/Silver/Moore's

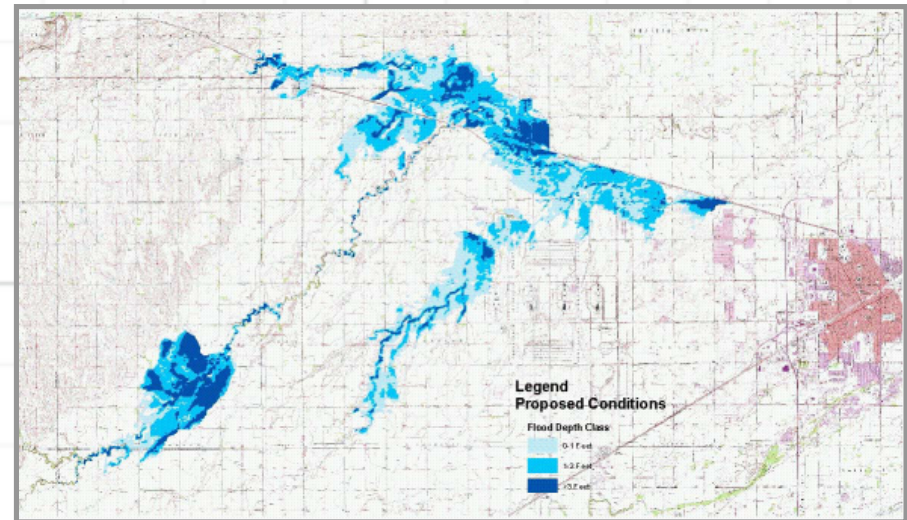
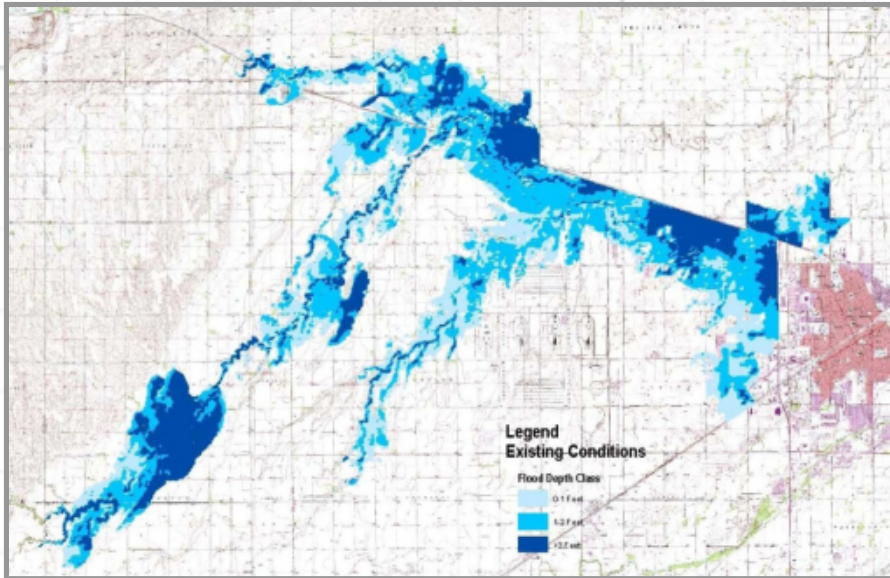
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## Background





# Upper Prairie/Silver/Moore's



Central Platte  
Natural Resources District



# Upper Prairie/Silver/Moore's

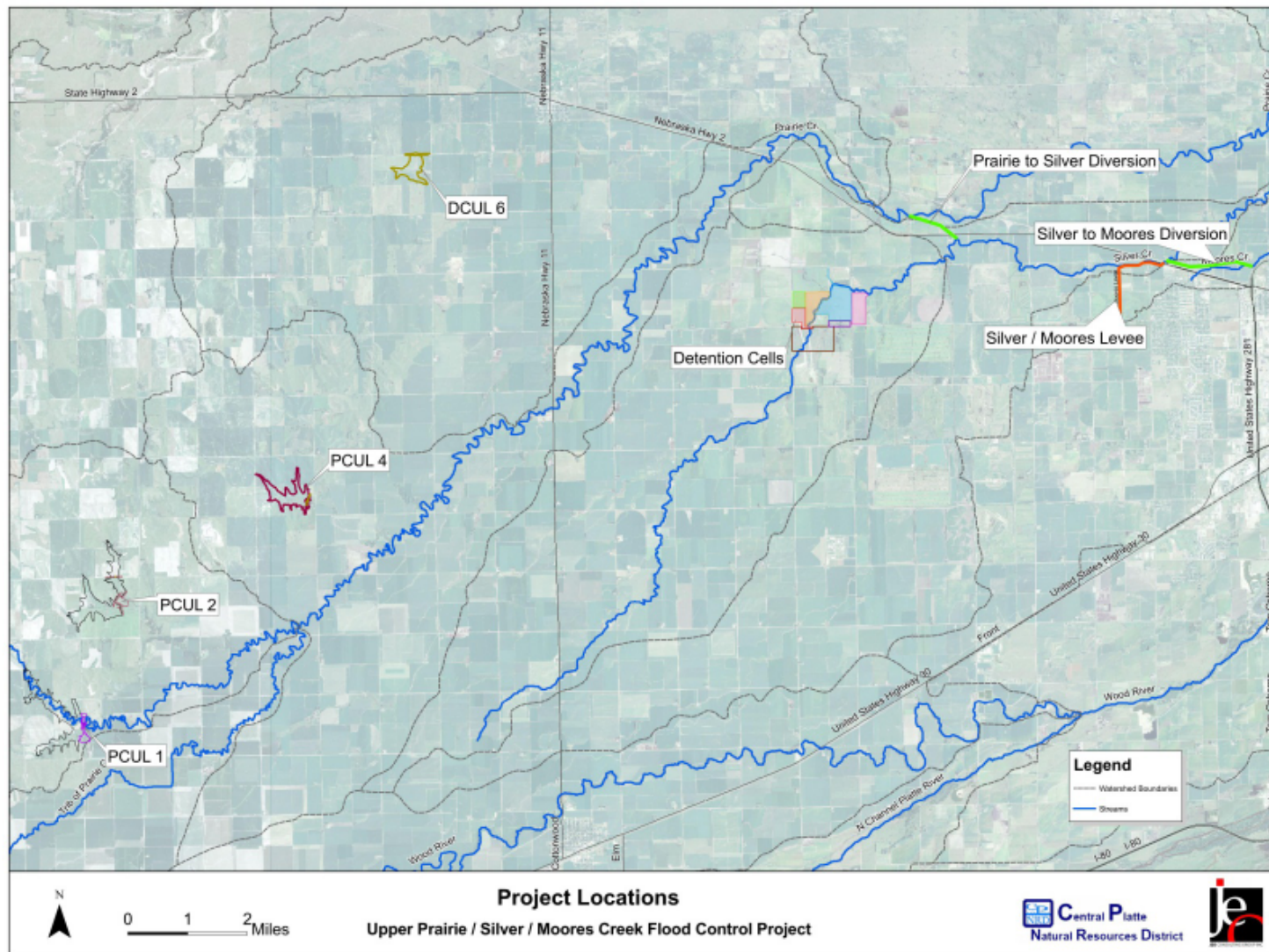
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## Hydrology and Hydraulics

- **Dry, Prairie, Silver, and Moores Creeks**
- **Approximately 230 Square Mile Drainage Area**
- **Uplands and Lowlands**
- **Timing of Hydrographs**
- **Flows Crossing Basin Divides**

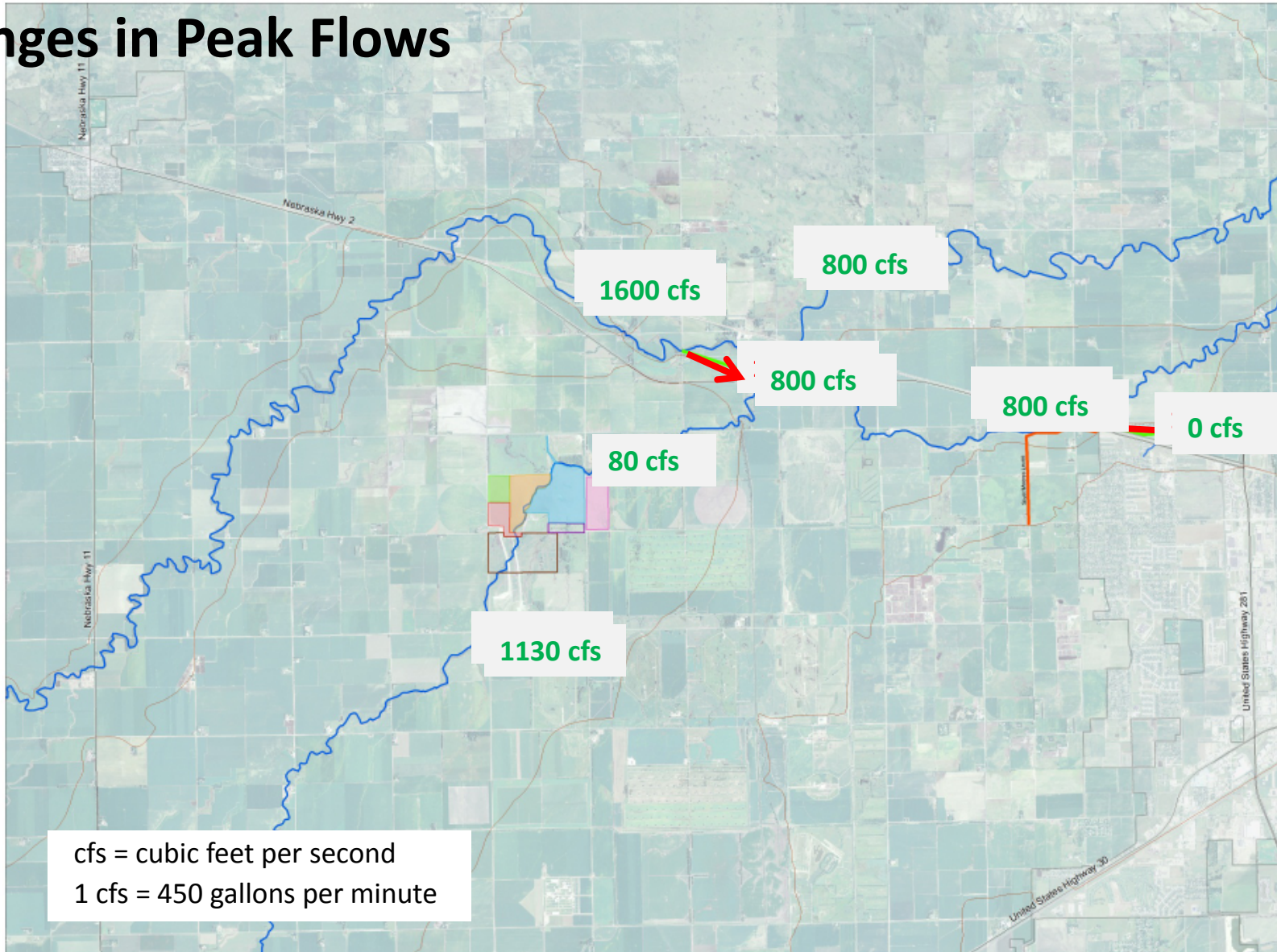
# Upper Prairie/Silver/Moore's

## Project Components



# Upper Prairie/Silver/Moore's

## Changes in Peak Flows

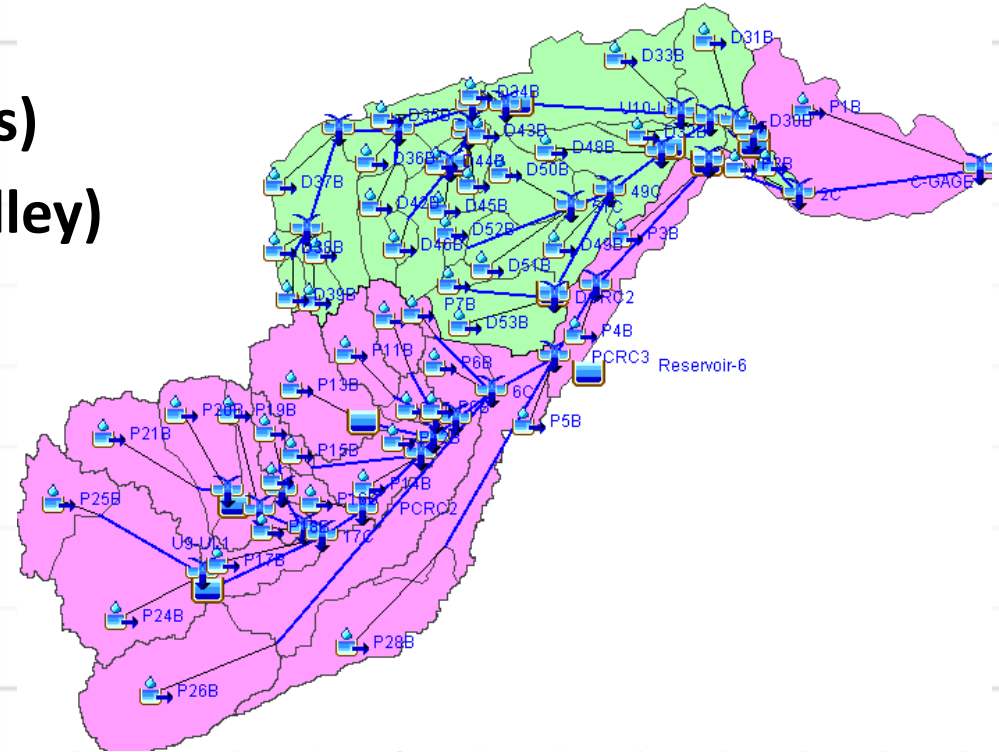




# Upper Prairie/Silver/Moore's

## ➤ Naming Convention:

- UL = Upland (In the Hills)
- LL = Lowland (In the Valley)
- PC = Prairie Creek
- SC = Silver Creek
- DC = Dry Creek



Example:

- PCUL 4 = Prairie Creek UpLand Structure #4



Central Platte  
Natural Resources District



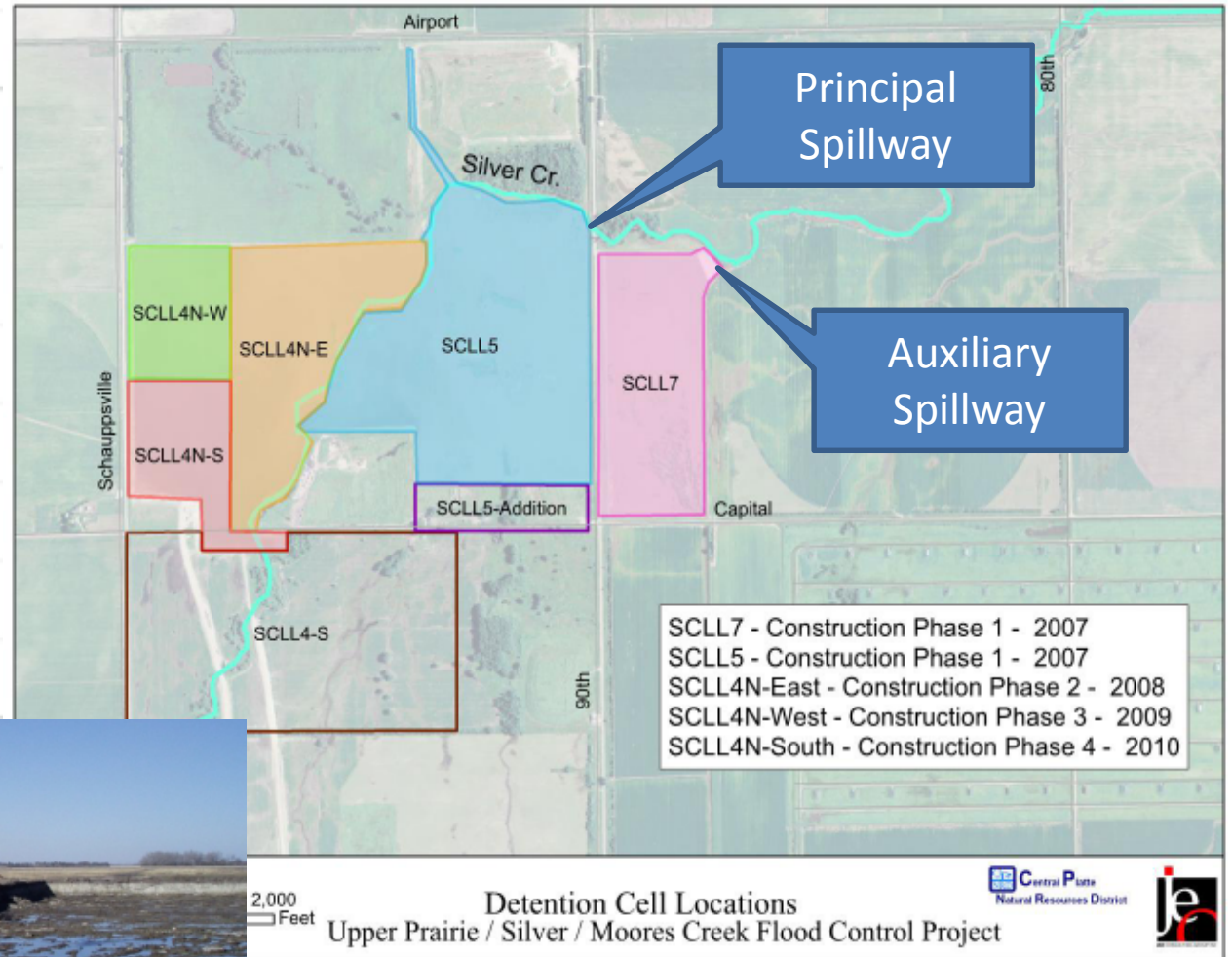
# Upper Prairie/Silver/Moore's

## Detention Cells

3.8 Million CY Excavation to Date

2.0 Million CY Excavation Remain

Reduce Silver Creek flows from about 1130 cfs to 80 cfs (100-yr)



Central Platte  
Natural Resources District



# Upper Prairie/Silver/Moore's

## Detention Cells



# Upper Prairie/Silver/Moore's

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## Dry Dams

- **PCUL 4 & DCUL 6**
  - **Construction Complete in 2013**
- **PCUL 1 & PCUL 2**
  - **Construction In Progress, Estimated Completion by December 2014**



**Central Platte**  
Natural Resources District



# Upper Prairie/Silver/Moore's

## Dry Dams

- **PCUL 4**
- **57,000 CY Excavation**
- **Inflow = 3150 cfs**
- **Outflow = 60 cfs**
- **Drainage Area = 4.5 mi<sup>2</sup>**
- **100-yr Flood Pool = 120 Acres**



# Upper Prairie/Silver/Moore's

## Dry Dams

- **DCUL 6**
- **74,000 CY Excavation**
- **Inflow = 3650 cfs**
- **Outflow = 130 cfs**
- **Drainage Area = 3.5 mi<sup>2</sup>**
- **100-yr Flood Pool = 85 Acres**
- **Road Dam**



# Upper Prairie/Silver/Moore's

## Dry Dams

- **PCUL 4**
- **After 4 inches of rain**



# Upper Prairie/Silver/Moore's

## Dry Dams

- **PCUL 1**
- **203,000 CY Excavation**
- **Inflow = 3950 cfs**
- **Outflow = 125 cfs**
- **Drainage Area = 13.0 mi<sup>2</sup>**
- **100-yr Flood Pool = 265 Acres**
- **High Hazard**





# Upper Prairie/Silver/Moore's

## Dry Dams

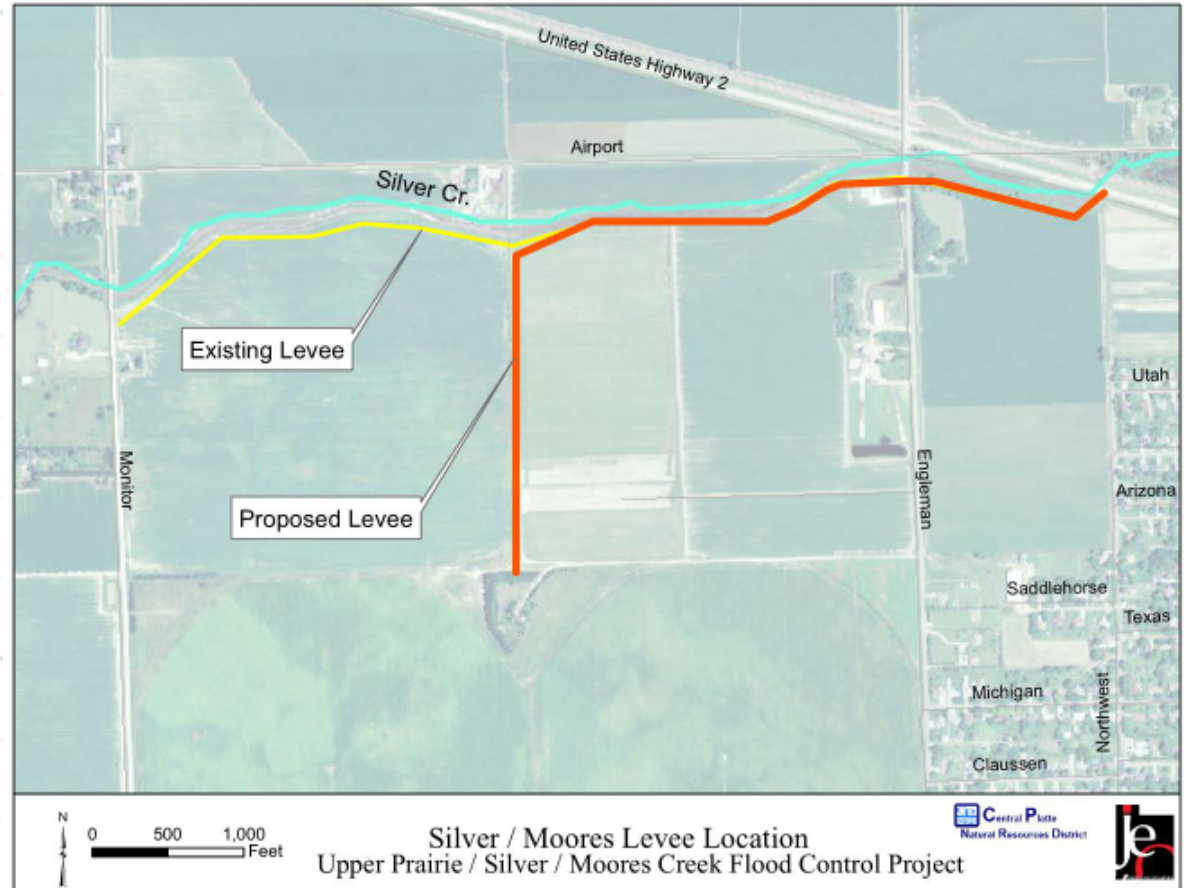
- **PCUL 2**
- **282,000 CY Excavation**
- **2 Dams, 1 Outlet**
- **Inflow = 4300 cfs**
- **Outflow = 120 cfs**
- **Drainage Area = 9.3 mi<sup>2</sup>**
- **100-yr Flood Pool = 232 Acres**
- **High Hazard**



# Upper Prairie/Silver/Moore's

## Silver/Moore's Levee

- <2 Miles
- FEMA Design Standards
- Last Line of Defense
- Design Starting
- Construction TBD



# Upper Prairie/Silver/Moore's

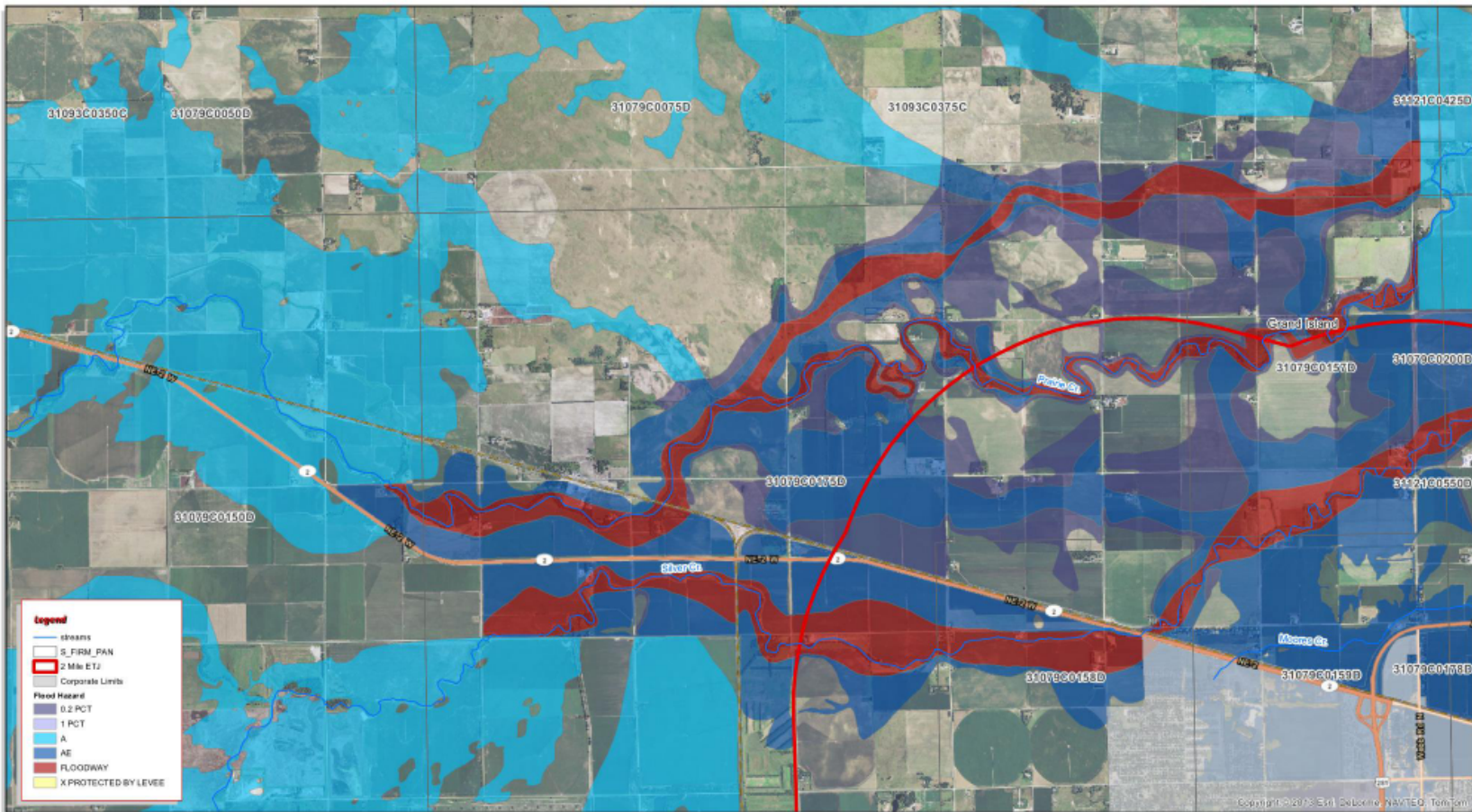
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## Conditional Letter of Map Revision (CLOMR)

- **Existing and Proposed Conditions**
  - Existing Conditions are Changing!
- **Including Moore's Creek Flood Study**
- **Coordination with FEMA Region VII, DNR, Etc.**
- **Speed up the Map Revision Process**

# Upper Prairie/Silver/Moore's

## Conditional Letter of Map Revision (CLOMR)



**Grand Island Flood Control Projects**  
Grand Island, NE



1 inch = 3,000 feet

Created By: SMS  
Date: 12/18/2013  
Software: ArcGIS 10.2  
File: 310D2



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# Upper Prairie/Silver/Moore's

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## Other Project Pieces

- **Minor Ditch Connections**
- **Operation and Maintenance Manual**
- **LOMR**
- **Moore's Creek Flood Study and Master Plan**

# Upper Prairie/Silver/Moore's

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## Overall Project Schedule

- |   |                            |
|---|----------------------------|
| – Design of Upland Dams                     | Complete                   |
| – Design of Benton & Still Rehab            | On Hold                    |
| – Design of Levee                           | Summer 2013 to Winter 2014 |
| – Construction of DCUL6 & PCUL4             | Complete                   |
| – Construction of PCUL1 & PCUL2             | June 2014 to December 2014 |
| – Construction of Benton & Still Rehab      | TBD                        |
| – Construction of Levee                     | TBD (2015)                 |
| – Construction of Final Detention Cells     | TBD (2016-2017)            |
| – Approval of Letter of Map Revision (LOMR) | TBD (2018-2019)            |



# Upper Prairie/Silver/Moore's

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## Project Costs

- Estimated Project Cost (2014): ~\$28,200,000
- NRDF (52.5%) Cost Share: ~\$15,540,000
- Local Cost Share (47.5%): ~\$14,060,000

### Project Cost Breakdown:

1. Feasibility Study - \$264,500
2. Land Acquisition - \$4,600,000
3. Engineering – \$2,800,000
4. Construction - \$20,100,000
- O, M, & R Costs - \$460,000



# Upper Prairie/Silver/Moore's

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## Project Costs

- Estimated Project Cost (2014): ~\$28,200,000
  - NRDF (@52.5%) Cost Share: ~\$14,802,305
  - Local Cost Share (47.5%):
    - CPNRD (@21.97%) ~\$6,194,412
    - City of Grand Island (@21.97%) ~\$6,194,412
    - Hall County (@2.38%) ~\$671,038
    - Merrick County (@1.19%) ~\$335,519





# MOORE'S CREEK FLOOD STUDY AND MASTER PLAN

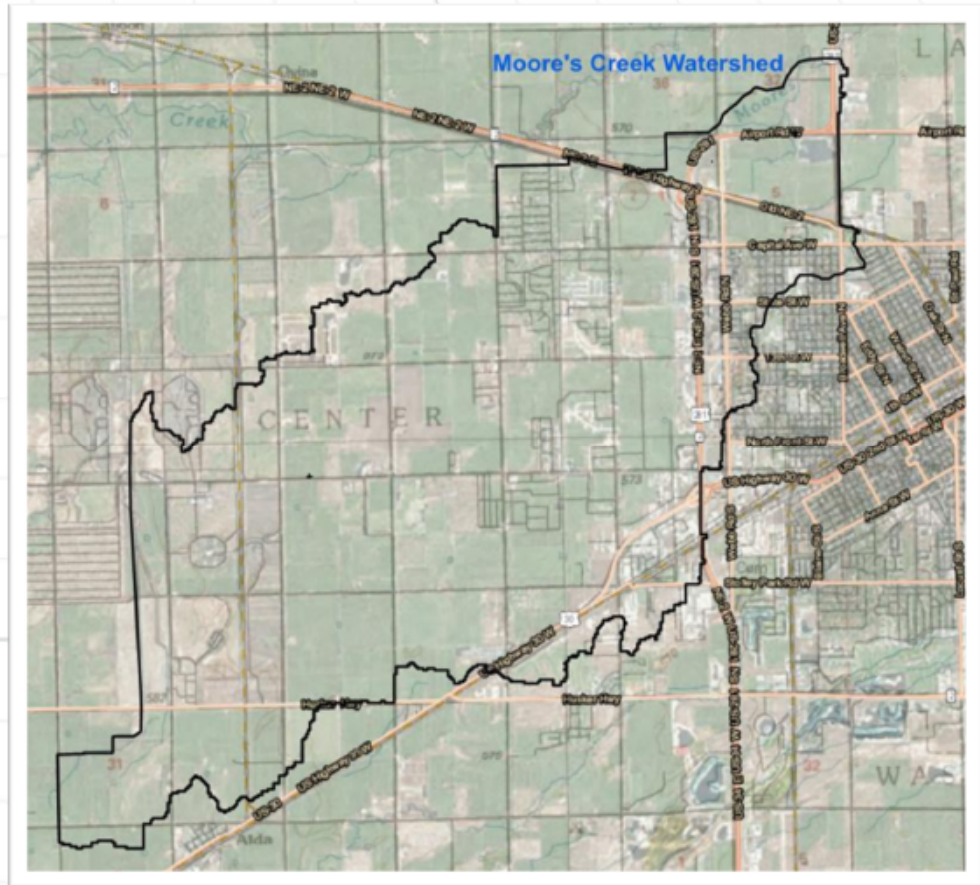
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# Moore's Creek

## Moore's Creek Background

- 15,000 Acres
- 30% Urban
- 70% Rural / Agriculture
- On-going Development on the West side of the City
- Court Order to Restrict Flows Downstream

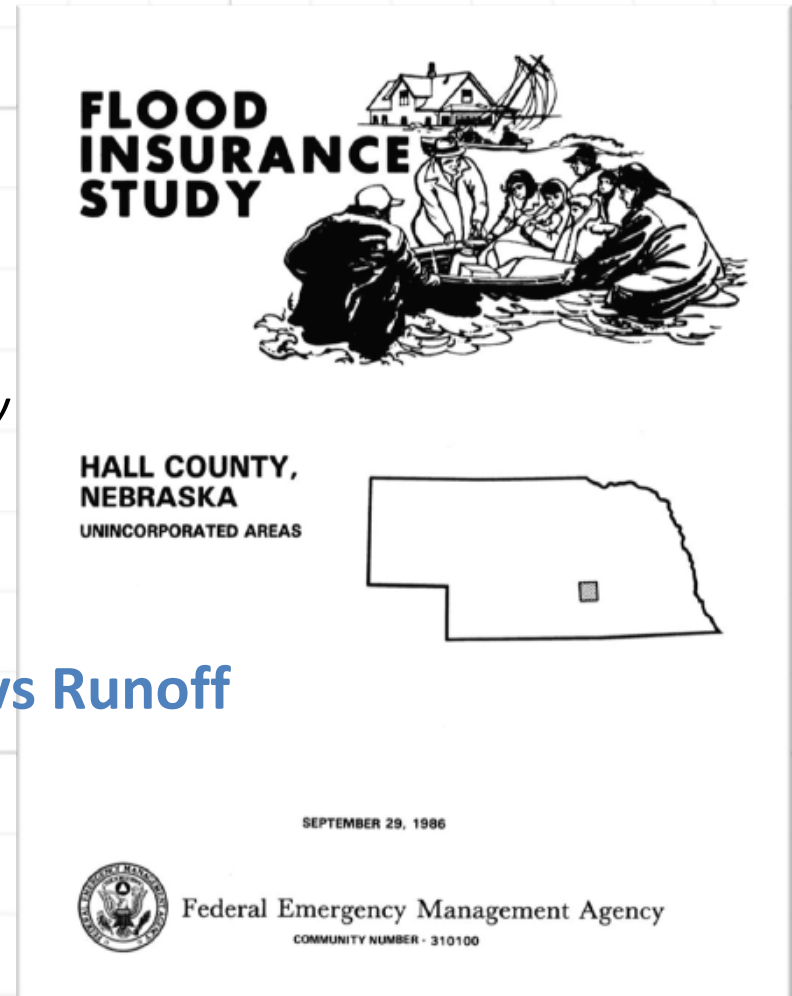


# Moore's Creek

## Moore's Creek Background

- Original Floodplain/Flood Risks Identified based upon Hydrology Study in 1980's
- *Significant Changes since Original Study*

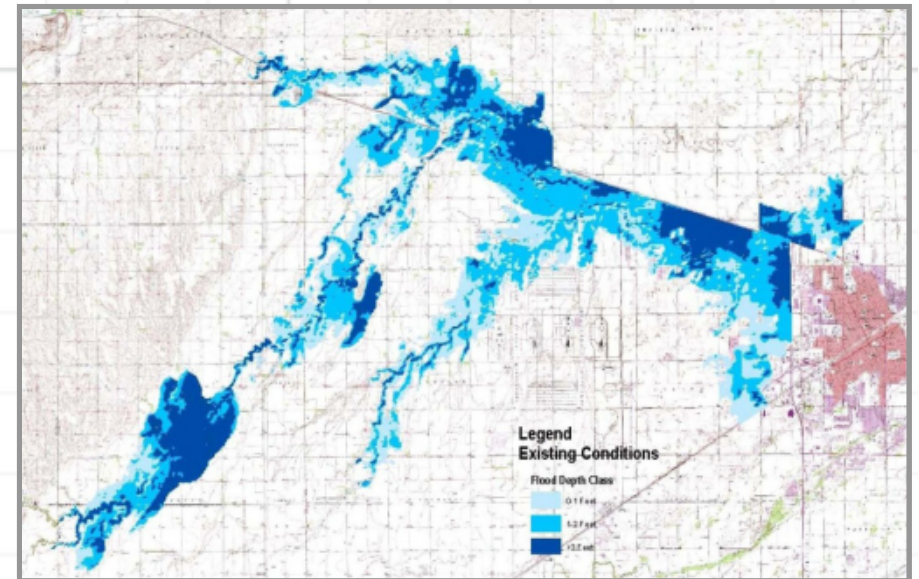
**Hydrology = Study of Rainfall vs Runoff**



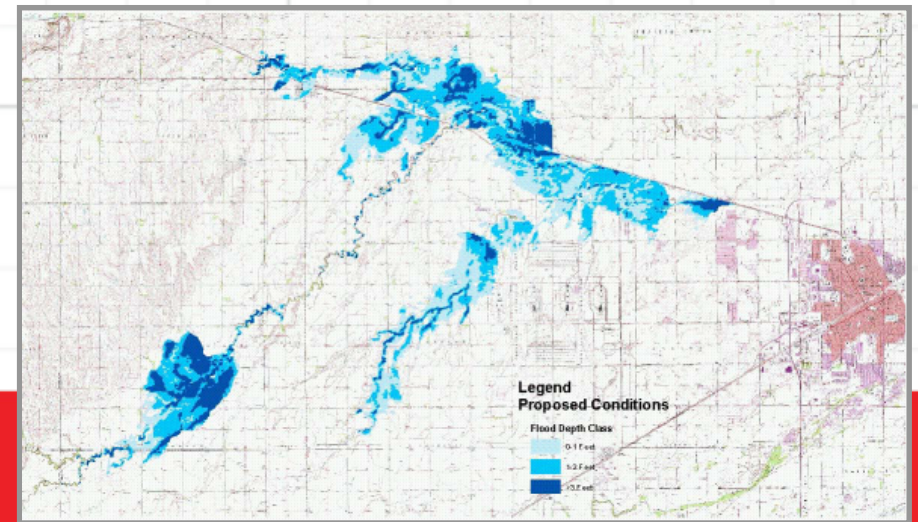
# Moore's Creek

## Moore's Creek Background

- 2004 Feasibility Study
  - No Detailed Hydrology or Hydraulics for Moore's Creek
- Assumed primary Flood Risk due to Overflows from Silver/Prairie Creeks



**Hydraulics = Study of Conveyance  
vs Flood Elevations**

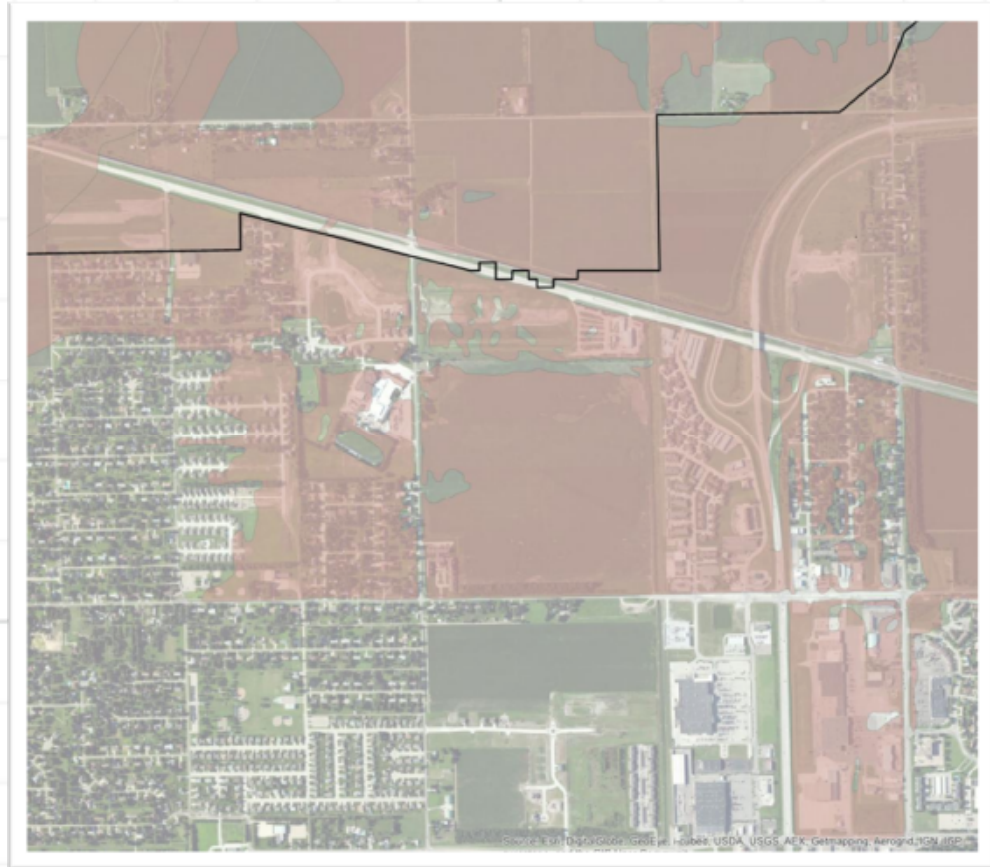


# Moore's Creek

## 2008 Floodplain Maps Updated

### In Floodplain, near City

- 900 Parcels; \$150M
- 730 Structures
  - 600 Residential
  - 130 Non-Residential



# Moore's Creek

## Floodplain and Flood Insurance Implications

### ➤ Floodplain Management

- Restrictions to the Types of Structures that can be built in the Floodplain, and where



### ➤ Biggert Waters Act of 2012

- Changes in how Flood Insurance Rates are Determined
- Increases Financial Stability of the NFIP, less Tax burden
- *Can Have Significant Financial Impacts to Cities in the Floodplain*

### ➤ Grimm Waters Act of 2014

- Enacted to dampen the Financial Impacts
- Phased Implementation of New Insurance Rates over Several Years



# Moore's Creek

## BW-12 and Rebuilding Decisions

### Elevation lowers premiums

### "ZONE A" EXAMPLE



Slide and Graphic Provided by FEMA



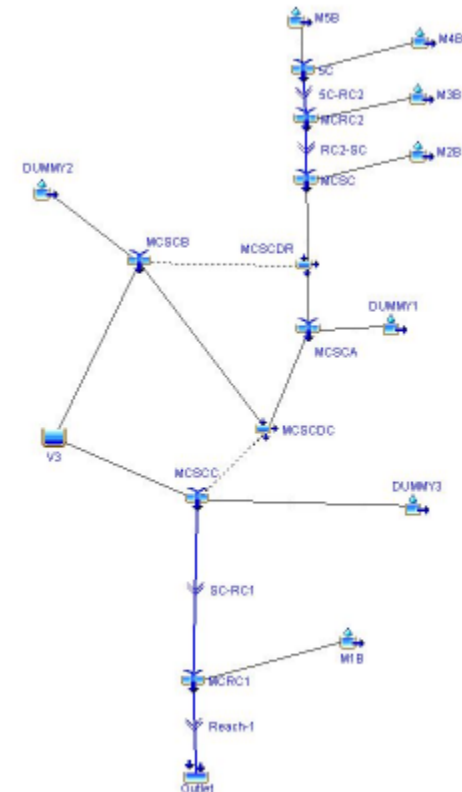
# Moore's Creek

## Moore's Creek Flood Study

- **Detailed H&H Analyses**
  - Considers Flood Control Projects Currently Underway in Dry/Prairie/Silver
    - Reduction/Elimination of Overflows From other Creeks
  - Impacts from New Development
  - Accurate assessment of current Flood Risks

**H&H = Hydrology and Hydraulics**

*Hydrology Model*

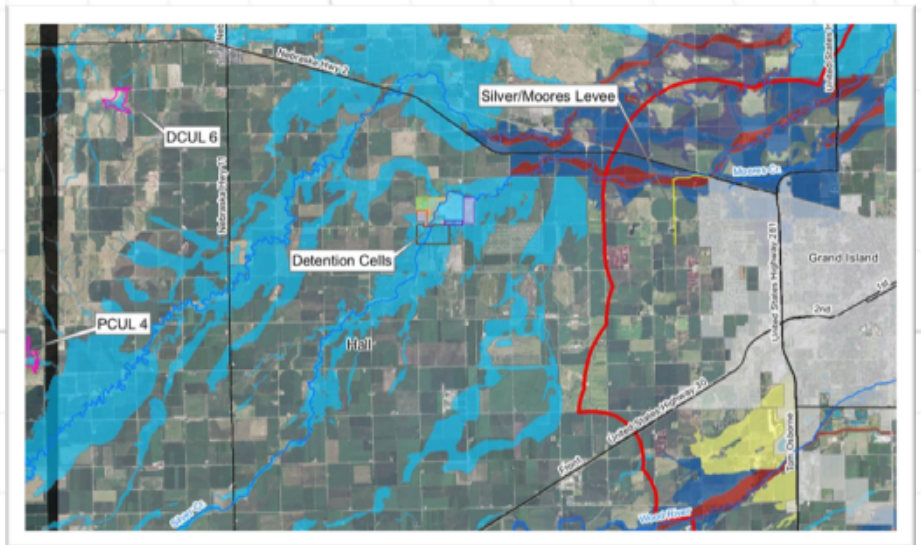




# Moore's Creek

## Moore's Creek Flood Study

- In conjunction with Floodplain Remapping efforts (CLOMR) for Prairie and Silver Creeks
- 2018-2019 Anticipated Completion of Floodplain Remapping
- ***GOAL – Remove Properties from the Floodplain***

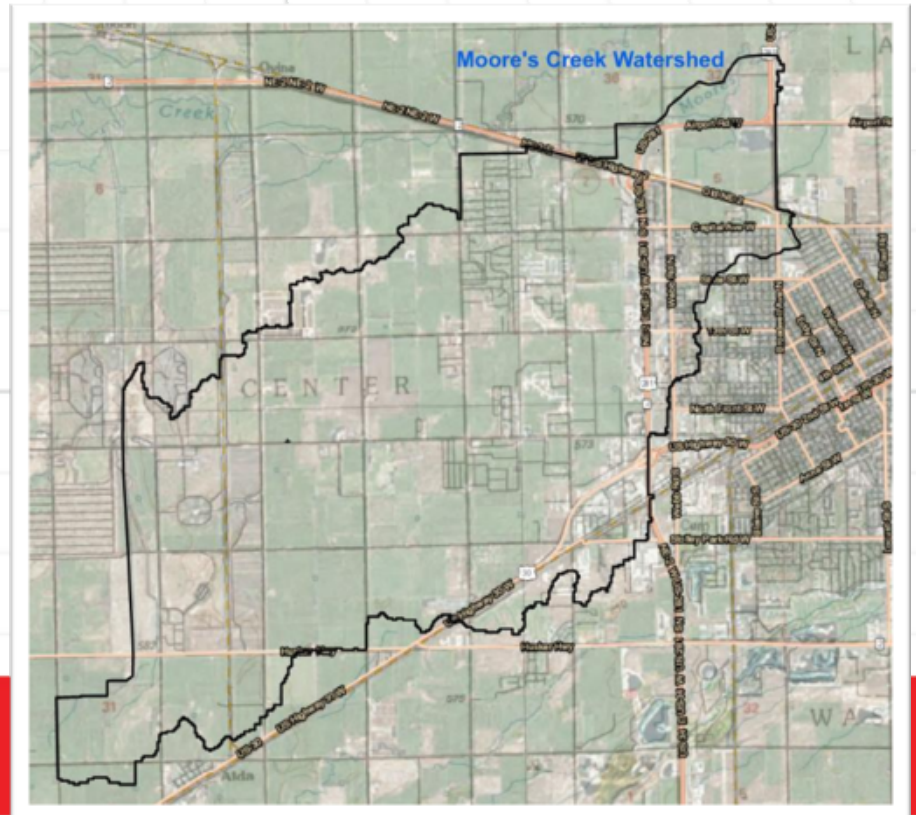


# Moore's Creek

## Moore's Creek Master Plan

- **Analyses of Future Development based upon Future Landuse**
- **Review Stormwater Regulations and Policies**
- **Anticipated Completion 2015**

*Ensure Future Development is done in a responsible manner, consistent with Court mandates*



# Moore's Creek

## Moore's Creek Master Plan

- **Capital Improvement Program Project Development**
  - Flood Control and other Drainage Improvements
- **Proposed Conditions Floodplain Delineations**



# Moore's Creek

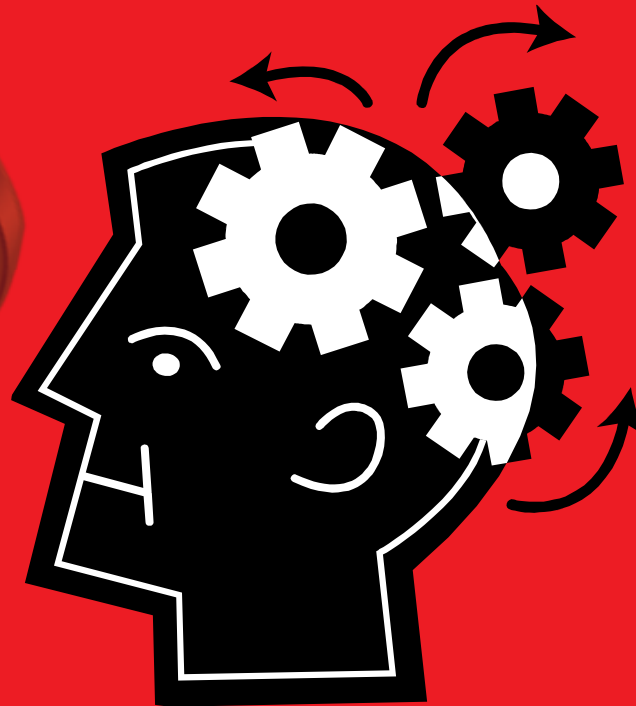
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## **Moore's Creek Flood Study, Master Plan and Northwest Flood Control Projects**

*Overall Comprehensive Effort to  
Reduce Flood Risks and Drainage  
Issues, and Educate to Residents of the  
City of Grand Island and Hall County*



THANK YOU!





**MOORE'S CREEK FLOOD STUDY AND MASTER PLAN**  
**In conjunction with the NORTHWEST FLOOD CONTROL PROJECT**  
**CITY OF GRAND ISLAND, HALL COUNTY AND CENTRAL PLATTE NRD**

## **PROJECT OVERVIEW for NEWSLETTER/PRESS RELEASE**

The City of Grand Island (City) has partnered with Hall County (County) and the Central Platte Natural Resources District (CPNRD) to investigate the flooding that occurs in the northwest portion of the City. The project involves a detailed analysis of the hydrology and hydraulics of the upper parts of the Prairie, Silver, Dry, and Moore's Creek watersheds primarily in rural Hall County. A Feasibility Report was completed in 2004, detailing findings of the H&H analysis and proposed several flood mitigation projects with the ultimate goal of reducing flood damages and removing several hundred homes and businesses from the FEMA Floodplain.

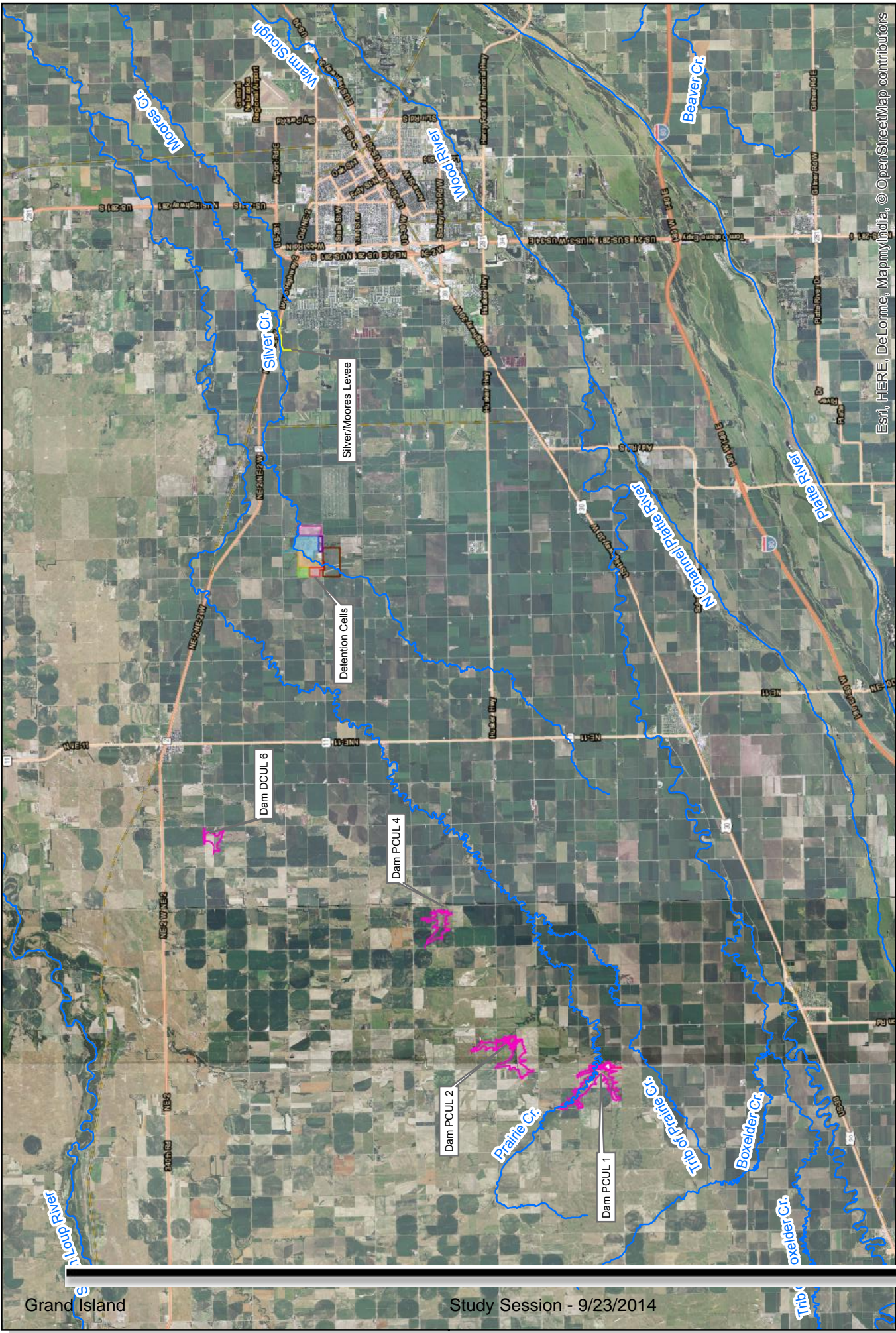
The overall proposed project will provide flood protection for the 100-yr storm to urban, residential, and commercial properties in western and northern Grand Island, generally south of Highway 2 and west of Highway 281. Secondary purposes of the project are to: provide 100-yr flood protection to crop land and rural residents; reduction of road and bridge damages; reduction of the rural 100-yr floodplain extents; and removal of northern and western Grand Island from the FEMA Floodplain. To accomplish these goals, several flood control structures are undergoing design and/or construction including: lowland detention cells; floodwater retarding dams; and a section of levee.

In 2013, JEO began efforts to reassess the FEMA floodplain through the Conditional Letter of Map Revision (CLOMR) process. Removal of structures will have significant economic impacts due to recent changes in the National Flood Insurance Program (NFIP). Many federal assistance subsidies will be removed thereby returning insurance rates to more risk-based levels and providing more financial stability to the program. The remapping done as part of this project is intended to significantly reduce flood risks, reduce the size of the floodplain, and thus reduce flood insurance requirements. Proposed flood control structures, upon construction, will significantly impact floodplain extents. Therefore, these structures will be incorporated into a revised floodplain analysis and submitted to FEMA for adoption. The Moore's Creek watershed is partially located within the City, and is therefore of particular interest with respect to the floodplain. Though the floodplain maps for the City were updated in 2008, they do not accurately reflect the Moore's Creek floodplain due to recent flood control projects and new development. For this reason, the City is conducting a Flood Study to reassess the floodplain. A public open house will be conducted later this year to inform residents of the findings of the Flood Study. Further phases of the project will include a Master Plan for Moore's Creek, to identify additional measures to reduce flood risks and encourage responsible new development.

If you have any questions regarding this project, feel free to contact:

- Terry Brown, Assistant Public Works Director, [terryb@grand-island.com](mailto:terryb@grand-island.com), 308-385-5444
- Chad Naby, Regional Planning Director, [chadn@grand-island.com](mailto:chadn@grand-island.com), 308-385-5240

**JEO CONSULTING GROUP, INC.; Upper P-S-M Project Overview**



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 File: 310D2

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## Grand Island Flood Control Projects

Upper/Silver/Moore's Creek Flood Control Project  
 known as the Northwest Flood Control Project  
 Platte NRD and City of Grand Island