CITY OF Ames

Caring People ◆ Quality Programs ◆ Exceptional Service

MEMO

ITEMS 1 & 2

To: Mayor and City Council

From: Bob Kindred

Date: February 14, 2014

Subject: City Council Workshop – February 18, 2014

Mayor and Council:

In anticipation of Tuesday's Council workshops, we are sending you Power Point presentations in PDF for both topics. Reviewing these slides in advance should help you get a head start on both topics, which hopefully will allow staff to do a more effective job while going through these complex topics on Tuesday night.

The first topic is driven by our need to comply with federal and state laws requiring adoption of a post-construction storm water ordinance. We plan to cover the following areas:

<u>Post-Construction Stormwater Ordinance</u>
Stormwater management orientation (Stormwater 101)
Current methods for managing stormwater
State MS4 Stormwater Permit
Process followed to develop proposed ordinance
Current stormwater requirements
Proposed stormwater requirements
Council direction needed
Maintenance alternatives
Performance bonding
Appeals
Next steps

The second topic addresses a goal from the previous City Council to mitigate flooding (both in the flood plain and in local areas). Council directed us to schedule a workshop where they could be informed and educated regarding flood plain regulations, after which they would decide if further steps were warranted. This presentation will cover the following areas:

<u>Flood Plain Regulations</u>
Orientation to flood plains (Flood Plains 101)
Review current Ames flood plain regulations
Overview of other potential flood plain regulations
Recap both existing and potential efforts to address localized flooding
Council Q/A

We look forward to a learning time together on Tuesday!

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smart WATERSHEDS

FOR CLEAN RIVERS AND STREAMS

Ames Post Construction Ordinance

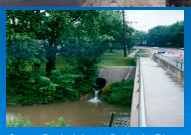
CITY OF ames

What is stormwater runoff?

- Rain and melted snow that flow off impervious surfaces, such as streets, rooftops, and lawns, to surface waters
- It is most often collected and quickly conveyed off-site

You live on waterfront property!

- Storm drains are connected to streams, ponds, and lakes.
- Water is not treated before it flows to the stream.

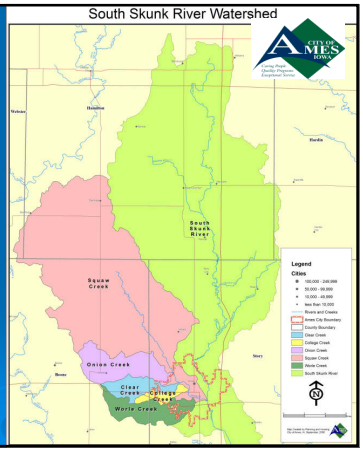


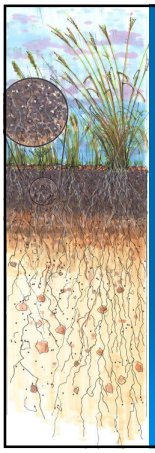
Storm Drain Inlet & Outlet in River

Ames Watersheds

- **South Skunk River**
- **Squaw Creek**
- **Onion Creek**
- **Clear Creek**
- **College Creek**
- **Worle Creek**

South Skunk River Watershed





Historic Landscapes

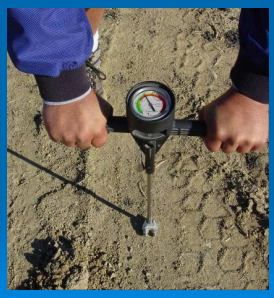
- Prairie soils had 8-10% organic matter content and 45% pore space
- Now soils have < 4% OM
- Even less organic matter on construction sites
- Soils have lost 60-80% of their ability to absorb and infiltrate rainfall events

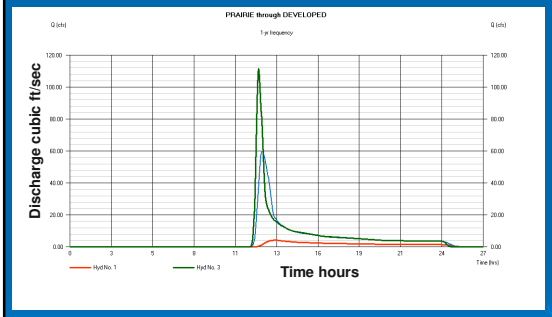
Impervious Surfaces

One inch of rain, falling on one acre, delivers 27,000 gallons of water!

Typical urban surfaces, ***including residential lawns***, do not absorb significant amounts of precipitation.

Urban soils become compacted thru the development process





- Red = Prairie
- Blue = Agriculture
- Green = Urban Single Family Residential

How is Stormwater Currently Managed in Ames?

- Portions of the community older than 1980s-Collect in storm drains and discharge to stream: Doesn't address water quality or flood control.

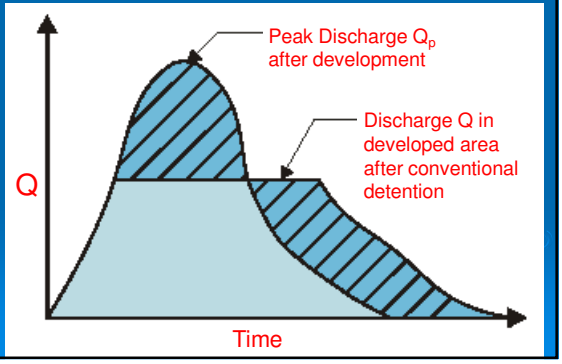
How is Stormwater Currently Managed in Ames?

- Subdivisions built 1980s to present: wet or dry ponds: Collect in storm drains discharge to ponds-throttle down discharge rate, minimal treatment, impact stream stability-flashy flows

Dry pond: Sommerset development

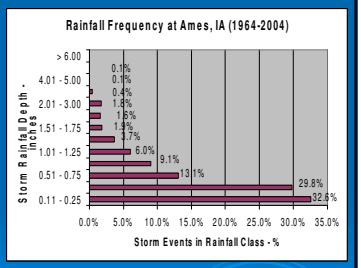
Wet ponds: Moore Park, Northridge Heights

Hydraulic Alteration after Traditional Methods

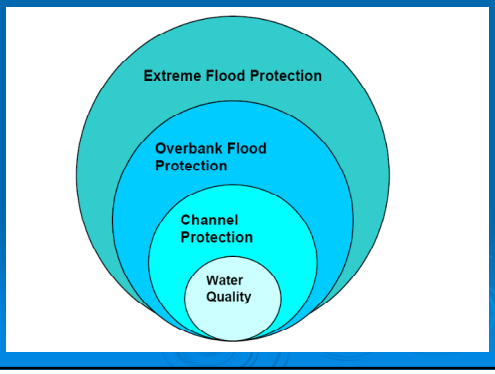


Rainfall Patterns and Water Quality

- The 'first flush' of rainfall moves pollutant loads to surface waters
- Use practices that retain water from the small storms water on-site
- Strategies include:
  - Slow down, infiltrate, cleanse, discharge



Relationship of Uniform Sizing Criteria

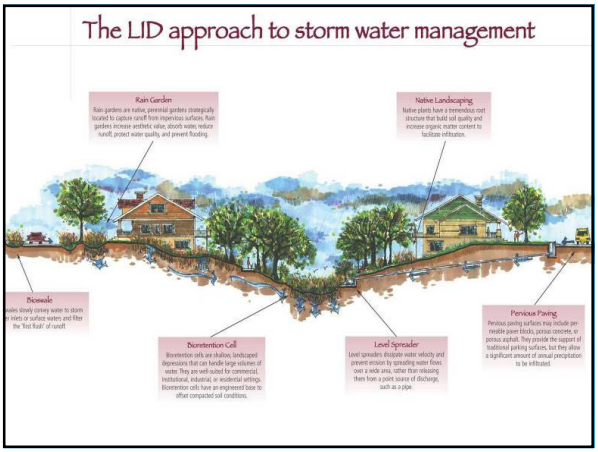


Unified Sizing Criteria -Comprehensive Approach to Stormwater Management

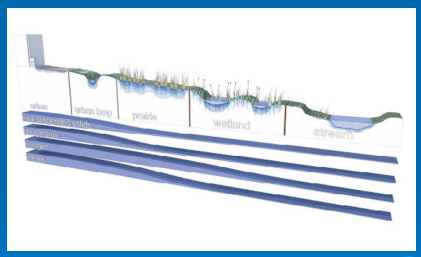
1. Address the most commonly occurring events, which deliver most pollutants to urban streams (1.25 inches/acre).
   - **Water Quality Standard (WQ_v)**
2. Address slightly larger, events that cause rapid "bounce" in water levels in streams (1 year, 24 hour event).
   - **Channel Protection Standard (CP_v)**
3. Address volume and peak of runoff generated during minor storms to reduce potential surcharge of local storm sewer systems and/or overbank flooding (5 year storm event).
   - **Overbank Flood Protection (Q_p)**
4. Address the volume and peak of runoff generated during rarely occurring, major storms to reduce potential for infrastructure damage from major flooding (10 year to 100 year events).
   - **Extreme Flood Protection (Q_f)**

Hydrology for Stormwater Quality Management

- Capturing and treating runoff from "smaller" storms should capture the largest percentage of the runoff events.
- A BMP capable of capturing these smaller storms would also capture the "first flush" volume of the larger, more infrequent runoff events.
- Design for water quality BMPs should be centered on the **Water Quality Volume** required to capture and retain the runoff for the smaller storms from a given site.
- The Water Quality Volume is the storage needed to capture and treat the runoff from 90% of the average annual rainfall.



Stormwater Treatment Train



Graphic: ASLA

Using a combination of practices in series to manage all types of storm events for water quality and flood management.

Ringgenberg Development

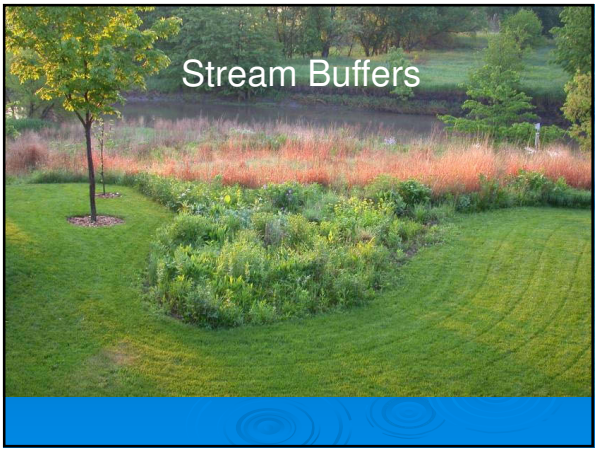
- Components of a stormwater treatment train
- Bioswales, ponds, wetland

Photos: Fox Engineering

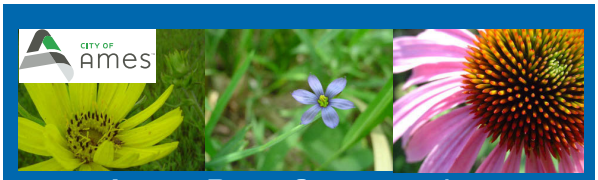
Stormwater Quality Management

- Low Impact Development
- Bioretention Cells
- Bioswales
- Native Landscaping
- Permeable Paving
- Rain Gardens
- Soil Quality Restoration

Bioretention manages runoff from impervious surfaces.



Native Turf



Ames Post Construction Ordinance

"An ordinance that comprehensively manages stormwater to mitigate runoff from imperious surfaces and address water quality and minimization of flooding impacts"

Iowa DNR Stormwater Permit

- Ames holds a MS4 Permit from the IDNR
- Requires a post construction stormwater management ordinance
  - An ordinance shall be adopted or amended as needed and enforced which will address the control of runoff from building activities after construction has been completed. The ordinance shall require water quality and quantity components be considered in the design of new construction and implemented when practical. The statement shall promote the use of storm water detention and retention, grass swales, bioretention swales, riparian buffers and proper operation and maintenance of these facilities.

Background

- 2006 - Final draft of Post-Construction Stormwater Management Model Ordinance
  - Created through Iowa Stormwater Partnership (IDALS, IDNR, Polk County Soil and Water Conservation District, ISWEP, NRCS, University of Iowa, Iowa State University, and SUDAS)
    - Ahlers and Cooney Municipal Lawyer and ISWEP
- 2007 to present – numerous Post-Construction draft ordinances (staff discussions)
- 2007 - Construction Site Erosion and Sediment Control Ordinance
- 2008 and 2010 – Community Flooding

Background

- 2010 - Conservation Subdivision Ordinance
  - Worked with area developers to create
  - Contains similar language to proposed ordinance:
    - Stream buffers
    - Unified Sizing Criteria and Low Impact Development
    - Iowa Stormwater Management Manual
    - Easements and Maintenance
- 2011 – Urban Stream Assessment update and Ames Flood Mitigation Study
- 2010 to 2012 – Localized flood mitigation projects
- 2012 finalized draft Post-Construction Stormwater Management Ordinance for Ames

Public Input

- Stormwater Advisory Committee
  - Established as MS4 permit requirement
  - Met to craft draft ordinance on August 21, 2013
    - Comments were incorporated into a new draft that was then opened for public comment
  - Members include:

Tom Sauer (Soil Scientist)	Charlie Kuester (Planner)
Steve Mayberry (ISU MS4)	Leanne Harter (Planner)
Chuck Winkleblack (Developer)	Kurt Friedrich (Developer)
Scott Renaud (Engineer)	Nathan Easter (Engineer)
Jim Colbert (Biologist)	

Public Input

- Ames Residents and Business Owners were invited to learn more about and comment on the proposed Post Construction Stormwater Management Ordinance
  - Meeting announcements were included in City Council Highlights
  - Meeting invitations posted around City Hall
  - Press Release issued
  - Invitation via email to Ames Homebuilder's Association members
  - Draft ordinance, presentation, and comment form were placed on City's website

Public Input

- Two Public Meetings
  - Thursday, September 12, 2013, 12:00-1:00 pm and 5:30-6:30 pm at Ames City Hall Auditorium
- One Open House
  - Tuesday, September 24, 2013, 5:00-6:00pm at Ames City Hall Conference Room 235
- November 12, 2013 City Council presentation by Tracy Warner and Pat Sauer
  - Council direction to host a future workshop

Current Stormwater Requirements

- "Stormwater management design shall include grading, facilities, improvements, or some combination thereof, which results in no increase in the rate of runoff when compared to the undeveloped condition in the area to be developed."

Current Stormwater Requirements

- "The rainfall frequencies that shall be incorporated in the design of the stormwater management system shall include the 5 year, 10 year, 50 year, and 100 year design storm events."
- Does not address stormwater water quality and stream channel protection

Ames Proposed Post Construction Ordinance

- Local goals of a Post-Construction Ordinance:
  - Utilize a combination of best management practices (BMPs) (also known as a stormwater treatment train)
  - Minimize increases in stormwater runoff,
  - Minimize non-point source pollution, and
  - Minimize mass grading

Ames Proposed Post Construction Ordinance

- Need design and specification documents for implementation
  - 26 MS4 communities
    - 14 of 26 have an ordinance referencing the Iowa Stormwater Management Manual
    - 10 of 26 have an ordinance which specifically mentions at least a portion of the Unified Sizing Criteria

Ames Proposed Post Construction Ordinance

- Statewide Urban Design and Specifications (SUDAS)
  - Adopted by City of Ames for infrastructure improvements (pavement, traffic signals, water main, storm sewer, sanitary sewer, etc.)
    - Created and maintained by a partnership of public agencies
- Adoptions of Iowa Stormwater Management Manual is similar approach to SUDAS

Ames Proposed Post Construction Ordinance

- Design and specification documents
  - Adoption alternative 1: IDNR Iowa Stormwater Management Manual including Unified Sizing Criteria with future editions and local supplemental specs (recommended)
    - This manual was created by a partnership of public agencies and included stormwater experts
    - Updates to this manual are completed by Iowa Stormwater Education Program (ISWEP), reviewed by the partnership agencies, and adopted by IDNR
  - Adoption alternative 2: Direct staff to create design and specification documents

Ames Proposed Post Construction Ordinance

- Where would this apply:
  - To new development and redevelopment disturbing 1 acre or more of land and to any development disturbing < 1 acre if impervious cover >10,000 square feet
    - 1 acre of disturbed area is consistent with IDNR General Permit No. 2 and Municipal Code Chapter 5A (Construction Site Erosion Control)
    - 10,000 sq feet (local recommendation)
      - 150 sq feet currently requires a Site Plan

Ames Proposed Post Construction Ordinance

- Where would this apply:
  - To new development and redevelopment disturbing 1 acre or more of land and to any development disturbing < 1 acre if impervious cover >10,000 square feet
    - 10,000 sq feet (local recommendation)
      - *Model Ordinance Language: The size of the site development to which post-construction stormwater management runoff control applies varies but many communities opt for a size limit of 5000 square feet or more. For sites less than 5000 square feet, local officials may wish to grant an exemption as long as the amount of impervious cover created does not exceed 1000 square feet.*

Procedures and Requirements

- A stormwater management plan prepared by an engineer or landscape architect
- Graphic inventory of existing natural resources
  - Including hydric soils (wetland soils) and landscape features to be protected
  - 10 of 26 MS4 communities require
- Topographic watershed map
  - IDNR LiDAR (available at no cost) or COA aerial topo

Procedures and Requirements

- Design calculations for proposed BMPs
  - Mimic historic hydrology by using runoff numbers for a meadow vs. existing (typically Ag) conditions
    - This further reduces storm water runoff
- Use Low Impact Development (LID) features:
  - Preserve open space and natural areas,
  - Re-establish prairies
  - Minimize impervious cover
  - Current Conservation Sub. Ord. (Ch. 23 Div. VI)

Procedures and Requirements

- Technical assessment of soils
  - Soils information guides
    - Successful placement of BMPs
    - assessing potential for basement flooding
  - General soils information is free on NRCS website
  - Soil borings for additional information (as needed)
  - 8 of 26 MS4 communities require

Procedures and Requirements

- Stream Buffers
  - S Skunk River, Squaw Creek, and Onion Creek
    - analysis to determine adequate buffer width
  - College, Clear, and Worle Creeks
    - stream buffer width 100 feet on each side perpendicular to waterway
  - Same language as Conservation Subdivision Ordinance
  - 4 of 26 MS4 communities require/recommend

Procedures and Requirements

- Maintenance, Repair and Landscaping Plan
  - Addresses routine and long-term maintenance
  - Establishment phase
    - Native landscape can take 3 years to establish
- Maintenance Agreement
  - 26 MS4 communities
    - 8 require Maintenance Agreements
    - 7 require Maintenance Easements
    - 19 have Property Owner responsible for maintenance
    - 2 have shared Property Owner/City responsibility
    - 2 have City solely responsible for maintenance

Procedures and Requirements

- Maintenance Alternatives:
  - Private land owner's responsibility
    - City of Ames would provide educational literature for how to maintain various stormwater practices and be available as technical support to address questions/concerns
  - City of Ames responsibility (through Storm Sewer Utility Fund, G.O. Bonds, and/or Assessment to those who benefit)

  Partnership for responsibility

Procedures and Requirements

- Maintenance Alternatives:
  - **Alternative 1**: Owner's responsibility in all development and redevelopment (e.g. Homeowner's Association, private contract, or non-profit organization) **(Recommended)**
  - **Alternative 2**: Owner's responsibility for commercial and industrial development, City responsibility for residential development (through Storm Sewer Utility Fund, G.O. Bonds, and/or Assessment)
  - **Alternative 3**: City responsibility for all development and redevelopment (through Storm Sewer Utility Fund, G.O. Bonds, and/or Assessment)

Procedures and Requirements

- Recorded maintenance easements for access to public BMPs (water runoff enters BMP from public right-of-way) (same as current process)
- Recorded drainage easement for flow conveyance and access to public waterway (such as College Creek or S. Skunk River) (same as current process)

For lots impacted by Stormwater BMPs

- Lowest opening of all buildings impacted by a stormwater BMP shall be a minimum of 3 feet above 100 year water surface elevation
- Intended to avoid localized flooding issues such as Northridge Parkway Subdivision
- Builder shall provide a certified elevation certificate before obtaining occupancy

Waivers

- Waivers:
  - Partial Waivers – may be granted by Municipal Engineer for redevelopment projects if proposed development does not impair attainment of objectives of this ordinance
    - Alternative minimum requirements for on-site management
    - Off-site Facility to meet requirements
    - Monetary Contribution (Fee-in-Lieu) for watershed studies, monitoring, and improvements

Performance Bond

- Financial Security with Final Plat or Site Plan
  - To ensure construction of BMPs
  - Total estimated cost for the construction of the BMPs (similar to current process for other public infrastructure)
  - Receive as-built plans from owner, City conduct final inspection of site, and then release financial security
  - 7 of 26 MS4 communities may require performance guarantee

Performance Bond

- Performance Bond
  - To ensure BMPs are maintained in an effective state
    - Maintenance required by 24 of 26 MS4 communities through ordinance language and/or performance bond
    - Bond is required by 7 of 26 MS4 communities
      - 2 years, 4 years, 5 years, 10 years , and 25 years
    - Alternative 1: require 4 year performance bond (recommended)
    - Alternative 2: do not require performance bond

Maintenance and Repair of Stormwater BMPs

- This section will be updated to reflect Council direction provided tonight
- This section provides guidance for property owners who are responsible for inspection documentation and maintenance of BMPs
  - Includes provision for lack of maintenance

Appeals

- Appeals:
  - Alternative 1: Rely on waiver process (above) (recommended)
    - If this becomes a problem, a separate Stormwater Appeal Board could be adopted into the ordinance at a future date
  - Alternative 2: Appeals come before City Council
  - Alternative 3: Creation of a Stormwater Appeal Board (appointed by Mayor)

Summary

- Main changes from current ordinance
  - Manage/treat water quality volume in addition to water quantity
  - Unified Sizing Criteria (up-to-date engineering method)
  - Mimic historic hydrology (meadow runoff numbers)
  - Submittal requirements (e.g. soils, natural resources)
  - Minimize mass grading
  - Stream Buffers
  - Lowest Opening 3 feet above 100 year water surface elevation
  - Maintenance, Repair, and Landscaping Plan
  - Maintenance Agreement
  - Performance Bond
  - Waivers and Appeals

Summary

- Decision points
  - Manage water quality and quantity volumes
  - Adoption of Iowa Stormwater Management Manual
  - Stream Buffers
  - Lowest opening 3 feet above 100 year W.S.E.
  - Maintenance responsibility
  - Financial Security
  - Performance Bond
  - Waivers
  - Appeals

Next Steps

- Staff finalize ordinance for City Council consideration
  - March 25, 2014 meeting for 1st reading
- Planning & Zoning Commission and City Council actions to address current ordinance
- Work with stormwater consultant to create and provide
  - Technical design documents for staff and design engineers
  - Host training for staff and design engineers/developers/etc.
- Following adoption of ordinance, DRC implementation

Questions or Comments?

- Contact Tracy Warner, Municipal Engineer
  (515) 239-5160, twarner@city.ames.ia.us

  or
- Pat Sauer, Stormwater Consultant,
  psauer@iamu.org