



City of Grand Island

Tuesday, June 18, 2013

Study Session

Item -2

Discussion Concerning Water Related Issues

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

Council Agenda Memo

From: John Collins PE, Public Works Director

Meeting: June 18, 2013

Subject: Discussion Concerning Water Related Issues

Item #'s: 2

Presenter(s): John Collins PE, Public Works Director

Background

Department of Public Works staff receive frequent complaints of water related issues including groundwater levels, water in basements, standing water in yards, ditches & detention cells, overgrowth of vegetation in ditches & detention cells, and neighbors pumping water to them or blocking drainage.

We attempt to address each complaint as it is presented, but are not always able to respond in a timely manner to resolve the issue.

Discussion

The purpose of this item is to present an overview of complaints and solutions so that City Council and the community may gain an understating of the total problem and how each individual complaint is related with the other.

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 individual drainage issues and recommendations to future council meetings.

Water Related Issues

☞ Symptoms/Complaints

☞ Sources

☞ Solutions



Water in Basements

- ☞ Ground Water
- ☞ Lot Drainage
- ☞ Subdivision Drainage
- ☞ City Drainage
- ☞ Structure Error (roof drain, poor seals, etc.)



Standing Water On Property

- 🌊 Lot Drainage
- 🌊 Subdivision Drainage
- 🌊 City Drainage
- 🌊 Crop Irrigation
- 🌊 Lawn Sprinklers
- 🌊 Ground Water Discharge (from Pumping)
- 🌊 Blocked Drainage (Ditches and/or Storm Sewers)
- 🌊 Inadequate Detention
- 🌊 Poor Ditch Grades, Pipe Grades, and Culvert Slopes



Standing Water In Ditches

- Subdivision Drainage
- City Drainage
- Crop Irrigation
- Lawn Sprinklers
- Ground Water Discharge (from Pumping)
- Blocked Drainage (Ditches and/or Storm Sewers)
- Inadequate Detention
- Poor Ditch Grades, Pipe Grades, and Culvert Slopes



Overgrowth of Vegetation In Ditches

Results from maintenance difficulties due to:

- ☞ Standing Water (see Previous Slide)
- ☞ Inadequate Equipment/Insufficient Staff
- ☞ Inappropriate Design or Construction
- ☞ Confusion over Who is Responsible (Streets, Department of Roads, Private Owner, etc.)



Standing Water In Detention Cells

- City Drainage
- Ground Water Discharge (from Pumping)
- Crop Irrigation
- Lawn Sprinklers
- Blocked Drainage (Ditches and/or Storm Sewers)
- Poor Ditch Grades, Pipe Grades, and Culvert Slopes
- Inadequate outlet
- Inadequate capacity
- Too Deep
- Vegetation

Overgrowth of Vegetation In Detention Cells

Results from maintenance difficulties due to:

- ☞ Standing Water (see Previous Slide)
- ☞ Inadequate Access
- ☞ Inappropriate Design or Construction
- ☞ Confusion over Who is Responsible (Streets, Parks, Private Owner, etc.)

Classes of Solutions

- 🌊 Citywide Dewatering System
- 🌊 Individual Dewatering
- 🌊 City Drainage Construction
- 🌊 Subdivision Drainage Construction & Regulation
- 🌊 Lot Drainage Regulation
- 🌊 Proper Infrastructure Maintenance

Dewatering System

Potential to:

- Reduce water in basements
- Reduce water in ditch bottoms
- Reduce water in detention cells
- Increase water in ditches and detention cells
- Operations (effort and cost)

Individual Dewatering

Potential to:

- ☞ Reduce water in basements
- ☞ Increase water in ditches and detention cells
- ☞ Put water in streets occasionally creating issues with ice, mud, or other debris – damages pavement.
- ☞ Put water into public areas or neighbors' yards



City Drainage Construction

Potential to:

- Reduce water ditches and detention cells
- Make the system more efficient
- Eliminate the need for court mandated weirs
- Increase water in ditches and detention cells

Subdivision Drainage Construction & Regulation

Potential to:

- Reduce standing water on property
- Reduce standing water ditches and detention cells
- Make the system more efficient
- Reduce maintenance required both within the subdivision and for adjacent drainage systems
- Increase inspection and enforcement workload

Lot Drainage Regulation

Potential to:

- ☞ Reduce standing water on property
- ☞ Encourage water to flow along planned routes
- ☞ Increase inspection and enforcement workload

Proper Infrastructure Maintenance

Potential to :

- ☞ Reduce standing water on property
- ☞ Reduce standing water ditches and detention cells
- ☞ Make the system more efficient
- ☞ Identify infrastructure issues before failure

Past and Current Efforts



Citywide Dewatering System

- 🌊 1998 Dewatering CPNRD Study:
 - Modeled City
 - Tested Concept
- 🌊 2011 City Dewatering Program
 - 5 Pumps Dewatering about 171 Properties
- 🌊 2012 Dewatering Study
 - Modeled City
 - Created 3 Semi Independent Areas



Individual Dewatering

- ☞ Many Individuals Pumping
- ☞ Regularly Advise Owners of Acceptable Areas to Direct Water
- ☞ Frequently Attempt to Mitigate Complaints of Neighbors' Dewatering

City Drainage Construction

- RFQ Development for Drainage Master Plan

- Numerous Projects

Examples of Projects

- 🌊 Highway 30 Drainage Improvements
- 🌊 Cannon Ditch Lining
- 🌊 Stagecoach Detention Cell Lining
- 🌊 CCC to Wood River Drainway
- 🌊 Moores Creek Drainage
- 🌊 Annual Ditch Lining Program
- 🌊 Annual Storm Cell Improvement Program

Subdivision Drainage Construction & Regulation

- 🌊 Typical Sections for Roadways (in development)
- 🌊 Review of Land Development Requirements and Process
- 🌊 Review of Builder Requirements and Process
- 🌊 Identified Need for Survey and GIS

Each part will include reviews with internal and external stakeholders prior to presentation to Council

Lot Drainage Regulation

- Review Grading requirements and Drainage Impediment issues for individual lots as well as process for permitting and inspection
- Identified Need for Survey and GIS

This will include reviews with internal and external stakeholders prior to presentation to Council

Proper Infrastructure Maintenance

- Maintenance includes debris removal, making repairs and correcting minor deficiencies.
- Regardless of how much drainage infrastructure is constructed, drainage will fail if not properly maintained.
- Assessment has been underway for 2 years
- Activities highly dependent on weather and groundwater
- Primary issues have been identified
- Recommendations are Ready

System Assessment

- 🌊 We have performed a number of maintenance activities over the last two years so that we could assess the condition of the City's drainage system and the effectiveness of various corrective methods, such as, partnering with the Wastewater Division's Collections Unit to clean storm sewer, resetting ditch grades, setting a higher priority for existing catch basin cleaning, and testing specialized equipment.

System Assessment

Repair Outlet Scouring



Before

System Assessment

Repair Outlet Scouring



After



System Assessment

Catch Basin Repair and Curb Restoration



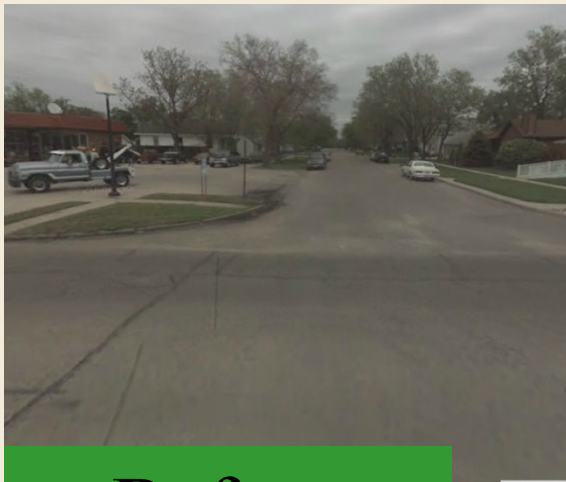
Before



After

System Assessment

Catch Basin and Storm Sewer Installation



Before



During



After

System Assessment

Catch Basin Cleaning & Debris Removal



System Assessment

Ditch and Detention Cell Grading



Before



After

System Assessment

Concrete Low Flow Liner Installation



Maintenance Activities: Ditches

- Removing debris (trees, branches, etc.)
- Mowing
- Filling low spots and washouts
- Re-establishing Grade

Maintenance Activities: Culverts

- Removing debris (trees, branches, big red balls, etc.)
- Resetting to grade (matching ditch grade)
- Cleaning with sewer jet/vac
- Replacing



Maintenance Activities: Storm Sewer

- Removing large debris
- Cleaning pipes with sewer jet/vac
- Cleaning catch basins and manholes
- Repairing catch basins and manholes
- Replacing/Repairing pipe
- Condition assessment
- Setting to grade



Maintenance Activities: Detention Cells

- Removing large debris
- Mowing
- Setting grade (to flow toward outlet)
- Reestablishing grade above ground water
- Cleaning outlets and inlets
- Repairing outlet grates
- Lining bottom (flow liner or in total)
- Repair and maintenance of pumps
- Maintaining gates

Current Staff

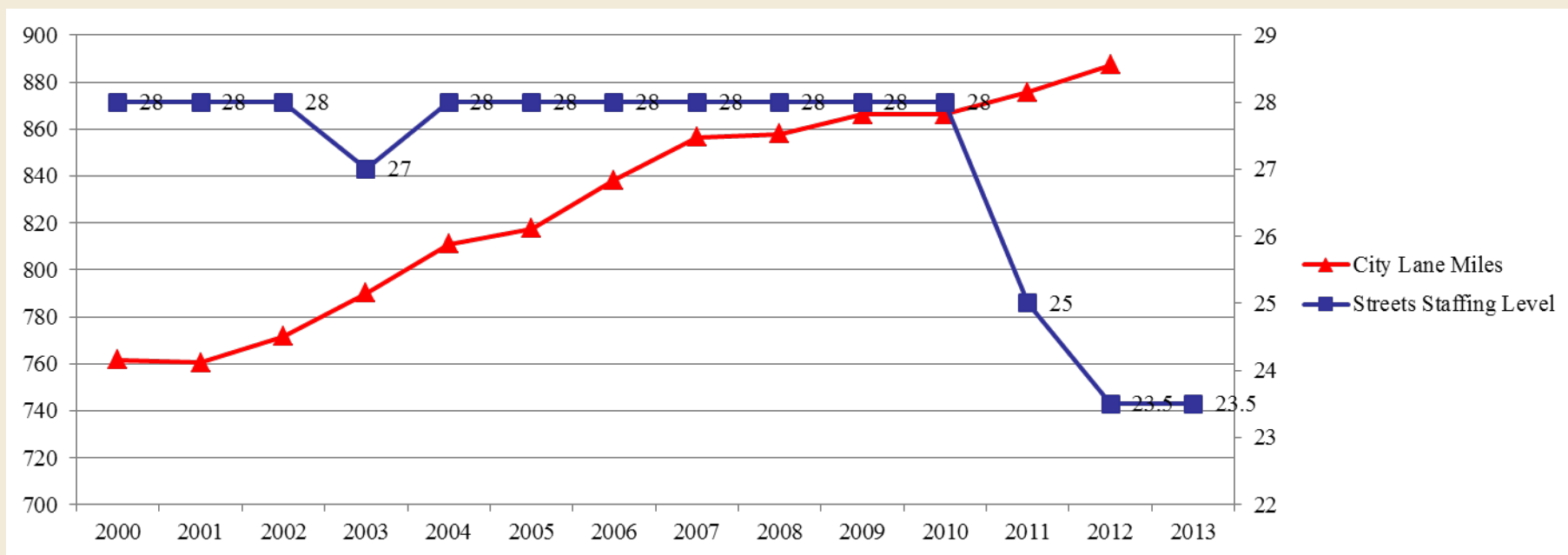
Streets – handling pavement repair, pothole patching, crack sealing, mowing, sweeping, and seasonal drainage work.

Traffic & Drainage – handling traffic signals, signs, and striping as well as cleaning catch basins and detention cells, and adjusting the drainage system to flow properly.

Staff Analysis

- The Traffic & Drainage crew are staffed at a level to handle the traffic function or the drainage function, but not both.
- Existing equipment is geared more for Traffic work.
- Seasonally handling some drainage, but Public Safety and Law require that Traffic work be given priority over drainage.

Streets Staff & City Infrastructure Trends



Recommended Division Changes

- Separate the functions of traffic and drainage among two crews.
- Re-establish existing Traffic and Drainage crew into a dedicated **Traffic** crew.
- Create a new **Drainage** crew.
- Budget will include recommendations for additional FTE

Drainage Crew's Areas of Responsibility

- Flush Culverts and Storm Sewer Pipes
- Reestablish Ditch Grades and Reset Culverts
- Remove Spoil and fill low areas in ditches and detention cells
- Repair Manholes
- Remove debris and trim vegetation in ditches and detention cells
- Repair Storm Water Pumps
- Remove debris and flush under bridges
- Installing liners in ditches and detention cells

Discussion

