North Liberty Tree & Storm Water Advisory Board
Committee Meeting: Wednesday February 11, 2015 @ 7:00PM
City Council Chambers

Proposed Agenda

NEW BUSINESS:

1. Review and approve minutes:	Minutes from the November meeting.
2. Public Comments/Concerns:	Open to public for comments and concerns; 5 minutes per person time limit.
3. Welcome new board member:	JoAnn Greene
4. Board Appointments: (Elect Officers & discuss Board member terms)	Chairperson: _____ Vice Chair Person: _____ Secretary: _____
5. Storm Water Issues:	Hearing to receive Public comment on Top Soil Requirements. Tom Palmer; City of North Liberty Building Official Any Storm Water issues or concerns not on the agenda.
6. Tree City USA Award: (19 yrs.)	Annual Community Forestry Awards Luncheon & Workshop. Tuesday April 9th at the Stoney Creek Inn in Johnson, IA. Discuss Board attendance.
7. Bike Trail & Muddy Creek Clean Up Day:	Trail Clean up date set for April 11th. Meet at the Rec Center 9:00 am. (Discuss Tree Board and Public participation)
8. Tree Ordinance:	Tree Ordinance has been approved and adopted by City Council.

OLD BUSINESS:

1. Old Business:
   Issues from past meetings.

CONCLUSION:

1. Next meeting:	Next Meeting: April 8, 2015 at 7:00 pm. City Council Chambers. Meeting Quarterly: (January, April, July, October)
2. Adjourn:	

North Liberty Tree & Storm Water Advisory Board

Minutes of Wednesday November 5, 2014

Meeting called to order**:** 7:00

Present: Guy Goldsmith, Thomas Stoeffler, Gary McDowell, Darice Baxter, Malinda Allen

Absent: None

New Business:

1. Review and approve minutes: Minutes approved
2. Open to public for comments and concerns: No comments or concerns brought forward
3. MidAmerican "Trees Please" grant $1,000. Finished with project at Mar Lee Park. (Guy Goldsmith)Plans to plant native trees around West Lakes next year once grant is approved.
4. Storm Water Issues: Tom Palmer. Top soil requirements discussion. Copies of DNR code requirements from Oct 1, 2012- Oct, 1 2017 given to board. Rules revisited. Proposal to invite builders to the next meeting before making recommendations to city council. (Darice Baxter)Suggestions on code amendment. Board to possibly contact local HBA.
5. Review of new city tree ordinance: Don Colony, Street Superintendent. Concerns with ROW trees discussed. Exhibit of root intrusion into city facilities. Curb, gutter and tile issues for the city. Maintenance issues discussed. Board agrees to review this issue in 3/5 years. Some grammatical errors to ordnance to be corrected. Final draft approved by board.

Old Business: (Malinda Allen) Living Roadways conference (Darice Baxter) short course for soils. Darice will get more info.

Next meeting: February 11th 7:00pm at City Council Chambers, (#1 Quail Creek Circle)

Meeting adjourned: 7:50pm

Iowa Department of Natural Resources
Environmental Protection Commission

ITEM | # | **DECISION**

TOPIC **Notice of Intended Action, Chapter 64, "Wastewater Construction and Operation Permits" and Storm Water General Permit No. 2 for Construction Activities – Topsoil Preservation**

The Commission is asked to approve the attached Notice of Intended Action for Chapter 567-64 IAC "Wastewater Construction and Operation Permits" and changes to storm water General Permit No. 2. The proposed changes to Chapter 64 amend General Permit No. 2. The changes to General Permit No. 2 implement the recommendations of an Executive Order 80 stakeholders' group regarding topsoil preservation.

The current requirement is that if 4 inches or more of topsoil existed prior to development, a minimum of 4 inches is to be in place on the surface of the site after construction is complete unless land use precludes the practice. The proposed requirement is that the permittee(s) shall, unless infeasible, preserve topsoil. "Infeasible" shall mean not technologically possible, or not economically practicable and achievable in light of the best industry practices as determined by the permittee. "Unless infeasible, preserve topsoil" shall mean that, unless infeasible, topsoil from any areas of the site where the surface of the ground for the permitted construction activities is disturbed, shall remain within the area covered by the applicable General Permit No. 2. Soil may be used elsewhere in the development and no minimum retention requirement is applicable to an individual lot or portion of the project.

A public comment period will begin after publication in the Iowa Administrative Bulletin. The Department intends to conduct public hearings in Des Moines, Cedar Rapids and Davenport to solicit public comments.

Joe Griffin, Environmental Specialist Senior
NPDES Section, Water Quality Bureau
Iowa Department of Natural Resources

December 29, 2014

ENVIRONMENTAL PROTECTION COMMISSION[567]

Notice of Intended Action

Pursuant to the authority of Iowa Code sections 455B.103A and 455B.105(3), the Environmental Protection Commission (Commission) hereby gives Notice of Intended Action to amend Chapter 64, "Wastewater Construction and Operation Permits," Iowa Administrative Code.

The proposed amendments to Chapter 64 will revise General Permit No. 2 which authorizes the discharge of stormwater from construction sites. Substantive changes in General Permit No. 2 are required to implement the federal effluent guidelines for Construction and Development Point Sources. This standard is found at 40 CFR 450.21. Most of the measures in the federal effluent guidelines are already included in General Permit No. 2. The changes being proposed in General Permit No. 2 involve topsoil preservation at construction sites. The Code of Federal Regulations requires one to minimize soil compaction and, unless infeasible, preserve topsoil. Currently, the Commission defines this requirement as the preservation of at least 4 inches of topsoil at construction sites when this is consistent with land use practices and if at least 4 inches of topsoil existed on the site prior to construction.

At the time the 4-inch rule was adopted, it was generally believed by the Commission and stakeholders that the fiscal impact of the rule would be minimal and would not significantly impact developers, builders, or home buyers. In early 2014, various members of the development community requested that the language be changed to mirror the federal standard of preserving topsoil, unless feasible. These stakeholders reported that actual costs of implementation of the 4-inch standard were significantly

higher than anticipated, including costs with having to verify that the standard was uniformly met throughout the construction site. Cost impact estimates have been reported to vary from several hundred dollars per lot to several thousand dollars per lot. This economic concern led to the formation of an Executive Order (EO) 80 stakeholders' group, which convened meetings and obtained public input in 2014. The EO 80 stakeholders' group recommended to the Commission that the topsoil preservation requirement in General Permit No. 2 be changed to more closely align with the federal language, with some additional verbiage added. The EO 80 stakeholders' group indicated that the proposed revisions will result in a net reduction in costs to residential developers and home builders which would lead to lower prices for home purchasers. On September 16, 2014, the Commission directed the Department of Natural Resources (Department) to initiate rule making to adopt the EO 80 stakeholders' group recommendation for General Permit No. 2 with further, minor changes recommended by the Commission.

The rule amendments and related documents were submitted to the Governor's Office on October 21, 2014. The Department was notified on December 12, 2014 that the proposed rule had been cleared.

The following revisions to General Permit No. 2 are proposed:

Part IV.D.2.A.(2).(c) of the stormwater General Permit No. 2 is revised as follows:

> **A.(2).(c).** Unless infeasible, the following measures shall be implemented at all sites: utilize outlet structures that withdraw water from the surface when discharging from basins, provide and maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration ~~and~~

~~minimize soil compaction. Topsoil shall be preserved at all construction sites unless land use precludes the practice. The requirement to preserve topsoil shall be met only when the depth of topsoil after soil disturbing activities have been completed and final stabilization achieved for the permitted activity is equal to, or greater than, 4.0 inches, including soil contained in sod, on all areas of the site where the surface of the ground disturbed for the permitted construction activities is exposed and not covered by concrete, asphalt, gravel or other such material and where 4.0 inches or more of topsoil existed prior to the commencement of soil disturbing activities that are permitted under the current permit authorization for the site. On areas where less than 4.0 inches of topsoil existed prior to the commencement of soil disturbing activities that are permitted under the current permit authorization for the site, the minimum depth of topsoil after soil disturbing activities have been completed and final stabilization achieved for the permitted activity shall be equal to, or greater than, the depth of topsoil that existed prior to the commencement of soil disturbing activities that are permitted under the current permit authorization for the site. The final topsoil depth is to be measured after the soil has been compacted in a fashion generally considered adequate for an established lawn and so that the expected settling that will occur after measurement will be minimal and shall include the soil contained in any sod that has been placed on the site. The type of topsoil at the site after soil disturbing activities have been completed and final stabilization achieved for the permitted activity shall be similar to that which exists or existed in the general area of the site.~~ The permittee(s) shall minimize soil

compaction and, unless infeasible, preserve topsoil. "Infeasible" shall mean not technologically possible, or not economically practicable and achievable in light of the best industry practices. "Unless infeasible, preserve topsoil" shall mean that, unless infeasible, topsoil from any areas of the site where the surface of the ground for the permitted construction activities is disturbed, shall remain within the area covered by the applicable General Permit No. 2. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. The permittee(s) shall control stormwater volume and velocity to minimize soil erosion in order to minimize pollutant discharges and shall control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points. An affidavit signed by the permittee(s) may be submitted to demonstrate compliance.

For construction activity which is part of a larger common plan of development, such as a housing or commercial development project, in which a new owner agrees in writing to be solely responsible for compliance with the provisions of this permit for the property which has been transferred or in which the new owner has obtained authorization under this permit for a lot or lots (as specified in subrule 567--64.6(6) of the Iowa Administrative Code), the topsoil preservation requirements described above must be met no later than at the time the lot or lots have reached final stabilization as described in this permit.

~~For sites where less than 4.0 inches of topsoil is to be in place after soil disturbing activities have been completed and final stabilization achieved for the permitted activity, a soil survey conducted by properly qualified personnel who regularly conduct soil surveys as part of their normal job duties must be conducted prior to commencement of soil disturbing activities that are permitted under the current permit authorization for the site. The results of the soil survey shall become part of the Pollution Prevention Plan and shall indicate the depth of topsoil at a suitable number of points on the site commensurate with standard engineering practices established for the size of the site.~~

The topsoil preservation requirement described above shall be implemented for projects that have not received an authorization under this permit prior to October 1, 2012. The topsoil preservation requirements are not required to be implemented for projects that have been authorized prior to October 1, 2012. In residential and commercial developments, a plat is considered a project. For other large areas that have been authorized for multiple construction sites, including those to be started at a future date, such as those located at industrial facilities, military installations and universities, a new construction project not yet surveyed and platted out is considered a project. This stipulation is intended to be interpreted as requiring the topsoil preservation requirements on development plats and construction activities on other extended areas that may have several construction projects permitted under the same authorization to be implemented on those projects not yet surveyed and platted out prior to October 1, 2012 even if other plats and

construction activities in the same development or other extended area were authorized prior to October 1, 2012.

It is not the intent of the Commission that the textual changes in General Permit No. 2 be adopted in the Iowa Administrative Code but that these changes be made in the general permit itself which is adopted by reference into the Iowa Administrative Code.

Copies of the proposed revised General Permit No. 2 are available upon request from the Department at the address or telephone number below.

The proposed rule change will have minimal or no effect on jobs and employment opportunities. The substantive change regarding topsoil retention can be achieved with minimal disruption in the current sequence of events that occur during development and construction. A copy of the Jobs Impact Statement is available upon request.

Any interested party may make written comments on the proposed amendments on or before April 1, 2015. Written comments should be directed to the Storm Water Coordinator, Iowa Department of Natural Resources, 502 E. 9th Street, Des Moines, Iowa 50319; fax (515) 725-8202. People who wish to convey their views orally should contact the Storm Water Coordinator at (515) 725-8417 or at the Department's offices on the fifth floor of the Wallace State Office Building.

Public hearings will be held (to be determined).

This amendment is intended to implement Iowa Code chapter 455B, division I.

The following amendment is proposed.

Amend subrule 64.15(2) as follows:

64.15(2) Storm Water Discharge Associated with Industrial Activity for Construction Activities, NPDES General Permit No. 2, effective October 1, 2012 to October 1, 2017, as amended on ~~March 26, 2014~~ July 15, 2015.

_____
Date

_____
Chuck Gipp, Director

Tom Palmer

From: Hesseltine, Michael J <michael-hesseltine@uiowa.edu>
Sent: Monday, January 26, 2015 4:22 PM
To: Tom Palmer
Cc: bwayson@northlibertyiowa.org; Zimmerman, Breanna - NRCS, Iowa City, IA (Breanna.Zimmerman@ia.nacdnet.net)
Subject: Top Soil comments

Hello Tom –

I am following up on an article from a recent article in the Corridor Business Journal. Please consider this my public comment.

I live at 1250 Copper Mountain Drive in NL and have struggled significantly with top soil related issues. I have worked on extensive planting beds around my property and have 2 concerns that are related. **First** the amount of top soil might be an inch or two on average at best. There are places where the top soil is not evident above the clay base. Beyond the initial very thin layer as described it is all clay. This clay (disturbed from construction) is full of weed seeds from the past. **Second** and equally upsetting is the amount of gravel that is in the yard just under the thin layer of top soil. Obviously the density of gravel is greatest within a foot or two from paved areas such as the drive or side walk. Having said that I have planted areas for perennial beds and shrubs that extend several feet out from these structures. Every single time I remove the sod I get buckets of gravel I have to pick out and have to buy top soil and other ingredients from local stores to augment the poor soil I find beneath the sod. At one point I was so exasperated I took pictures to send to the builder.

I feel that if the top soil was of a better quality and quantity, *more dense*; the sod or plantings across the city would be healthier and stronger. This should in turn be able to absorb more run off from heavy rains and prevent things like frequent flash flooding and other drainage related issues. Currently (and this would be a **third** point) we are experiencing a great amount of erosion to the creek bed and walls behind our property. We have lost about a yard or more of our usable property which has been swept into the creek. This includes many cubic yards of soil that are gone and will not come back. The creek itself leads into Stone Lake. While there are many issues which are problematic about this erosion there are two that we should be concerned with more greatly. This soil erosion must be silting up the lake which will cost the city money sooner than it should. This erosion has the potential to affect our personal property values down the road if allowed to continue. I have already lost one tree which was swept away in flooding in the spring of 2013. Ironically I planted it to conserve the bank. That was $150 I might as well have just tossed into the street.

We have lived at this current residence since 2011 and feel that the floods have been worse each year as development continues upstream. Having said that I am far from anti-development. In fact I attracted to living in an up and coming community. As a citizen I really want smart and sustainable development. I want the type of development which does not bow to special interests like developers but the kind of development which is fostered and guided by eco-friendly policies we can all live with. I have copied a neighbor and council member as well as one of the Johnson County soil technicians which reviewed the creek erosion first hand. Thank you for your time.

Michael Hesseltine
1250 Copper Mountain Dr
North Liberty Iowa -52317

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Dear Tree Storm / water advisory Board,

I am replying to your request for comments concerning topsoil, removal / replacement for new construction in N.L. Please preserve the topsoil!

After living here since 1972 we have witnessed first hand how important it is to have in place practices that prevent or slow down soil erosion or run-off. In North Liberty where water run-off has been a problem since our town was established, It is profoundly important to keep our topsoil or add better if needed.

I am at odds with the state changing there requirements. They have been so pro-active in other areas to preserve our prime Iowa soil, then they turn around and completly change there commitments. Wearing two hats at the same time never works.

After serving 8 yrs on the N.L. city council, water run-off and the many problems it has created to residents after buying a home here was a major concern, and caused many heated discussions over the years, and resulted in a storm water management plan. A small start to a big problem. The City and councils have since worked hard to improve these problems —

created by early development. In the 70's 80's and 90's, one of the Biggest, loudest, complaints by our citizens, especially in the older developments, was the flooding of there basements and backyards. Since the 90's new rules and regulations - plus water retention basins, have helped the homeowners and businesses with this problem. I am so glad the city has put in place many conservation practices. If these practices increase the purchase of a home, I for one would welcome the increase to the price of a home. If I knew I was protected, and my yard plants and shrubs, and drainage would benefit from proper top soil. Its part of the unseen investment we can easily forget to include when we purchase property.

Our home on Zeller st was the new part of Town in the 60's. Due to fly-by-night developers many homes were put in without concern for proper drainage, finished streets or storm sewers. 5 Acres of homes drained into our backyard. Add up the sump pumps, added garages, covered patios, storage sheds, poor soil, and you have a mighty river running onto a street that at that time was higher than our front yard - so our back yard was under water most of the time.

Now we have a paved street - storm sewer, and gutter. and life is better after living with those problems for over 30 yrs. So you folks keep moving forward not backwards as the State seems to be doing. Homes here always will sell. Development will not stop. Developers will always cry and try to bully the council when required to do what's right and fair.

The city has learned and grown as well. We have more money and talented resources to make our community the best. We want to do what's right for the residents, and it's important to thank the city, Boards, and the Developers for what North Liberty have accomplished

Thank you for your time.
wishing to all the best
DeAnna Lear

From: Holden, Palmer J
To: Tom Palmer
Subject: Top soil
Date: Monday, January 26, 2015 9:57:26 AM

We bought a home in a new area of Iowa City three years ago. When I wanted to plant a garden I had to buy topsoil as there was none beyond what was in the sod. That is ridiculous. I watched a triplex constructed on Scott Park Drive this fall and took some pics for my curiosity. NO topsoil was returned to the property visible from the road.

Our home buyers deserve better. I grew up on a farm and never dreamed I'd have to buy black dirt in Iowa to plant a garden. Builders should be embarrassed but I doubt they are.

Palmer

Dr. Palmer Holden
ISU Emeritus Prof.
15 Mary Court
Iowa City, IA 52245
515-231-5543

From:	Steve Fletcher
To:	Tom Palmer
Subject:	Topsoil comments
Date:	Sunday, February 01, 2015 10:02:34 AM

First of all, thank you for soliciting our feedback on this issue. I live in the Fox Run subdivision and know firsthand the importance of adequate topsoil....because we have none! I can't speak for everyone in our subdivision but when I moved in in fall of '05 our yard was a sickly yellow, the soil was rock hard compacted clay and trees planted in this suffered a high mortality rate.

Flooded yards are an issue after heavy rains as are wet spots that take days to dry out due to the lack of topsoil. Compacted clay yards with sod dropped on top do not readily absorb rain. The sod even has a difficult time putting roots down deep into the hard clay.

I have spent the past 10 summers applying heavy amounts of organic materials to my lawn to improve the soil. Had the developers/builders placed an adequate amount of topsoil on the yard, many of these problems would not have existed.

Another downside to the lack of topsoil is the increased chemical and water usage required to grow and maintain an attractive lawn. Since the grass can't grow deep roots, more water is required and more chemicals are necessary to feed and to prevent or kill weeds.

We all know the builders will complain that it costs more..but a $1000 or a few thousand dollars more isn't going to stop someone from buying a new house and the long term benefits it provides to all far outweigh the short term profit motives of a few.

I strongly encourage the City to require builders replace at least 4 inches of topsoil in all new construction.

Thank you,
Steve Fletcher
635 Black Bear Bend
North Liberty, IA 52317
319-430-4374

From:	WaldoSemken, Laura - NRCS, Iowa City, IA
To:	Tom Palmer
Cc:	Almitra, Wren - NRCS, Iowa City, IA
Subject:	4" top soil
Date:	Monday, January 26, 2015 11:32:00 AM

Dear North Liberty Tree and Storm Water Advisory Board,

I am a resident of North liberty (since 1995) and an employee for Johnson County Soil and Water Conservation District. The Iowa Department of Land Stewardship (IDALS) and The Natural Resources Conservation Services (NRCS) are dedicated to building and preserving soil health for many reasons. Here is one very important reason: healthy soil can infiltrate storm water.

Top soil contains organic matter and the more organic matter it has, the more water it can infiltrate. Only topsoil is able to do this free service. Good water infiltration recharges ground water (please read this: Growing water use threatens to strain Jordan aquifer), helps reduce flash flooding, and reduces pollution (sediment, thermal, nutrients) that washes into Muddy Creek, Buffalo Creek and the Iowa River. Healthy top soil equals significantly less storm water run-off.

There are also important benefits to the homeowner. Healthy topsoil is able to store water and nutrients. This means that more water and nutrients are available to turf grass, trees, and other landscape plants. If lawns need to be watered less and the amount of fertilizer applications can be reduced or eliminated, this will save the homeowner money and conserve our precious ground water from the Jordan Aquifer.

Laying sod over compacted clay is an insult to the homeowner and to the city. You might as well pave the entire yard. Water does not infiltrate this system, it simply runs off causing all kinds of problems like water in basements, erosion, flash flooding, polluted streams, and very unhappy lawns that need huge amounts of water and fertilizer applications (which runs off immediately, causing problems in the Gulf of Mexico http://toxics.usgs.gov/hypoxia/hypoxic_zone.html).

As you can see adopting a 4" top soil rule would benefit the city in many ways. I encourage you to become familiar with other rainscaping practices as well like rain gardens and soil quality restoration. For more information about Rainscaping Iowa go to http://rainscapingiowa.org/. These practices work beautifully in tandem with each other, creating a landscape where water is allowed to infiltrate our soil, recharging our ground water and purifying it all for free.

Thank you for your consideration,

Laura Waldo-Semken

Buffer Initiative Technician

Johnson SWCD 51 Escort Lane

Iowa City, Iowa 52240

319-337-2322 x3

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Coralville Engineering Department

Standard Operating Procedures

Policy Number	N/A	**Policy Title**	Inspection of section IV D2 A(2)(c) (topsoil requirements)		
Department	Engineering		**Contact**		Amy Foster
Review Date	03/14/13	**Effective Date**	03/14/13	**Reviewed By**	Holderness/Larson Johannsen
This policy	☐ **Remained Unchanged**	☐ **Was Revised**	✠ **Is New**		

If New or Revised, Why? New SOP. This program is undergoing changes that will go into effect on October 1st, 2012. Engineering will be managing this program.

Policy: For regulatory compliance the City of Coralville shall inspect construction sites to ensure compliance with the Iowa Department of Natural Resources General Permit #2 section IV D2 A(2)(c) (topsoil requirements).

Procedure: The City of Coralville Engineering Department shall inspect in the following ways, depending on which application is used:

Compost Incorporation: The City of Coralville Engineering Department will conduct a site inspection once notified by the Contractor that the work has been completed. The Contractor will notify the Engineering Department by contacting Amy Foster. Contractors shall contact Amy through email (preferred) at afoster@ci.coralville.ia.us or by leaving a message at 319-248-1733. The site visit will require a 24 hour call ahead for inspection. During the site visit a soil probe will be used to ensure that the soil has been uncompacted to a depth of six (6) inches. A reasonable amount of compaction will be allowed to settle the soil. The use of heavy equipment on the site will not be allowed after uncompaction of the site. The soil probe will also be used to ensure that two (2) inches of compost has been added to the site soil. The contractor will be required to provide the cubic yards (CY) of compost applied and also the origin of the compost. This information is required at either the site inspection or before the site visit through an email or telephone message.

Topsoil Incorporation: The City of Coralville Engineering Department will conduct a site visit once notified by the Contractor that the work has been completed. The Contractor will notify the Engineering Department by contacting Amy Foster through email (preferred) at afoster@ci.coralville.ia.us or by leaving a message at 319-248-1733. The site visit will require a 24 hour call ahead for inspection. During the site visit a soil probe will be used to ensure that four (4) inches of topsoil are present at the site. Topsoil determinations will be at the inspector's judgment using color and ribbon tests to make determinations.

2E-6 Soil Quality Management and Restoration

BENEFITS Low = <30% Medium = 30-65% High = 65-100%			
Reduction of:	Low	Med	High
Suspended Solids	■	■	■
Nitrogen	■	■	
Phosphorous	■		
Metals	■	■	■
Bacteriological	■	■	■
Hydrocarbons	■	■	■

Description:
Soil quality management preserves and protects intact soil profiles. Soil quality restoration (SQR) reduces compaction, increases pore space, improves organic matter content, and re-establishes populations of soil dwelling organisms (microbes, worms, insects, etc.) on soils disturbed during construction.

Typical uses:
- Preservation of intact soil profiles
- Restoration of disturbed soils as part of final grading and stabilization of construction sites.
- Incorporation into lawn care management practices on established landscapes.

Advantages/benefits:
- Reduces stormwater runoff volume.
- Protects water quality by infiltrating and processing pollutants in stormwater runoff.
- Reduces the need for irrigation by increasing water holding capacity and water availability.
- May reduce the need for fertilizers and pesticides.

Disadvantages/limitations:
- Access to soil restoration services may be limited.
- Access to compost may be limited.
- May increase development costs.

Maintenance requirements:
- Annual applications of compost amendments is recommended (but not required).
- Lawn clippings should not be removed, as they decompose they add organic matter.
- Pesticide use should be minimized to maintain healthy populations of earthworms, soil dwelling insects, and soil microbes.
- Strategic use of native landscaping should be considered, as opposed to cool season grasses to maintain and enhance soil quality over time.

DRAFT

A. Description

Chapter 2A-1 details how land disturbing activities generates additional surface runoff. Creation of impermeable surfaces (rooftops, pavements and other hardscapes) and compaction of soils through grading activities limit the ability of the landscape to infiltrate water during rainfall events. If soil compaction is a major component in the increase of runoff volume, then restoring soil to better allow rainfall to infiltrate and percolate through the soil profile is a key method to reduce runoff.

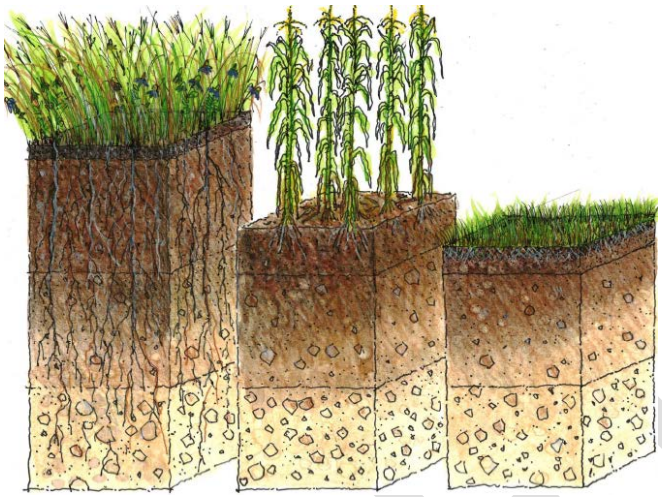
Prior to settlement, Iowa soil within the native tall grass prairie landscape had an 8-10% soil organic matter content. Rain infiltrating into the historic landscape moved slowly through the soil profile to emerge down-gradient as cool, clean groundwater discharge that fed and maintained stable, clean streams, rivers, wetlands and lakes. A healthy soil profile with 50% pore space should be able to infiltrate anywhere from 0.6 inches to 2 inches of water per hour into the soil profile. The water-holding capacity of most prairie soils should be around 0.2 inches of water per inch of soil profile. Therefore, a soil at field capacity with 50% pore space should be able to store a minimum of 2.4 inches of rainfall in the upper 12 inches of the soil profile.

Today, due to tillage-based agriculture and urban land development, many Iowa soils have only 4% soil organic matter (SOM) content or less. Most Iowa soils have about 2% SOM. Organic content can be even less where topsoil has been stripped and exported from development sites. Such soils have lost 60-80% or more of their ability to absorb, infiltrate, and store rainfall.

Undisturbed soils have layers or horizons that form over hundreds of years. Prairie soils have a surface O- horizon that is thin and contains a high concentration of SOM from decayed vegetation. The next layer, the A-horizon is what many refer to as topsoil. It is rich in SOM giving it a darker color and has less clay compared to subsurface horizons. The next is the B-horizon that has a higher clay content and lighter color than the A-horizon. The C-horizon or lowest horizon consists of the parent material in which the soil has been formed such as glacial till, or wind-blown deposits. Figure 1 shows the differences in soil profiles between prairie, corn and urban turf. The O-horizon that once appeared in the prairie soils has been either oxidized or eroded away due to modern agricultural practices as shown beneath the corn soil profile.

DRAFT

Figure 1. (L to R) Prairie soil profile, soils under modern agriculture and soils after urban development under turf grass.



Compaction of site soils through urban development have an NRCS curve number of nearly 90 (see open space, poor condition, soil group D; Table 2, Section 2C-5). Compare that with soils, with little to no compaction, where curve numbers of 40-60 may be expected (see open space good/fair condition, soil group A/B; same table). Consequently, heavily graded urban green space is typically "hydrologically dysfunctional," and the ability of these landscapes to absorb and infiltrate water is extremely limited.

Figure 2 provides results of research conducted in Ankeny, Iowa by Iowa State University that shows changes in soil quality indicators, bulk density and organic carbon, over time with changes in development practices. Bulk density, or the mass per given volume, is a measure of the compaction of soils. Organic carbon is related to organic matter content. Figure 1 shows bulk density has increased with time and organic carbon content has decreased with time. These marked changes began occurring in the 1980s onward when topsoil was being stripped and not replaced from sites and more mass grading and on-site vehicular traffic became common.

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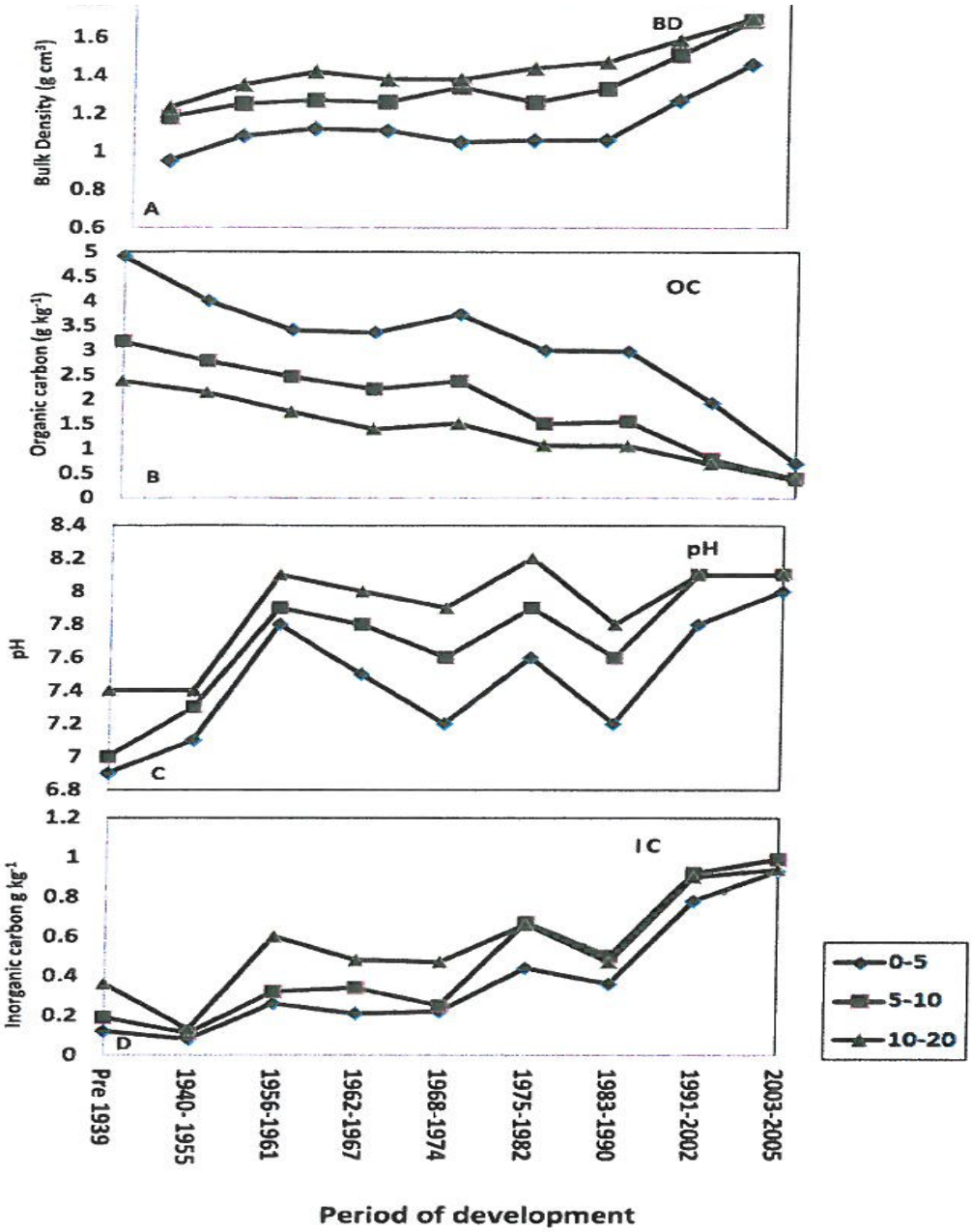
Figure 2. Variation of (A) bulk density (BD), (B) organic carbon (OC), (C) pH, and (D) inorganic carbon (IC) values in soils by period of development of Ankeny, Iowa at depths of 0-5, 5-10, and 10-20 cm (A. Langner, Manu, A. and Nath D., SSSAJ, 2012)



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The goal of soil quality management and restoration (and other infiltration-based stormwater management practices) is for urban landscapes to mimic the hydrologic functionality of the native pre-settlement landscapes, at least for the more commonly occurring small storm events. This is achieved through the protection or creation of soil profiles having at least 40% pore space, 2% (3-5% preferred) organic matter content, and a healthy population of soil microbes and other species of soil dwellers.

To reduce the effects of SOM loss and soil compaction, minimize mass grading activities. The first step in site design should be a review of site conditions prior to preparing a conceptual layout. Topography, existing soils, including soil depth and organic matter content, drainage paths, watershed boundaries, delineated wetlands and flood hazards should all be considered *before* site design begins. (Refer to Part F of this section for further details)

Soil quality is best maintained by minimizing the area impacted by construction. A designer should use the information gathered during the site review to determine ways to lay out the proposed development so the most permeable soils are preserved and the area disturbed or compacted by construction is reduced as much as possible. A "building envelope" should be delineated to confine grading activities, construction traffic, stockpiling of materials, and other construction activities within a defined area. An additional benefit to this step could be reduced grading and infrastructure development costs.

Where land disturbing activities are necessary, soil quality restoration (SQR) should be performed as part of final landscaping, prior to seeding or installation of sod. For single-family residential developments, this will generally be accomplished on a lot-by-lot basis after all construction activities are complete.

Foundation and basement excavation generates soil stockpiles, which along with other building activities can compact soils on a large portion of a typical residential lot. Soil conditions worsen when basement excavated subsurface soils are spread over the lot, prior to re-spreading topsoil.

When SQR techniques are used to counteract soil compaction, the soil profile under green space areas will be a water management and water storage resource. Locate pervious areas strategically so that stormwater runoff can be dispersed across it via sheet flow, where and when possible.

B. Stormwater management suitability

Where green space is limited, or transitioning runoff to sheet flow is not possible, another BMP will be necessary to manage stormwater runoff (ISWMM Part 2B).

The water quality volume may be managed on-site with significant green space, when deep tillage practices are used. *Runoff volume reductions for larger storms can be modeled through appropriate reductions in NRCS curve numbers by accounting for open spaces with higher quality soils and vegetation.*

C. Pollutant removal capabilities

Good soil quality will generally provide for the capture of most of the major pollutants of concern, and would be comparable to bioretention for pollutant removal. Hydrocarbons, bacteria, sediment, metals, and other pollutants are generally captured in the top part of the profile when runoff is infiltrated. A healthy microbial population will degrade and utilize many of the pollutants as a food source. A pollutant, such as nitrogen moving in solution could move past the root zone of turf landscapes with high percolation rates. Incorporating strategic native landscaping along with soil quality restoration is recommended for increased evapo-transpiration and more nutrient uptake.

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D. Application and feasibility

Some component of SQR is applicable to almost all Iowa soils. Conditions such as hydric soils and surface ponding could render SQR not feasible. A hydric soil is permanently or seasonally saturated to cause anaerobic conditions in the upper part of the soil. Development on sites with hydric soils or surface ponding is discouraged as part of Low Impact Design due to the inability to infiltrate stormwater and generally because hydric soils are unsuitable for dwellings and other structures.

The potential infiltration and storage capacity of healthy soils makes an infiltration-based and groundwater driven hydrology feasible, which was the case back when the prairies and other native ecosystems were intact. If this type of hydrology for 90% or more of rainfall events in Iowa can be replicated, then the potential for water quality enhancement and stabilization of urban stream flows seems quite feasible, as well.

E. Planning and design criteria

A soil management plan (SMP) should be created for each new development. It should be created and initiated before any site layouts or designs are prepared, and it should be modified as the design process continues. Soil management plans are needed to treat landscapes as mass grading is completed and infrastructure is installed. A SMP will be needed as well for individual lots.

Table 1: Process for developing Soil Management Plans (SMPs)
1. Investigate existing site soil conditions. 2. Identify areas where soils and vegetation will not be disturbed on a site map or scale drawing as part of Contract Documents or site Storm Water Pollution Prevention Plan (SWPPP). 3. Identify areas where topsoil will be stripped and stockpiled on a site map or scale drawing. 4. Select which method(s) of Soil Management and Soil Quality Restoration are to be used and identify where they will be employed. 5. If using tillage for Soil Quality Restoration (SQR) then determine the depth of tillage and provide recommendations for suitable moisture conditions. Tillage of wet soils can cause smearing. 6. Determine and quantify types and amounts of materials needed to complete SQR requirements. 7. Specify methods for establishing permanent vegetative cover (i.e. sodding, seeding rates). 8. Incorporate SMP into site specific SWPPP if one is required to be implemented from initial disturbance to final stabilization.

Step 1. Prior to site design, soils information from resources such as county soil maps, geotechnical reports or other available data should be reviewed. Identify areas expected to have higher quality soils with intact soil layers. If possible, determine the type, quality and organic content of topsoil available on site. County soil map information can be viewed through the USDA at the following link:

http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Step 2. First and foremost, areas having higher quality soils should be protected. By minimizing land-disturbing activities, soil profiles are left intact and compaction does not

occur. Compaction, which increases bulk density and reduces pore space, is a primary culprit in the creation of hydrologically dysfunctional landscapes. During preliminary site design, orient improvements to minimize disturbance of higher quality soils. Plan grading activities to avoid compacting, filling or deep tilling under the drip line of any trees that are intended to be saved.

Step 3. Stripping and removing topsoil is another key aspect of post-construction soil quality problems. Topsoil contains organic matter that is the key to soils being able to absorb water. Soils with 2% or greater organic matter have the ability to absorb water like a sponge; lower than 2% and soils will absorb less rainfall, generating runoff quicker. Existing topsoil should be stripped, stockpiled and returned as part of final grading. Topsoil may need to be amended with compost to achieve the desired organic matter content of a minimum of 2%.

The SMP should identify where topsoil is to be removed, stockpiled and replaced. Stockpiles may need to be stabilized with temporary seed and mulch during construction and protected by perimeter sediment control measures (identified on the SWPPP and/or grading plan).

Step 4. Where land-disturbing activities cannot be avoided, SQR should be performed as part of final grading. Scarification and tillage should be done to a depth specified in the SMP.

Step 5. On sites where the majority of the landscape will be left as open space, deep tillage depths may be specified to address the water quality volume treatment requirements for adjacent open space. This is described in more detail later in this section.

Step 6. Based on the selected method of SQR, the SMP needs to quantify the amount of materials (i.e. imported topsoil, compost, etc.) necessary to complete the work. Incorporate these quantities into the overall quantity estimate and/or bid documents for the project.

Step 7. Select the type of permanent stabilization to be provided for all disturbed areas (i.e. sodding, seeding; native etc.). The area where each measure is to be applied should be identified on at least one of the following: landscaping plan, seeding plan, or site schematic plan as part of the SWPPP; and quantified within the overall quantity estimate and/or bid documents for the project.

Note: Methods of SQR and vegetation establishment included within the SMP should be considered “non-structural practices” which are required to be identified within a SWPPP, when one is prepared. If a given project meets state or local thresholds that require a SWPPP to be prepared for a given site, the SMP needs to be made part of the SWPPP, either as an attachment or incorporated into the SWPPP.

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Table 2: SQR design components, new construction	
Topsoil	Refer to SUDAS Section 2010 for definition of topsoil. Topsoil used for SQR should contain or be amended to contain a minimum of 2% organic matter content.
Tillage Depth	Compacted soil should be tilled to a specified depth based on the SQR method to be employed at a given site. Selecting the method of SQR depends on quality and availability of topsoil, subsoil properties and if WQv is intended to be managed for adjacent impervious areas. Use ripping tillage tools for deep tillage.
Soil Moisture Conditions	Do not remove or respread topsoil or perform tillage operations when soils are wet.
Compost Application	Apply compost as specified in soil management plan to achieve a minimum of 2% organic matter content. Apply compost before deep tillage to incorporate organic matter into the soil profile. Refer to later portions of this section for application rates.
Sand	Sand may be used to alter soil texture and increase infiltration/percolation rates.
Native Landscaping	Native landscaping with prairie or woodland grasses and forbs or native turf is encouraged, as they often have deeper, root systems that improve soil porosity and enhance runoff reduction by infiltration and transpiration.
Runoff from Adjacent Impervious Areas	**Concentrated flows must be avoided**. Disperse runoff from impervious areas across the SQR area in sheet flow, using a level spreader or other means to evenly distribute runoff across the treatment area.

Table 3: SQR design components, existing vegetation	
Aeration	Deep tine or deep plug aeration, do not perform aeration after a rain or on wet soils.
Compost Application	Apply a 1/2-3/4 inch layer of compost over aerated lawn.
NOTE: Direct stormwater runoff toward areas with restored soil quality as sheet flow.	

F. Design procedures

For all projects a SMP should be created. Refer to Part E and Table 1 of this chapter for guidance in developing the SMP. The SMP should detail one or more of the following methods for restoring soil quality and identify where these methods will be employed. The SMP should be included within the Storm Water Pollution Prevention Plan (SWPPP) for any site where one is required. (The SMP details methods to preserve or enhance soil health, which would be a non-structural stormwater management practice, required to be detailed within a SWPPP.)

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For the purpose of this section, a **healthy soil profile** is defined as an A horizon with a depth of at least 8 inches underlain by intact B and C horizons, meeting the following requirements:

i. Soil from an A-horizon with a clay content less than 25% meeting the definition of off-site topsoil as per SUDAS Section 2010-2.01-C.

ii. Soil does not have a bulk density that exceeds 80 lb/ft (1.3 gm/cm$^{3)}$ (Singer and Munns, 1987)

iii. Soil is not hydric and has at least 2 feet of separation from normal high water table.

iv. A healthy soil profile could also have less than 8 inches of undisturbed topsoil with good structure and still meet the definition of a healthy soil profile if it has percolation rates of 1 inch/hour or more. It would need to meet the hydric guidance above.

Prior to preparing a conceptual layout or site design, review sources of information to identify soil and determine existing soil conditions by reviewing county soil maps, geotechnical reports or field visits. Areas shown as Hydrologic Soil Groups "A" or "B" are best candidates for preservation (see Section 2C-5, page 4 for more information on soil groups).

Additional studies or testing is required to verify the presence of healthy soils. Geotechnical studies, coring or soil pits and percolation tests can be used to evaluate these properties. Soils determined to meet the definition of "healthy" as stated above should not require amendment. Verify that at least the upper 8 inches of the soil horizon meets the definition of healthy soil.

Consider location of identified healthy soils in initial site design. Design should layout proposed improvements to avoid disturbing or compacting healthy soils as much as possible. Final design plans and the site SMP should identify which areas are to be preserved using this method. Both the design plans and SMP should note the method of protecting these areas (i.e. construction fence, etc.) to prevent them from being disturbed or compacted by tracking or storage of materials.

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The following decision chart can be used to determine the appropriate methods to use for site conditions.

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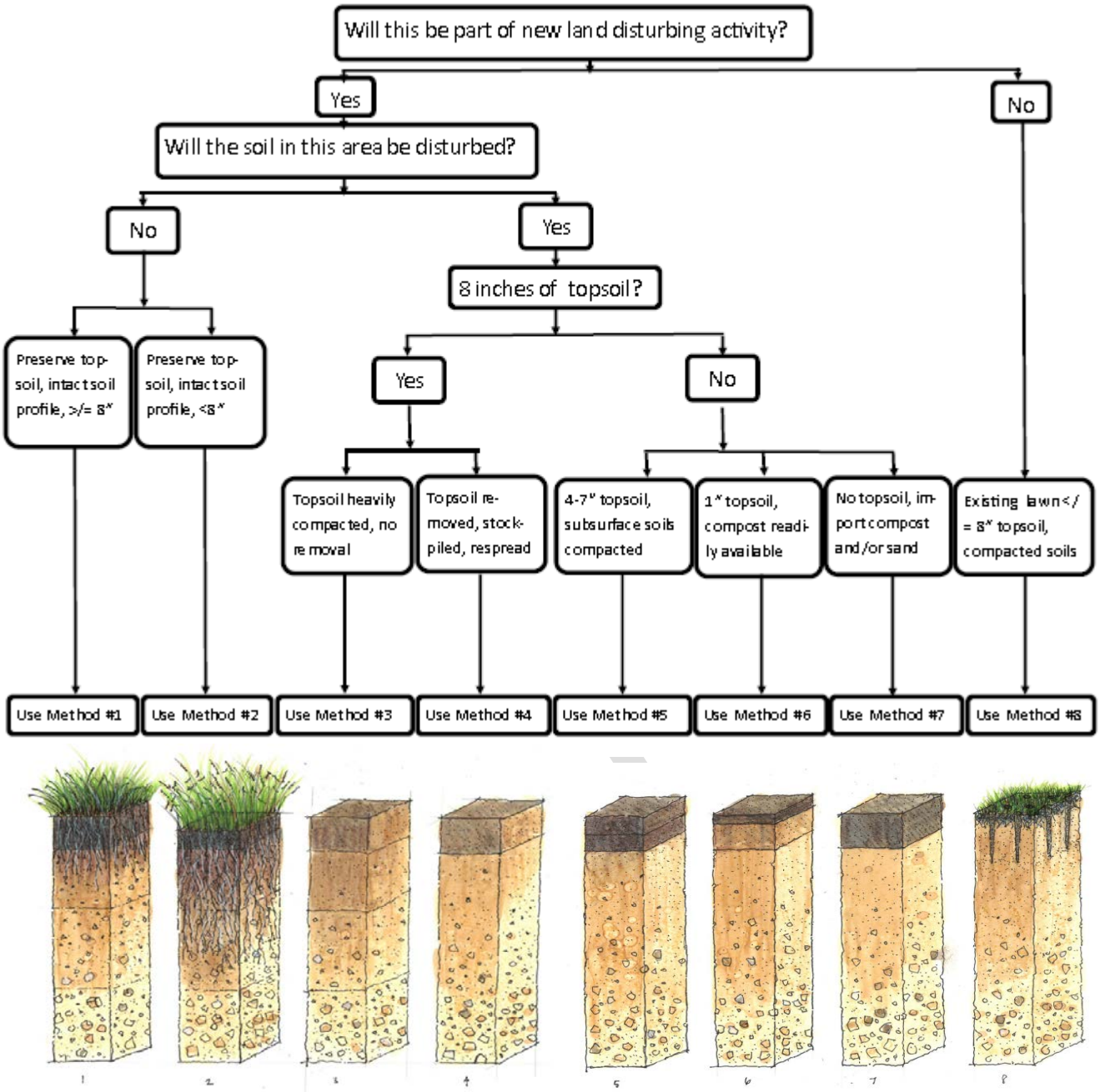
Figure 3: Decision guide for selecting soil management and soil quality restoration methods.



Soil Management on Undisturbed Sites

The goal of all methods is to maintain or create 8 inches of healthy soil profile. When tillage is performed, do not till wet soils (If ruts from equipment traffic form then the soils are too wet).

Method 1. Preserve existing healthy soil profile: Identify areas where healthy soils will not be disturbed and protect them from compaction.

Purpose: This method is intended to preserve areas determined to have a healthy A-horizon to a depth of at least 8 inches with a B- and C-horizon that appear to be intact. Prior to any site design, available information shall be reviewed to determine existing soil conditions. Geotechnical studies, coring, soil pits or other soil tests shall be performed on-site as needed.

Method 2. Preserve undisturbed areas that have intact A-, B- and C-horizons where the topsoil may never have developed to a depth of 8 inches but due to good soil structure and adequate porosity have a Hydrologic Soil Group of A or B and have percolation rates of 1 inch per hour. (Sandy soils or timber soils may never have developed an eight inch deep A-horizon but may have adequate infiltration and percolation rates to manage the WQv).

Purpose: This method is used where intact native soils have the ability to infiltrate and percolate the water quality volume even though the A-horizon may not be 8 inches.

Soil Quality Restoration on Disturbed Sites

Method 3. Eight inches or more of topsoil is present but compacted by land disturbing activities.

Purpose: This method is intended to restore at least 8 inches of compacted A-horizon soils to its previous, uncompacted, functioning state.

Procedure:

i. Topsoil used for SQR must meet the definition of a healthy soil and have an organic matter content of 2% or greater.

ii. Till disturbed, compacted area to a depth of at least 8 inches to achieve a bulk density that does not exceed 80 lb/ft^3 (1.3 gm/cm^3)

Method 4. Stockpile topsoil, respread 8 inches of topsoil.

Purpose: This method is applied where healthy topsoil is present at a site prior to construction, but is stripped, stockpiled and respread following construction.

Procedure:

i. Topsoil used for SQR must meet the definition of a healthy soil or be amended to have an organic matter content of 2% or greater.

ii. Site soils should be stripped and stockpiled in an approved location identified in the SMP. The SMP should identify the depth of the topsoil layer to be stripped and replaced. Stripping and stockpiling should occur before other site grading or

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construction activities are initiated to keep topsoil separate from lower horizon soils.

iii. Soil stockpiles should be protected by appropriate erosion and sediment control measures, identified within the SWPPP. Test stockpiled soils to determine if compost amendments will be required to achieve the desired organic matter content.

Method 5. Combination of 4-7 inches of topsoil and tillage to achieve an 8 inch soil profile depth.

Purpose: Use a combination of tillage and spread a minimum of 4 inches of topsoil or a blend of topsoil and compost to create an 8 inch soil layer**.**

Procedures:

i. Till or scarify the upper surface of the existing soil to a depth of 1-4 inches prior to placement of topsoil.

ii. Spread 4-7 inches of either a topsoil or topsoil /compost blend over the prepared area, as per SUDAS 2010, Part 3.02.C. Do not place wet topsoil.

iii. Perform tillage to a minimum depth of 4 inches to address compaction caused by topsoil placement.

Table 4: Recommended tillage, topsoil and compost depths for soil quality restoration to get 8 inches of healthy soil that includes 4 inches of topsoil.

Method	Tillage Depth (Inches)	Topsoil Depth (Inches)	Compost Depth (Inches)
5	1	7	0
5	2	6	0
5	3	5	0
5	4	4	0
6	6	1	1
7	8	0	2

Method 6. Compost amended and blended topsoil applied as surface blanket over tilled subsoil

Purpose: Use when there is not enough topsoil onsite and/or compost is readily available. Use 1 inch of compost in place of 3 inches of topsoil. The equivalent of four inches of topsoil can be achieved through a blend of 1 inch of topsoil and 1 inch of compost. This soil blend is spread as a surface blanket over 6 inches of tilled subsoil to result in an 8 inch healthy soil profile.

Procedure:

i. Till or scarify the upper surface of the existing soil to a depth of 6 inches prior to

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placement of topsoil and compost blend. Do not till wet soils.

ii. Spread 2 inch soil blend as a blanket over the tilled subsurface soils. Do not place wet topsoil and compost blend.

iii. Minimize recompaction when spreading the compost/topsoil blanket.

Method 7. Create an engineered healthy soil onsite where topsoil is absent by importing compost and/or sand.

Purpose: Use when healthy topsoil is absent at a site prior to construction, or topsoil is exported because space is not available to stockpile stripped topsoil.

Procedure:

i. Upon completion of site grading and construction activities, the area where soil is to be amended should be inspected. The surface should be free of any debris and stones larger than 1 inch in diameter (1/2 inch if permanent vegetation is to be turf grass). Remove smaller rocks or gravel if they densely cover the surface in a given area.

ii. Spread 2 inches of compost prior to tillage.

iii. Sand may be added to change the texture of topsoil to increase infiltration and percolation rates. Refer to Section 2E-1, Part E for additional information. If sand is to be added, spread a minimum of 1 inch or calculate the depth of sand by volume required to change the soil texture class to at least that of a loam or sandy loam soil (Section 2E-1, Table 1 and Figure 4). Sand should be added in a uniform layer before tillage. Refer to Table 5 on recommended additions based on soil texture. It is recommended to test site soils to determine actual sand application rates, which should be less than those listed in the table below. Alternatively, sand and compost can be mixed elsewhere prior to spread and then spread and tilled.

iv. Incorporate the compost and/or compost and sand blend through tillage to a minimum depth of 8 inches. Upon completion, remove any clods, lumps, roots, litter or other undesirable material, or any stones larger than 1 inch in diameter (1/2 inch if the permanent vegetation is to be turf grass).

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Table 5: Estimates of Sand Amendment Rates Required to Change Texture Class				
Soil Texture Class	**Silt* %**	**Sand* %**	**Clay* %**	**Amendment Rate (CY sand / CY original material)**
Sandy Loam	30	50	20	None
Loam	50	23	27	None
Silt Loam	68	5	27	0.35 / 1.00
Sandy Clay Loam	19	44	37	0.80 / 1.00
Clay loam	40	19	41	0.50 / 1.00
Silty clay loam	54	5	41	0.50 / 1.00
Sandy clay	5	39	56	1.75 / 1.00
Silty clay	40	5	55	1.75 / 1.00
Clay	5	5	90	3.50 / 1.00

** Based on ISWMM Section 2E-1, Figure 4 using percentage values for a given soil requiring the greatest amount of sand amendments to make soil act as a sandy loam or loam textural class Hydrologic Soil Group "B".*

Method 8. Enhance Soils under Existing Vegetation. Use aeration and compost applications to make existing soils and vegetation able to absorb the WQv.

Purpose: Use to improve soil quality to support existing vegetation and reduce runoff from open space areas. This method will provide for the capacity of the landscape to absorb the WQv, but is not intended to address WQv requirements for adjacent impervious surfaces.

Procedure:

i. Mow existing vegetation to a height of approximately 2 inches.

ii. Aerate to a depth of 4 inches (6 to 8 inches preferred).

iii. Apply ½ – ¾ inch compost blanket over the mowed area.

iv. Apply seed as specified or incorporate seed into the compost blanket if using a pneumatic blower.

v. Water twice daily (morning and evening) until vegetation is established.

G. Water Quality Volume Management Guidelines

The recommended approach to determining the available soil water storage is based on research conducted by Hudson (1994) that provides data on the relationship between available soil water and percent organic matter in soil. Data collected in this research included soils information on samples collected from Iowa. Hudson's research shows that the higher the organic matter content, the greater the available storage capacity of the soil. Essentially, soils with higher organic content have greater ability to swell like a sponge, retaining more water within their pore spaces. Data from the Hudson study can be used to determine the available water storage characteristics for soils which have been preserved or where SQR techniques have been applied. This can be used to determine the depth of soil with a given organic matter content needed to manage the WQv.

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If the organic matter content of a soil is known, Table 6 can be used to determine the available water storage for every inch of depth for the restored or preserved soil profile. From that, it projects the available storage within soil profiles of 4, 6 and 8 inches. This table is based on the Hudson research, which included soils with a silt loam texture and a bulk density of 1.25 gm/cm^3 (78.0 lb/ft^3).

Table 6: Amount of available water storage in healthy soil profiles based on percent soil organic matter content. Data is based on research conducted by Hudson (1994)*. Assumes bulk density of 1.25 gm/cm^3 and silt loam texture. Available Water Content (AWC = Field Capacity – Permanent Wilting Point); AWC = Theta * 100; Theta = Volumetric Water Content

%SOM by weight	Bulk Density (gm/cm3)	Available Water Storage (in/in soil)	Available Water Storage (in/4 in soil)	Available Water Storage (in/6 in soil)	Available Water Storage (in/ 8 in soil)
1	1.25	0.13	0.52	0.77	1.03
2	1.25	0.17	0.66	1.00	1.33
3	1.25	0.20	0.81	1.22	1.62
4	1.25	0.24	0.96	1.44	1.92
5	1.25	0.28	1.11	1.66	2.22
6	1.25	0.31	1.26	1.88	2.51
7	1.25	0.35	1.40	2.11	2.81
8	1.25	0.39	1.55	2.33	3.10

There are a few things to keep in mind while using Table 6:

1) To properly use this table, you will need to know the organic matter content for a given soil. Since evaluation and design will be occurring before construction the content for the future restored soils will usually be unknown. An assumed value will need to be used that is supported by actual soil data collected from the site. This value will need to be verified by post-construction testing. Care should be taken in making this assumption, if testing shows that the assumed value has not been achieved, additional SQR measures will be needed to meet the selected value, or other BMPs will be needed downstream to address the volume of runoff not addressed by this practice.

2) The column in orange can be used to calculate the available water storage for a soil of any depth, by selecting the value for a given organic matter content (%SOM) and multiplying it by the depth of the soil profile in inches.

3) Remember that the first 1.25 inches of water storage are needed to address the volume of rainfall that falls directly onto the preserved or restored area. When the available storage exceeds this value, there is surplus storage which can be used to manage the WQv requirements of adjacent areas, when their runoff is to be directed across the preserved or restored area. (Profiles with such conditions are highlighted in light blue in Table 6.) Refer to following pages for section titled "Guidance on Using Preserved or Restored Areas to Manage WQv for Adjacent Areas".

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For example: An 8 inch soil profile known to have 6% OM has 2.51 inches of available storage. The first 1.25 inches of storage will absorb rainfall from the 1.25 inch WQv event. That means that 1.26 inches of storage remain available to absorb runoff to that soil profile from adjacent impervious surfaces.

Organic matter content at a given site may be unknown, or soils may either be compacted or lack adequate organic material to meet WQv requirements. In such a case, the following guidelines may be applied to use compost as a SQR technique to improve the water storage capacity of a soil profile.

Table 7: Water volume managed based on disturbed soils amended with compost. Assume a soil bulk density of 2 gm/cm^3 (120 lb/ft^3) for soil material (compacted subsoil or B-horizon).

Soil (in) /Compost (in)	Weight Soil (lb)	Weight Compost (lb)	Total Weight (lb)	% OM	Water Volume Managed (in)
7/1	70	3.7	73.7	1.5	1.2
6/2	60	7.4	67.4	3.2	1.7
5/3	50	11.1	61.1	5.5	2.4
4/4	40	14.8	54.8	8.1	3.2

Guidance on Using Preserved or Restored Areas to Manage WQv for Adjacent Areas:

As noted previously, when it can be verified that there is storage capacity in a given soil profile which exceeds the 1.25 inch WQv rainfall depth, there is an opportunity to manage runoff from adjacent areas. Flow from upstream areas could be directed to the preserved or SQR area, in a manner which would allow that runoff to infiltrate into the healthy soil profile. This allows these areas to act as stormwater Best Management Practices (BMPs) for managing the WQv requirements for such adjacent areas.

If this is the intent of a given design, the following requirements should be met:

1. Install and maintain appropriate site and perimeter controls to prevent sediment discharge from the adjacent construction areas to the BMP during construction.

2. After construction, provide for adequate separation between any impervious surfaces and the BMP area for a pretreatment buffer.

3. To act as a BMP for managing runoff from adjacent areas, runoff needs to be distributed evenly as sheet flow across the area to be counted as a BMP so it can infiltrate into the soil profile.

    a) For smaller applications (runoff from adjacent residential roofs, open spaces without SQR and small impervious areas) careful grading at the point of entry can be used to spread out flows.

    b) For larger areas, it may be necessary to employ a level spreader or other structural method to convert concentrated flow to sheet flow or to prevent runoff from following a concentrated path of flow into the BMP.

    c) The finished surface of the BMP area should be graded as such that flow to be

treated will spread out across it. Flow should remain as sheet flow and not concentrate into low points or swales.

d) There can be larger areas preserved or where SQR is applied, but only those areas where sheet flow will pass over the finished surface should be counted as a BMP towards treating the WQv for adjacent areas.

4. To reduce flow velocity, minimize erosion and promote infiltration, the slope within the BMP area being counted toward WQv treatment should not exceed 6%.

5. The BMP area will need to be verified to have healthy topsoil to the desired depth and organic matter content needed to manage the WQv. Refer to Part I, "Construction Observation and Verification Requirements" within this Section.

If items 1-5 above are satisfied, the BMP area will be able to manage part or all of the WQv requirements for adjacent areas. The following table shows the relationship between the excess water storage volume in a soil profile to the size of an adjacent impervious surface which can be managed by the BMP in order to meet 100% of the WQv requirements for the adjacent impervious area. Keep in mind that open space areas without preserved healthy soils or where SQR techniques have not been applied to a depth of at least 4 inches should be treated as if they were 50% impervious (such areas will generate runoff during the WQv event which will need to be treated.

Table 8: Minimum BMP Area Ratios to Fully Manage WQv

Excess Water Storage Volume (inches)	**Multiply BMP Area by This Factor to Determine Maximum Impervious Area to be Treated**
0.50	0.42
1.00	0.84
1.25	1.05
1.50	1.26
2.00	1.68

Note the following when using Table 8:

1) Excess water storage is determined by finding the available water storage (Table 6 above) in a soil profile and subtracting 1.25 inches (the rainfall depth for the WQv event, which falls directly onto the BMP area).

2) Areas determined to have excess water storage volume, but that don't meet conditions 1-5 listed prior to Table 8, should not be included as part of the BMP area used to treat runoff from adjacent areas.

3) Upstream open spaces where healthy soils have not been verified and preserved or where SQR techniques have not been applied should be treated as 50% impervious area.

4) The relationship in Table 8 may be calculated for any value, by dividing the excess water storage volume by 1.1875 inches (runoff from a impervious surface generated by the 1.25 inch WQv event).

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For example: A soil profile for a 10,000 square foot SQR area has been found to have 1.40 inches of excess storage volume.

= 1.40 inches / 1.1875 inches = 1.18

The upstream impervious area to be treated by the BMP can be up to 1.18 times as large as the BMP area. 1.18 x 10,000 SF = 11,800 SF. Therefore, the SQR area in this example can manage the WQv for 11,800 SF of upstream impervious area.

Guidance on Partial Credit for Managing WQv with These Techniques:

In cases where a preserved or SQR area to be used as a water quality BMP does not have sufficient area to fully manage the WQv for the upstream impervious area, partial credit may be given. In such a case, other practices will need to be distributed elsewhere on site to fully meet the WQv requirements. This can be done by calculating the WQv stored by the BMP, and determining the remaining volume to be addressed by other practices.

For example: A soil profile for a 10,000 square foot SQR area has been found to have 0.50 inches of excess storage volume. It receives runoff from 8,000 square feet of impervious surfaces, 4,000 square feet of compacted open space and 5,000 square feet of verified healthy open spaces which have been preserved.

1) The effective impervious area within the watershed of the SQR will be:

   8,000 SF + (4,000 SF x 50%) + (5,000 SF x 0%) = 8,000 + 2,000 + 0 = 10,000 SF

2) Calculate the required WQv for the adjacent impervious area (refer to Section 2C-6):

   Rv = 0.05 + 0.009 (I) = 0.05 + 0.009 (100) = 0.95

   WQv = Rv x 1.25 inches = 1.1875 watershed inches

   = 1.1875 inches x 10,000 ft^2 / 12 inches per foot = 990 ft^3

3) Determine the available water storage within the SQR area to serve as the BMP:

   = 10,000 SF x 0.50 inches / 12 inches per foot = 417 ft^3

4) Determine the difference between available storage and required volume:

   = 417 ft^3 – 990 ft^3 = - 573 ft^3

Therefore, 573 cubic feet of treatment volume would need to be provided by another practice within the site, in order to meet the site's WQv requirements.

Should there be found to be excess storage available within a given BMP, that surplus should not be used to offset for other impervious surfaces whose runoff leaves the site without measures to address the WQv. Having surplus storage in one area, will not offset

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the effects of allowing runoff from other areas to leave the site without treatment.

H. Stormwater Modeling Guidelines

Providing healthy soils through preservation or SQR techniques should reduce the amount of runoff generated from that area for all storm events. Conversely, leaving soils in a compacted condition or with a lack of organic matter will likely increase runoff volumes. This section provides guidance on how to apply these principles in stormwater modeling.

Rainfall losses (the amount of rainfall not converted into runoff) can be estimated by the proper selection of curve numbers. These curve numbers (CNs) should be selected based on the Hydrologic Soil Group listed in the County soil survey for the given area, **unless site tests** indicate another soil group should be used. For open spaces they should also be selected based on the cover type and based on the criteria below:

No Preservation or SQR Technique Implemented	Use POOR condition
Healthy Soils Verified to Minimum 4” Depth	Use FAIR condition
Healthy Soils Verified to Minimum 8” Depth	Use GOOD condition

Refer to Section 2C-5 (NRCS TR-55 Methodology) to select the curve number that applies for the appropriate condition for the expected surface cover of a given area.

I. Construction Observation and Verification Requirements

Methods 1-2:

1. Prior to construction, complete testing methods to determine organic material content in areas proposed to be preserved. Verify that the areas to be preserved are protected by construction fences or other means deemed acceptable by the jurisdictional engineer.
2. Throughout construction, verify that no tracking, storage of materials or other disturbance is allowed within the protected area.

Methods 3-7:

1. Complete SWPPP management and inspections and install pollution prevention measures throughout construction (if required for a given site).
2. Compare site conditions with SMP.
3. When on-site topsoil is used, verify that the topsoil stockpile has been properly located and other site soils, debris, revetment stone or other materials are not being mixed with topsoil stockpile.
4. Verify surface, where SQR is to be completed, has been prepared and is free of debris, rocks larger than 1 inch in diameter (1/2 inch for turf grass areas) or other areas densely covered with smaller rocks and/or gravel.
5. Where topsoil is to be placed, observe site conditions, that the prepared surface is tilled to the required depth prior to topsoil placement and that it is not wet.
6. Refer also to other requirements of SUDAS Section 2010 related to the stripping, stockpiling and placement of topsoil. Verify that clods, lumps, roots, litter, other undesirable material, or stones larger than 1 inch (1/2 inch for turfgrass) have been removed prior to placement of any compost / sand or topsoil.

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7. Observe that tillage is performed to the depth required. Do not allow wet soils to be tilled.
8. Use visual observation to determine topsoil is placed to the depth specified within the SMP.
9. Use visual observation and collect delivery tickets or tags to determine specified volume of compost is applied to the SQR area. Compare delivery tickets with the SMP to match delivery location, total quantity of material, product description and source of material. Any deviation from specified materials will require laboratory test results to verify that the delivered materials are equivalent to those specified.
10. Verify depth of amended soil and scarification by using a shovel to dig at least one test hole per acre (a minimum of one test hole on smaller sites). The test location should be randomly selected by the site observer. Test holes should extend at least 4 inches below the expected tillage depth and/or topsoil layer and be at least 1 square foot in area. The amended soils and/or topsoil layers should be easy to dig, driven solely by the weight of the observer. The soil should be darker than existing soil below. Particles of organic matter are likely to be visible. Soil that requires vigorous chipping with the shovel to penetrate properly does not meet the specification. Where topsoil has been placed, the next 2 inch depth of soil should be loose enough to penetrate with the shovel. The loosened depth may vary based on pattern of scarification, some sections of the 1 square foot hole should be loosened 2 inches below the topsoil layer. Collect samples from the test hole locations and have tests completed to determine that the organic material content assumed in design has been met or exceeded.
11. Use a rod penetrometer to confirm the soil is uncompacted to the desired tillage depth at a minimum of ten locations per acre (with a minimum of ten on sites less than one acre). Locate test spots by dividing the site (or each acre) in half lengthwise, then dividing each half into five nearly equal sections. Conduct the test near the middle of each section. The rod penetrometer should enter the soil through 2 inches below the amended soil depth and/or topsoil layer, driven solely by the weight of the observer. Irregular scarification or rocks in subsoils may require probing a few spots at each location.
12. Record the results of the shovel and penetrometer tests on a Field Verification Form to be included with Site Record Documents. If a given site does not fulfill the intent of the SMP, corrective action will need to be taken prior to site stabilization.
13. Perform seeding, sodding or other stabilization techniques as specified. Collect tickets or other information as needed to verify that the appropriate materials and application rates are being used. Do not allow vehicular traffic, storage of materials or other disturbance within the SQR area during or after application of stabilization measures.
14. Continue SWPPP management and inspections and install pollution prevention measures until final stabilization. Should surface erosion occur, repair such areas with compost or appropriate topsoil-compost blends. Hand rake and reseed as necessary.

Method #8:

1. Verify that existing vegetation over the identified area for SQR is mowed to a height of 2 inches.
2. Observe the area has been aerated to a minimum depth of 4 inches.
3. Observe the area has been treated with a ½” to ¾” layer of compost.
4. Use visual observation and collect delivery tickets or tags to determine that the appropriate volume of compost is applied to the SQR area. Compare delivery tickets to match delivery location, total quantity of material, product description and source of material with SMP. Any deviation from specified materials will require laboratory test results to verify that the

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delivered materials are equivalent to those specified.

5. Perform seeding as specified.
6. Collect tickets or other information as needed to verify that the appropriate seed and application rates was used.

J. Maintenance Requirements

1. Monitor weekly and after rains of 0.5 inches until vegetation is well established.
2. Long-term maintenance involves maintaining organic matter content. Leave lawn clippings on the yard to decompose and recycle nutrients and organic matter. Annual applications of 1/2 to 3/4 inches of compost will help maintain or increase organic matter.

K. Reference Information

*Hudson, Berman. 1994. Soil Organic Matter and Available Water Capacity. Journal of Soil and Water Conservation. 49(2), 189-194

Singer, Michael J. and Donald N. Munns. Soils and Introduction. 1987, Macmillan Publishing Company, New York) (Edward J. Plaster. Soil Science and Management. 2009, 5th Edition, Delmar, Clinton Park, New York.

Soils for Salmon. http://www.soilsforsalmon.org/

SUDAS. http://www.soilsforsalmon.org/

Acknowledgements:

Original section created by Stephan Jones, Iowa State University and approved by the Iowa Stormwater Partnership Technical Committee

11/25/14 Version ISWMM, Overseen by ISWEP, ISWMM Technical Committee: Doug Adamson, Darice Baxter, Amy Bouska, Amy Foster, Joe Griffin, Rebecca Kauten, Mark Masteller, Wayne Petersen, Ryan Peterson, Greg Pierce, Pat Sauer, Jennifer Welch.

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Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

January 6, 2015

GUY GOLDSMITH
CITY OF NORTH LIBERTY
PO BOX 77
NORTH LIBERTY IA 52317

Dear Guy Goldsmith,

Congratulations, North Liberty has qualified as a *Tree City USA* for 2014. The *Tree City USA* designation is more than an award, it is positive proof of your community's long-term commitment to tree planting and maintenance that will offer multiple benefits to present and future citizens. North Liberty is one of over 80 Iowa communities, and over 3000 nationwide, that will receive the *Tree City USA* award this year from the National Arbor Day Foundation, the Iowa Department of Natural Resources, and the Iowa Urban Tree Council.

We would like to invite you and 2 additional community representatives to receive your *Tree City USA* award at our 25th annual Community Forestry Awards Luncheon. The Awards Luncheon will take place on Thursday, **April 9th** from 11:00 AM to 1:30 PM at the **Stoney Creek Inn***, 5291 Stoney Creek Ct, Johnston, IA 50131. Coffee and pictures will be prior to the luncheon and **10:00 AM**.

This year the Iowa Urban Tree Council will be hosting an educational workshop on community tree inventories prior to the luncheon, at 9:00 AM. Please see the enclosed registration for more details.

The Iowa Urban & Community Forestry Council invites you to nominate an individual or organization from your community to be considered for special recognition at this event. I have enclosed a nomination form and instructions for your use. Please return your nomination by February 3, 2015.

If you have any questions, please contact Shane Donegan at 515-725-8219, or e-mail shane.donegan@dnr.iowa.gov. Please return the enclosed RSVP form to us by March 24th, 2015 to the address on the form. We look forward to meeting you and your community representatives on April 9th to receive this prestigious award.

Sincerely,

Emma Hanigan
Urban Forestry Coordinator
Forestry Bureau

Directions: Merge onto I-80 towards Des Moines. Take exit 129 for NW 86th St towards Camp Dodge. Go north onto NW 86th St. Take the first right (east) onto Birchwood Ct. Turn left (north) onto NW 84th/Stoney Creek Ct.

AWARDS LUNCHEON RSVP

RESERVATION FORM
APRIL 9, 2015 AT THE STONEY CREEK INN, JOHNSTON

Please fill in the information below and return this form
by **March 24th** to:

Shane Donegan – Urban Forestry Specialist
Prairie Rivers RC&D
2402 South Duff Ave
Ames, IA 50010
Phone 515-725-8219, FAX 515-725-8201
E-mail: shane.donegan@dnr.iowa.gov

Community: _____

Names of Representatives Attending Complimentary meals (max. of 3)

1. _____

2. _____

3. _____

NOTE: *Please indicate if you wish a vegetarian meal or special dietary needs.*

Special Dietary Needs:

_____

Additional community representatives are encouraged to attend but we ask that a $15/person fee be enclosed. **Please make checks payable to the *Iowa Urban Tree Council.*** List additional representatives below and indicate choice of meal (regular or vegetarian).

_____

_____

_____

IOWA URBAN TREE COUNCIL
COMMUNITY TREE INVENTORY
WORKSHOP

This year, prior to Annual Awards Luncheon on April 9th, 2015 at the Stoney Creek Inn in Johnston, Iowa, the Iowa Urban Tree Council will be hosting a workshop discussing the benefits of Community Tree Inventories the workshop starts at **9AM** and the cost is **$10/person**. This workshop will be worth **1 CEU** from **ISA**.

The workshop will feature a representative from Davey Tree, who will give a short presentation on the benefits a tree inventory can provide for a community.

In addition there will be a panel of representatives from Iowa communities who have done work on tree inventories or have completed an inventory for their city. They will share their experiences with inventories and will answer any questions attendees have about accomplishing an inventory in their community.

Please RSVP with this form by **March 24th, 2015**

Attendees:

_____

_____

_____

_____

Please return RSVP to:

Shane Donegan – Urban Forestry Specialist
Prairie Rivers RC&D
2402 South Duff Ave
Ames, IA 50010
Phone 515-725-8219, FAX 515-725-8201
E-mail: shane.donegan@dnr.iowa.gov

Please make checks payable to the *Iowa Urban Tree Council.*

Bike Trail & Muddy Creek Clean-Up

The Tree & Storm Water Advisory Board with assistance from Boy Scout Troop 216 and Cub Scout Pack 216 & 275 will be leading this clean-up day to remove debris along Big Muddy Creek and the bike trail.

Public involvement, participation and education of storm water pollution prevention and management is the goal of this event!

For more information, please call the Parks Department at 626-5720.

In observance of Keep America Beautiful Day, please join Boy Scout Troop 216 and Cub Scout Pack 216 & 275, City Staff, and the Tree & Storm Water Advisory Board for this event!

Sat., April 11, 2015

9:00AM

Meet @ Rec. Center

Volunteers Needed!

ORDINANCE NO. _____

AN ORDINANCE AMENDING CHAPTER 150 OF THE NORTH LIBERTY CODE OF ORDINANCES TO IMPLEMENT CHANGES TO TREES IN RIGHT-OF-WAY

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF NORTH LIBERTY, IOWA:

SECTION 1. AMENDMENT. That Chapter 150, "Trees," of the North Liberty Code of Ordinances be and the same is hereby amended by repealing Chapter 150 and adding a new Chapter 150 in lieu thereof to read as follows:

CHAPTER 150
TREES

150.01 Purpose
150.02 Definitions
150.03 Trees, Shrubs, or Bushes in the Public Right-of-Way
150.04 Prohibited Trees
150.05 Duty to Trim
150.06 Removal of Trees
150.07 Tree, Shrub, and Bush Removal on Public Property
150.08 Tree, Shrub, and Bush Removal on Private Property
150.09 Permit and Regulation
150.10 Authority of the Council

150.01 PURPOSE.

The purpose of this chapter is to regulate and preserve the appearance of the City by requiring trees, shrubs, and bushes to be uniformly located, and to regulate the planting and care of such trees, shrubs, and bushes in the City for the protection of public health, safety, and welfare.

150.02 DEFINITIONS.

For the purposes of this chapter, the following definitions apply:

1. "Owner" means a person owning private property in the City as shown by County records. This term includes the term "agent," "occupant," "tenant," and "person in control" of the property.

2. "Parking" means the area within a street right-of-way located between the back of the curb and edge of the sidewalk closest to the curb. Also referred to as "parkway."

3. "Private property" means all property not owned by the City.

4. "Public property" means any and all property located within the confines of the City and owned by the City or held in the name of the City by any departments, commissions, or agencies within the City government.

5. “Public right-of-way” means that portion of land between property lines that is dedicated and deeded to the City to provide the area necessary for the installation of street and sidewalk surfacing, public utilities, and other improvements.

6. “Street” means the right-of-way dedicated to public use serving more than one property with vehicular access and frontage.

150.03 TREES, SHRUBS, OR BUSHES IN THE PUBLIC RIGHT-OF-WAY.

1. It is unlawful for any person to plant any tree, shrub, or bush in any public right-of-way or parking. In the event that the City or a private utility disturbs any public right-of-way or parking, the City or the private utility shall only be responsible for reseeding and establishing grass in the disturbed area.

2. The City of North Liberty may plant trees, shrubs, and/or bushes in the public right-of-way as a part of an approved City project, such as landscaped medians and boulevards.

150.04 PROHIBITED TREES.

The following species of trees are declared to be nuisances, and no person shall plant any of the following trees within the City:

Black Locust	Russian Olive
Box Elder	Siberian Elm
Cotton Bearing Poplar	Silver Maple/White River Maple (soft maples)
Female Ginkgo	Tree of Heaven
Green Ash	White Ash

150.05 DUTY TO TRIM.

1. All trees, shrubs, and bushes in the parking that overhang onto the street, alley, or other roadways of the City shall be trimmed immediately above such streets, alleys, or roadways and clear of the curb line, as determined to be necessary and appropriate by the Street Superintendent. The trimming under this subsection shall be the responsibility of the City.

2. All trees, shrubs, and bushes, whether in the parking or on private property that overhang onto any sidewalk or trail of the City shall be trimmed to a minimum height of eight (8) feet immediately above such sidewalk or trail. Any trees, shrubs, and bushes, whether in the parking or on private property, lower than eight (8) feet shall be trimmed so as to be at least two (2) feet clear of any sidewalk or trail. All trees on private property shall be trimmed to a minimum height of sixteen (16) feet immediately above and at least two (2) feet clear of any public street, alley or roadway. The trimming under this subsection shall be the responsibility of the property owners, agents, or occupants of property adjoining any sidewalk or trail.

150.06 REMOVAL OF TREES.

The City shall remove any tree standing on public property, or in the public right-of-way or parking thereof, which is dead, diseased, or declared to be a nuisance to public safety and may remove any other trees in its discretion. No compensation shall be paid to the abutting property owner regardless of whether the City or the property owner placed the tree in the public right-of-way or parking. Any person desiring to remove a live tree which has been planted in the public right-of-way or parking shall first obtain a permit from the Street Superintendent. If a permit is issued, the permittee must remove the tree at the permittee's own expense. No fee shall be charged for the permit to remove the tree.

150.07 TREE, SHRUB, AND BUSH REMOVAL ON PUBLIC PROPERTY.

No trees, shrubs, bushes, or other parts thereof which are dead, decayed, diseased, or dying upon a street, public right-of-way, parking, or public property of the City and which constitute a hazard to the health, safety, or well-being of any person shall be allowed to remain in such condition. No trees, shrubs, or bushes shall be maintained in such a manner as to interfere with the moving of traffic upon the streets in a safe and orderly manner.

150.08 TREE, SHRUB, AND BUSH REMOVAL ON PRIVATE PROPERTY.

No trees, shrubs, or bushes or parts thereof on private property which are dead, decayed, diseased, or dying or which have become dangerous to the public shall be allowed to remain in such condition.

150.09 PERMIT AND REGULATION

1. No trees, shrubs, or bushes may be planted on any public property or within any public utility easement without written permission of the City. No trees, shrubs, or bushes shall be planted under existing lines if, at maturity, it is likely to cause interference with those lines.

2. Trees required by City ordinance or approved site plans to be planted in and around parking lots, with the intent to provide shade for such parking lots, shall have a caliper of at least two (2) inches at the time of planting and an anticipated mature height of at least fifteen (15) feet.

150.10 AUTHORITY OF THE COUNCIL.

1. The City shall have the authority to order the property owner, agent, or occupant of the property adjoining any sidewalk to prune, maintain, and care for all trees, shrubs, and bushes located on the street, public right-of-way, parking, or the adjoining property of the owner, agent, or occupant that have become dangerous to the public or that may interfere with the regular movement of pedestrian or other permitted traffic upon the sidewalks in a safe manner, by serving notice upon the property owner to comply with the order. This order is in addition to the requirements that all trees, shrubs, and bushes be trimmed as above described.

2. Should the adjoining property owner, agent, or occupant fail to comply with said order within thirty (30) days after receiving notice from the City, then the City may order the pruning

or maintenance of such trees, shrubs, and bushes, and the City Council may assess the costs thereof against the adjoining property by resolution of the Council.

SECTION 2. REPEALER. All Ordinances and parts of ordinances in conflict with the provisions of this Ordinance are hereby repealed.

SECTION 3. SEVERABILITY. If any section, provision or part of this Ordinance shall be adjudged invalid or unconstitutional, such adjudication shall not affect the validity of the Ordinance as a whole or any section, provision or part thereof not adjudged invalid or unconstitutional.

SECTION 4. WHEN EFFECTIVE. This ordinance shall be in effect from and after its final passage, approval and publication as provided by law.

First reading on the _____ day of _____, 2014.

Second reading on the _____ day of _____, 2015.

Third and final passage on the _____ day of _____, 2015.

_____
AMY NIELSEN, MAYOR

ATTEST:

_____
TRACEY MULCAHEY, CITY CLERK

I certify that the forgoing was published in accordance with the laws and ordinances of the State of Iowa and the City of North Liberty the _____ day of _____, 2015.

_____
TRACEY MULCAHEY, CITY CLERK