JOHNSON COUNTY, IA PROPERTY STORMWATER MANAGEMENT PLAN

Kate Giannini
Soil & Water Conservation Specialist
Johnson County (Iowa) Planning &
Zoning Department

TABLE OF CONTENTS

List of Figures:

List of Tables:

List of Appendices

Executive Summary

Johnson County strives to be a local leader of sustainability, in hope others in our region will follow our lead and take action towards sustainability. In 2009, the County Board of Supervisors adopted the Johnson County Greenhouse Gas Reduction and Sustainability Plan. The goal of this plan was to reduce greenhouse gas emissions produced both, directly and indirectly, from daily county operations. Sustainability action steps to reduce greenhouse gases are included in the Johnson County Strategic Plan. Additionally, the sustainability plan addresses stormwater, specifically how stormwater runoff is addressed on county properties. The intent of this document is to provide an overall plan on how to address current infrastructure and make recommendations for future site designs on County property. Recommendations can be found on page 14.

1. Introduction

In 2011, the County Board of Supervisors adopted a Stormwater ordinance, which requires stormwater management plans for all major subdivisions and site plans. At this time the County decided to be pro-active and seek out ways they can sustainably manage runoff from its properties. For example, stormwater runoff has been reduced from the employee parking lot at the County's Administration Building (913 S. Dubuque Street, Iowa City) through proper site design, the use of porous pavement, and a bio-retention cell with native plantings. The County's stormwater management plan seeks to control stormwater runoff for the purposes of reducing stream erosion, protecting water quality, reducing risks from flooding, and mitigating the adverse effects of changes in land use on the aquatic environment. Both near term and long-term efforts must be implemented concurrently, given past land use decisions that significantly constrain what can be achieved on the landscape.

What is a Watershed?

A watershed is defined as "the area that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer, or even the ocean." As seen below in Figure 1, this watershed shows how water drains downhill. Making changes to the landscape keep pollutants from rural and urban areas from washing into our waterways.

Figure 1. Watershed Diagram, Iowa DNR
http://www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedBasics.aspx

Most of us have seen streams filled to the tops of their banks during storms. But how often do we think about how all that water gets there? When it rains, the soil absorbs some of the precipitation. Whatever the soil cannot absorb travels along the land, becoming runoff. This runoff will likely end up in the nearest stream, lake or river. The runoff carries with it soil particles, oil and dissolved substances, including fertilizers and pesticides, and other pollutants taking them into the nearest waterbody. Water that is absorbed by the soil may be used by plants or it may enter the groundwater system. Groundwater flows like a very slow underground river, often ending up in a nearby stream. The soil, sand, and rocks that the groundwater flows through can act as a filter, removing pollutants from the water. However, if the soil is contaminated, the filter may no longer function properly, making it a concern for the many Iowans who use groundwater for drinking.

Stormwater and the Hydrologic Cycle

The hydrologic cycle, illustrated in Figure 2, is the movement of water from the atmosphere to the earth's surface. Water moves through one or more components of the cycle including evaporation, transpiration, runoff, precipitation, infiltration, percolation and its eventual return to the atmosphere. In an undeveloped area, with natural ground cover such as forest or meadow, a significant portion of precipitation infiltrates into the soil. This water is filtered and cooled as it travels underground. Some infiltrated water is subsequently discharged into rivers and streams as baseflow. Baseflow provides a steady contribution of high quality water to lakes, streams and rivers. Other infiltrated water descends deeper underground to the water table and recharges aquifers. Groundwater recharge replenishes the supply of underground water that can be extracted for domestic use and irrigation. Another portion of precipitation is returned to the atmosphere through a combination of evaporation and plant transpiration called evapotranspiration. Where there is natural ground cover, all of these

processes together serve to minimize the percentage of precipitation that becomes runoff, the water that flows over that land surface into streams and other surface water bodies.

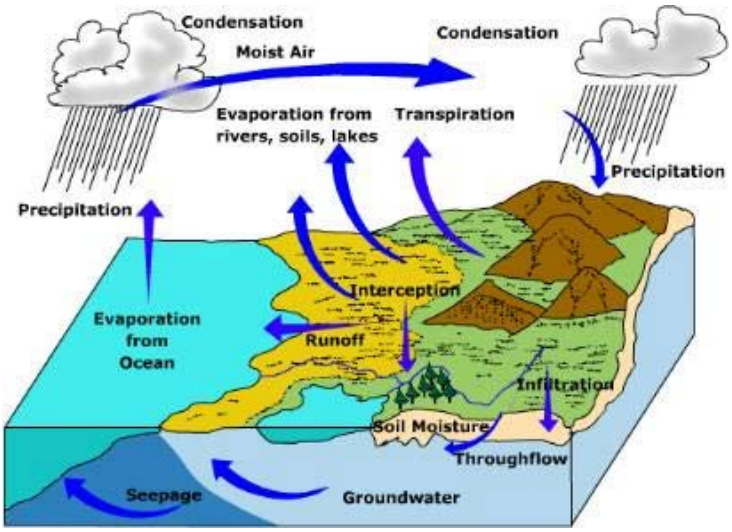

Figure 2. The Hydrologic Cycle, Adapted from: The Physical Environment: An Introduction to Physical Geography, http://www.uwsp.edu/gEo/faculty/ritter/glossary/h_k/hydrologic_cycle.html

Urbanization dramatically affects the hydrologic cycle by altering the relative percentage of precipitation that contributes to groundwater, evapotranspiration, and runoff relative to the natural ground cover. See Figure 3 below. Specifically, urbanization increases runoff by decreasing the amount of water that infiltrates into the ground and is taken up and transpired by plants. This is because water cannot infiltrate into, and plants cannot grow on, impervious surfaces such as pavement and rooftops. Increased stormwater runoff not only decreases baseflow and groundwater recharge, but also increases the amount of water that runs off the surface, picking up and carrying pollutants to lakes, streams, rivers and wetlands. The increased surface runoff increases flooding frequency and severity while the increased input of pollutants degrades water quality and aquatic habitat.

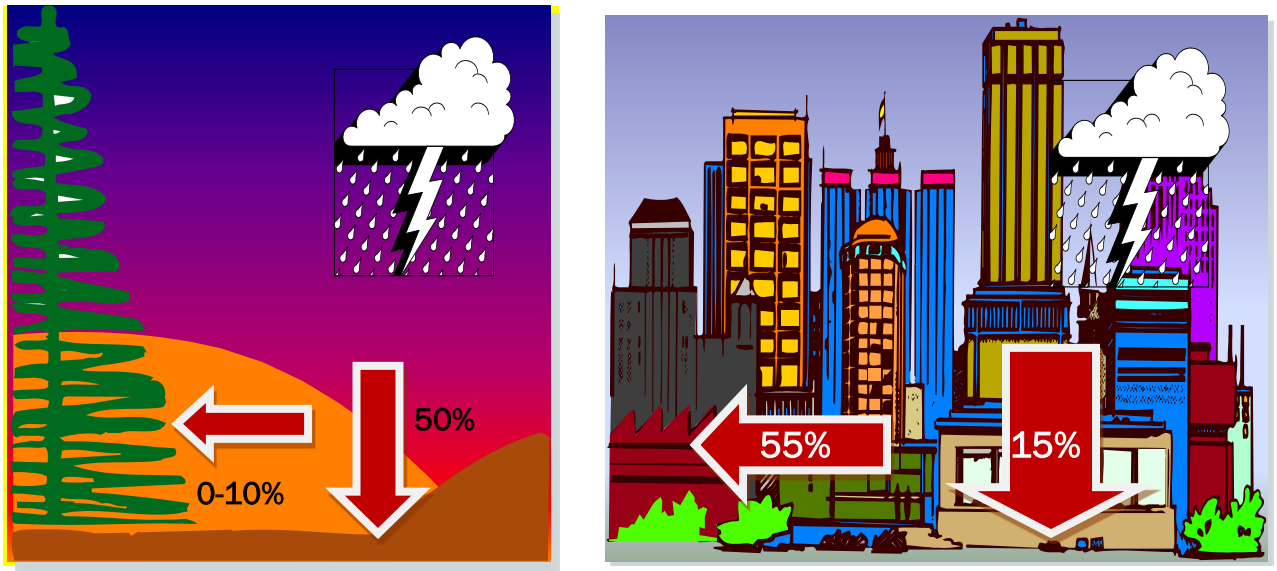

Figure 3: Historic Hydrology vs. Modern Hydrology

Iowa Historic Hydrology

Iowa once was a vast tallgrass prairie ecosystem, interspersed with upland savanna, prairie marshes and sloughs, wetlands, riparian woodlands along small streams and rivers, as well as isolated stands of trees in small park-like groves. These were components of the Iowa prairie matrix at the time of European settlement in the mid-1800s. To provide a geographic framework for land ownership, the Government Land Office was established, and first-hand accounts of its surveyors were later used in state guides and handbooks that promoted settlement and agriculture.

The landscape was drastically altered by Euro-American settlement and cultivation of the Midwest. For nearly a century and a half, Midwest farmers drained, dredged, and tiled the wetlands and marshes, and plowed up the tallgrass prairie which made our soil the most fertile and productive in the world. Although estimates vary, it is generally agreed that approximately 99 percent of the original wetlands, marshes, and small streams of Iowa were drained and plowed, while the larger streams and rivers were dredged and straightened to facilitate removal of surface water.

Today, artificial stream systems replace the more absorbent wetlands and marshes, and these streams flow in direct contact with Iowa's vast agricultural landscape. Further, we have eliminated many natural stream meanders through straightening and channelization. Drainage of wetlands and channelization of streams and rivers has promoted a hydrological imbalance. Today, in the upstream or headwater portion of small streams, water moves off the land much faster, allowing greater stream bank and bed erosion, creating increased transport and deposition of materials (including soil and agricultural chemicals), along with more severe flooding downstream. Draining of wetlands has lowered the water table,

causing natural underground springs and small streams to cease flowing and shallow wells to be deepened. Most of these changes in surface and subsurface hydrology have occurred within a human lifetime.

Low Impact Development

Low Impact Development (LID) is an alternative, ecologically-sensitive design approach that mimics the way natural areas store and infiltrate rainwater. The LID approach protects local and regional water quality by decentralizing stormwater management and absorbing rainfall throughout the landscape. In typical urban settings, soils are heavily compacted from the development process, causing yards to act more like an impervious surface than greenspace. Land is also covered with impervious surfaces, such as roofs, streets and sidewalks. Consequently, land is unable to absorb stormwater. Instead, stormwater is collected and conveyed as quickly and efficiently as possible. This process delivers pollutants such as sediment, hydrocarbons, metals, bacteria and fertilizers to streams, rivers, and lakes. LID minimizes the amount of impervious surfaces and mitigates the impact of necessary impervious surfaces.

Infiltration is the most effective means of controlling stormwater runoff since it reduces the volume of runoff that is discharged to receiving waters *and* the associated water quality impacts that runoff can cause. Infiltration is also an important mechanism for pollutant control. As runoff infiltrates into the ground, particulates and attached contaminants such as metals and nutrients are removed by filtration, and dissolved constituents can be removed by absorption.

Non–Structural Control Best Management Practices (BMPs)

Non-structural controls focus on preserving open space, protecting natural systems, and incorporating existing landscape features such as wetlands and stream corridors into a site plan to manage stormwater at its source. Some approaches focus on clustering and concentrating development, minimizing disturbed areas, and reducing the size of impervious areas. Non-structural BMPs can be found in the Iowa Stormwater Management Manual and at the Rainscaping Iowa website. Non-structural BMP examples include native landscaping, and road-side native plantings, native grass filter strips, native turf and soil quality restoration.

Structural Control BMPs

Structural controls are engineered and constructed systems that are used to treat the stormwater at either the point of generation or the point of discharge to either the storm sewer system or to receiving waters. A list of structural BMPs can be found in the Iowa Stormwater Management Manual and at the Rainscaping Iowa website. Some examples

include raingardens, bio-retention cells, bioswales, permeable pavement, wet and dry detention, green roofs, and streambank stabilization.

2. Johnson County Property Assessment

Soils

Johnson County is in east-central Iowa, and is drained by two rivers that carry drainage water south-eastward toward the Mississippi River. The Iowa River is the principal watercourse. Together with its tributaries, it drains 95 percent of the county. The predominant soils association is Fayette-Downs, which consist of soils on connected ridge tops and side slopes. It is dissected by drainage ways and streams, which form fingerlike networks throughout the area. Limestone out crops are found in a few places, especially in those areas adjacent to major streams. Slopes range from 2 to 40 percent. The gently sloping areas are suited for crops but the steeper areas are subject to erosion. The steeper Fayette soils are better suited to permanent pasture or woodland. The main concerns of management are controlling water erosion and maintaining tilth and fertility.

Geology

Johnson County is located within the Southern Iowa Drift Plain. The soil, substratum, and underlying bedrock in this region consists of several types of materials. In most places loess is at the soil surface. Loess consists of windblown, predominantly silt-sized soil particles. In this part of the state, the loess on stable upland positions is as much as 15 feet in thickness. The loess is underlain by Illinoian and pre-Illinoian glacial till. The glacial till was moved into this part of the state by vast sheets of ice known as glaciers. Since the till was moved by ice, it is comprised of materials that contain about 40 percent sand and rock fragments that can range from less than one inch to several feet in diameter. The glacial till ranges from a few feet in thickness to more than 100 feet over limestone bedrock.

Limestone bedrock is the oldest substratum material in Johnson County. Limestone is hardened calcium carbonate deposited by ancient oceans. Layered within the limestone can be strata of coal or shale. Both coal and shale are also water deposited. Limestone bedrock was deposited in somewhat thin layers over a long period of time. Following deposition, the limestone was exposed to the weather for another long period of time prior to the deposition of glacial till and loess. As a result, it is inherently cracked and creviced. Limestone bedrock can be exposed at the surface or be covered with 100 or more feet of loess and glacial till.

USDA-NRCS bedrock elevation maps reflect the elevation of the bedrock at or near the surface at approximately 600 feet. Based on the bedrock elevation maps, bedrock will be at or near the surface in some areas of Johnson County.

Johnson County Property Data

In 2012 & 2013 the Johnson County Soil & Water Conservation Specialist (SWCS) conducted a land use assessment of all property owned by Johnson County. Geographic Information Systems (GIS) were used to compile the data using ESRI ArcMap 10. The tables below show the results of the assessment. Individual property site maps can be viewed as appendices.

Table 1: List of Johnson County Owned/Operated Property

Property	Parcel ID	Address	City	ZIP	Acres
Administration Building	1015287001	913 S. Dubuque St	Iowa City	52240	4.00
Ambulance Building	1015282009	808 s. Dubuque St	Iowa City	52240	0.50
Captiol St Building's	1015251002, 1015205005, 1015205006, 1015205008, 1015205002, 1015205003, 1015205001	719 S. Capitol St	Iowa City	52240	0.84
Clinton St. Building	1015280005	821 S. Clinton St	Iowa City	52240	0.70
County Conservation Board Properties	0524151001 (Kent Park)	2048 HWY 6 NW	Oxford	52322	1662.22
Courthouse	1015204001	417 S. Clinton St	Iowa City	52240	2.35
Driftwood Lane buyouts	Multiple	Driftwood Lane SE	Iowa City	52240	34.50
Health & Human Services	1015281014	855 S. Dubuque St.	Iowa City	52240	2.40

Melrose Farm	1113151005+	4515 Melrose Ave.	Iowa City	52240	193.89
Oxford Property	521376001	Lower Oxford RD NW	Oxford	52322	5.89
Prairie Du Chien Rd	726231001	Across from Westcott Dr NE	Iowa City	52240	0.46
River Heights buyouts	Multiple	River Front Estate NE	Iowa City	52240	3.56
Secondary Roads, Shed sites, & SEATS	1112451003	4810 Melrose Ave	Iowa City	52240	46.86
Sherriff Building	1015229001	511 S. Capitol St	Iowa City	52240	0.81
Tri-county Bridge property	1731377001	Tri-County Bridge			10.34
				Total:	**1969.32**

Table 2: Johnson County Conservation Board Property Sites

Site	Acres
Walker Park	3.00
River Junction Access	12.00
Hills Access	40.00
Scott Church Park	5.00
Solon Prairie	3.00
Cedar River Crossing	235.00
Stuliff Access	0.25
Frytown Conservation Area	94.00
F.W. Kent Park	1082.00
Clear Creek Area	87.00
Ciha Fen	80.97
Williams Prairie	20.00
Total:	1662.22

Table 3: Johnson County Secondary Road Property Sites

Site	Address			Acres
Melrose Ave -Main site	4810 Melrose Ave.	Iowa City	52240	25.66
***Frytown/Angle Rd**	1892 Angle Rd SW	Kalona	52247	0.57
***Bayertown**	5102 500 St. SW	Riverside	52327	0.61
Lone Tree	118 Kirkpatrick St.	Lone Tree	52755	1.72
Swisher	338 3rd St. SW	Swisher	52338	1.47
Shueyville	3341 120th St NE	Solon	52333	5.7
Solon	4486 Sutliff Rd NE	Solon	52333	1.48
HWY 6 (by Kent Park)	1910 Lower Old Hwy 6 Rd NW	Oxford	52322	7.76
Local Road	3571 Utah Ave NE	Iowa City	52240	1.89
			Total:	**46.86**

*Johnson County leases

Table 4: Land Use Assessment Data

Land Use Category	*Acreage	Percentage
Buildings/Utilities	14.42	0.6%
Conventional Sidewalk/Driveway/Parking	25.45	1.1%
Road	15.01	0.9%
Gravel Parking Area	18.58	0.8%
Turf Grass	40.27	2.0%
Recreational	28.72	1.5%
Prairie	393.47	19.9%
Water	59.98	3.0%
Open Space/Grassland/Brush	92.84	4.7%
Trees	940.73	47.9%
Cropland	120.15	6.1%
Stormwater BMP	0.5	0.1%
Wetland	219.54	11.4%
Total	1969.32 acres	

Johnson County Conservation Board manages 1,662.22 acres of the total 1,970. That's nearly 85% of all property owned by the County. County Conservation staff manage natural resources and outdoor recreation areas including parks, campgrounds, prairies, wetlands, forest and river access areas. The Johnson County Poor Farm located west of town, on IWV Road has been owned by the county since 1855. The farm today still consists of a 120 acre corn/bean crop rotation.

*Please note that the total acreage does not include right-of-way acres.

Impervious Cover Analysis

If the combined acreage of the County Conservation Board properties, and the Poor Farm cropland is subtracted from the total acreage that identifies about 190 acres that consist of buildings, roads, driveways, sidewalks, parking, turf grass and some open space acres.

Using the NRCS (Natural Resources Conservation Service) Runoff Curve Number (RCN) method to compute peak runoff rates from rain events on average these land use areas produce an 80-98 RCN.

The RCN is essentially a coefficient that reduces the total precipitation to runoff potential after losses; evaporation, absorption, transpiration, and surface storage. Therefore the higher the RCN value the higher the runoff potential will be, with 100 be the top RCN value.

The above land use areas have a higher RCN therefore these areas shall be where the County focuses efforts of stormwater management practices.

Secondary Roads Department Stormwater Plan

Johnson County Integrated Roadside Vegetation Management (IRVM) Program manages approximately 6,000 acres of roadside spread out over nearly 1,000 miles of the County Secondary Road System Right of Way (ROW). These roadsides are designed to drain water away from the road, and are channels which feed directly into our rivers and streams. Stormwater management is critical to protect roads, infrastructures, and public safety.

Johnson County IRVM utilizes a host of Best Management Practices (BMPs) to manage stormwater in the ROW. Each maintenance and engineering project is considered individually, depending on slopes, anticipated water flow, and speed, traffic counts, soils, future usage, etc. Johnson County IRVM regularly utilizes erosion and sediment control measures on road projects such as silt fences, straw logs, rock checks, straw mulch, erosion control blankets, hydromulching, compost, riprap, etc. to manage stormwater and keep soil in place. Another primary tool utilized by the IRVM Program for long term stormwater

management is the planting of deep rooted and durable native grasses and wildflowers that improve erosion control, create wildlife habitat, and more effectively reduce weed and brush populations while slowing stormwater for increase water infiltration.

The public ROW has many users such as utilities, landowners, wildlife, snowmobiliers, etc. utilizing this narrow strip of roadside habitat. Johnson County IRVM Program strives and is commited to meeting these needs as well as improving stormwater management and erosion and sediment control on these public properties.

3. Recommendations

No single BMP can address all stormwater problems. Each type has certain limitations based on drainage area served, available land space, cost, and pollutant removal efficiency; as well as a variety of site-specific factors such as soil types, slopes, depth of groundwater table, etc. Careful consideration of these factors is necessary in order to select the appropriate BMP(s) for a particular location. Regardless of the type, stormwater BMPs will be most effective when implemented as part of a comprehensive stormwater management program that includes proper selection, design, construction, inspection, and maintenance.

Johnson County shall follow the following criteria when selecting BMPs for stormwater retrofits or new design projects:

- Stormwater treatment suitability
- Water quality performance
- Site applicability
- Implementation considerations
- Physiographic factors
- Soils
- Special watershed or stream considerations

Environmental regulations may also influence the location of a BMP and may require a permit to be considered.

For more information on the above criteria and their guidelines please visit the Iowa Stormwater Management Manual Section 2D-1 General Information for BMPs, starting on page 12.

Property Options

Each Johnson County property is different based on drainage, land use, soils, topography, and other features. Each site will have to be analyzed carefully for the best suited BMPs, and cost feasibility. Based on the most common land use categories, below are possible stormwater BMPs suitable for Johnson County properties:

Buildings

- Building footprints shall be evaluated on how water is captured and treated
- Redirect downspouts to a green area or a stormwater BMP
- If possible, harvest rainwater to be used for landscaping or for water use within the building. (Plumbing codes will need to be followed)
- Install a Green Roof

Sidewalk/Driveway/Parking

- **Permeable Paving systems** can reduce annual runoff volume by 80%, removing 65-85% of undissolved nutrients, and removing up to 95% of sediment in runoff. In general, costs are approximately 20 percent higher than conventional impervious concrete systems. However, at the development level, installation costs can be lower than conventional options because permeable systems can reduce costs associated with expansion of stormwater systems and additional land needed for retention ponds. The longer life expectancy (20 to 40 years) of permeable systems also helps to offset the initial installation costs. Maintenance is essential and vacuuming will be necessary to restore porosity when sediment happens to clog open pore spaces. Winter maintenance will need to be changed; sand and salt will clog the pore spaces, not allowing the system to function properly. Alternative de-icing methods will need to be evaluated, although many have found fewer icing issues due to the open pore spaces allowing infiltration.

Turf Grass/Open Space

- **Native Landscaping & Native Turf** plants, native to Iowa, enhance the landscape's ability to manage stormwater. Natives are hardy plants and grasses with deep root systems that create open space and allowing rainfall to percolate into the soil below. Native plants should be strategically placed on the landscape to enhance infiltration of stormwater. Establishment of native landscaping is less expensive to maintain than mowed turf grass areas.
- **Soil Quality Restoration** boosts infiltration potential and increases the amount of water that soil can hold, thereby reducing surface runoff and creating a greener, healthier lawn environment. Lawns with good soil quality reduce the need for

watering, and minimize the need for fertilizers and pesticides. Yards with poor, compacted soil contribute to water quality problems due to their inability to infiltrate and absorb water or make it available to turfgrass. Compacted soil also requires more fertilizers and pesticides, both of which could end up in runoff and eventually increase pollution in our local creek and streams. Soil quality restoration is so simple: start by reducing soil compaction and increasing organic matter content with the addition of compost.

- Bio-retention Cells capture and infiltrate stormwater runoff from impervious surfaces to reduce water pollution and stabilize stream flows. Bio-retention cells have an engineered and constructed subgrade to ensure adequate percolation and infiltration of captured runoff. Bio-retention cells can be used in most settings including parking lots and residential areas where soils do not adequately percolate. They use plants that can tolerate a wide range of moisture conditions. Native plants are encouraged because they are deep rooted, and they help maintain soil quality and good percolation. A limiting factor for placement of a bio-retention cell may be the lack of an outlet for the subdrain. An outlet is necessary to ensure proper drainage. The subdrain often outlets into the storm sewer or can discharge down gradient of the bio-retention cell
- Rain Gardens are depressional areas landscaped with native vegetation that soak up rainwater. They are strategically located to capture runoff from impervious surfaces, such as roofs and streets. Rain gardens fill with a few inches of water after a storm and then water infiltrates into the ground, rather than running off to a storm drain.
- Bio-Swales are vegetated paths installed as an alternative to underground storm sewers. The bioswale is engineered so runoff from frequent, small rains infiltrate into the soil below. When larger storms occur, bio-swales slow the flow of runoff while using above ground vegetation to filter and clean the runoff before it ends up in the local stream.
- Stormwater Wetlands serve to capture and temporarily store water on a larger scale. Stormwater wetlands are designed to capture and treat urban runoff before it can be deposited directly to streams and lakes. Natural biological processes filter and remove pollutants from the water as it moves through these wetlands. Like their smaller counterpart, these wetlands also bring an element of native Iowa back onto the landscape, bringing natural beauty to urban areas. Contrary to popular belief, functioning wetlands actually reduce mosquito numbers by providing essential habitat for frogs, dragonflies, damselflies and other predators.

Cropland

- No-till, cover crops, conservation crop rotation, contour buffer strips, grassed waterways, prairie, filter strips, water and sediment control basins, grade stabilization

structures, and terraces are all viable practices that could be implemented to a cropland landscape.

Trees/Shrub

- A DNR District Forester shall be contacted to evaluate the health of the area and make recommendations. Most common practices are invasive species removal, and brush management to allow native species and more desirable species to thrive. Also controlled prescribed fire is a great tool for maintenance.

New Properties

When new properties/buildings are to be designed, stormwater BMPs should be part of the early stages of the design process. Johnson County SWCS shall work with the design consultants and appropriate staff to ensure the Iowa Stormwater Management Manual is being followed and the best, most cost effective BMPs are being selected.

4. Plan Management

This plan provides a road map for addressing potential stormwater BMPs on Johnson County property. This plan is subject to change and modification to stay consistent with our adaptive approach to stormwater management, research and outreach. This plan is the framework for mitigating the adverse effects of stormwater, and the implementation of the plan will result in strategies and approaches for stormwater management that will be applicable in many other locations. The individual site plans to be developed from the acceptance of this plan should not only address the implementation of stormwater BMPs on Johnson County Property, but also the following:

Individual Property Stormwater Property Management

With-in three years of the acceptance of this document the Johnson County Soil & Water Conservation Specialist (SWCS) will develop specific individual property stormwater plans on all county owned properties. The individual property plans will look at the site water management and make recommendations based on cost, size, land use, and overall efficiency. These individual plans, as they get completed, will be presented to the Board of Supervisors on an annual basis and they can approve or deny making changes to the property based on the plan. When all properties have had a plan developed, previous plans will be re-evaluated.

Partners

The SWCS shall work with Board of Supervisors, Facilities Department, Secondary Roads Sustainability Assistant, Planning & Zoning Department Staff, the Green Team Committee, and the Johnson County Soil & Water Conservation District for assistance in implementing

this plan. The SWCS shall also develop partnerships with private and public entities to improve communications, build relationships, and stay current on technical information.

Public Outreach & Education

An informed and knowledgeable community is crucial to the success of a stormwater management program since it helps to ensure the following:

Greater support for the program as the public gains a greater understanding of the reasons why stormwater management is necessary and important. Public support is particularly beneficial when there is an attempt to institute new funding initiatives for the program or seek volunteers to help implement the program; and
Greater compliance with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters.

Johnson County will implement an ongoing informational program that will inform the public of Johnson County projects and their progress through press releases, newsletters, online information, meetings, brochures, signs, and community events. Particular attention will be geared toward informing the public about the impacts of stormwater discharges on local waterbodies and the steps that can be taken to reduce stormwater pollution. Community events will be focused toward improving communication, providing needed technical information and relaying project information and progress to the local public.

Monitoring & Measuring Success

In order to measure success when feasible, Johnson County will set-up a monitoring program for the BMPs installed. Monitoring will be conducted by volunteers, staff, or other partner agencies to help research the success or failure of the practice and determine next steps. Another method of evaluation will be through annual project reports and reviews, which will be used to make adjustments to this plan as needed. This document will be assessed on an annual basis to determine if milestones are being achieved or if there needs to be adjustments to the plan.

Maintenance

The effective performance for the installed BMP is essential to ensure proper maintenance and functionality. Each BMP should include a maintenance plan based on recommendations from the Iowa Stormwater Management Manual. Maintenance schedules and activities should be outlined clearly in the plan. This may include employee training on how to conduct inspections and incorporate good maintenance and housekeeping upkeep.

Funding

The SWCS will work with the Johnson County Grant Specialist to seek out available grants. The SWCS shall develop partnerships with public and private entities in order to stay competitive and up to date of available grants and alternative ways to help supplement project costs.

5. Plan Overview

This plan addresses stormwater management critical to Johnson County property. The SWCS will follow the guidelines outlined in this plan and develop site specific plans for Johnson County Properties within three years. This plan is to be used as a guideline to minimize the adverse impacts of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plans to be developed shall follow Iowa Stormwater Management Manual design and performance standards for new developments and retrofits of county property. This plan is subject to change and will be modified based on new standards and research.