Chapter 5

Minimum Control Measure: Item 4 Construction Site Stormwater Runoff Control

A. MS4 Permit Requirements

4.4 MCM 4. Construction Site Stormwater Runoff Control

The MS4 Operator shall develop, implement and enforce a program to reduce pollutants in any stormwater runoff to their MS4 from construction activities that result in land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre shall be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.

4.4.A The MS4 Operator shall have a law, ordinance and/or other regulatory mechanism to require erosion and sediment control BMPs at construction/land disturbance sites greater than or equal to one (1) acre or less than one acre if the construction activity is part of a larger common plan or development or sale that would disturb one acre or more.

1. The mechanism shall include sanctions which are designed to ensure compliance, to the extent allowable under State, Tribal, or local law.

<u>See Addendum MCM #4-1 Land Disturbance, Illicit Discharge & Erosion</u> <u>Control Ordinance.</u>

4.4.B The MS4 Operator shall review pre-construction plans. These reviews at a minimum shall.

1. Incorporate the consideration of potential water quality impacts through procedures for site plan review. The site plan review procedures shall evaluate threats to water quality shall by considering, at minimum, the following factors:

- a) Soil erosion potential.
- b) Site slope.
- c) Project size and type.
- d) Sensitivity of receiving waterbodies.
- e) Discharge flow type (pipe or sheet flow).
- f) Location of discharge point in relation to receiving water.
- g) Proximity of the site to receiving waterbodies; and
- h) Other factors relevant to the MS4 service area

2. Use a checklist, or other listed criteria, to ensure consistency and completeness.

<u>See Addendum MCM #4 -10 Sample Departmental Plan Review</u> <u>Routing Sheets.</u>

3. Include requirements for construction site operators to select, install, implement, and maintain appropriate stormwater control measures.

a)This includes temporary BMPs throughout the life of the land disturbance, and permanent BMPs which remain on site as required by local codes and ordinances.

See Addendum MCM #4-1 Land Disturbance, Illicit Discharge & Erosion Control Ordinance, Section 114 Erosion and Sediment Control, Section 118 Design Standards and Criteria, Sub-Section B Sediment Containment.

4. Consider ways to minimize disturbed areas through actions such as, phased construction requirements, temporary seeding or sodding, or erosion mats to exposed areas.

<u>See Addendum MCM #4-1 Land Disturbance, Illicit Discharge &</u> <u>Erosion Control Ordinance, Section 118 Design Standards and</u> <u>Criteria, Sub-Section B Sediment Containment.</u>

5. Include requirements for construction site operators to control construction-site waste that may cause adverse impacts to water quality.

This shall include at a minimum:

- a) Discarded building materials;
- b) Concrete truck, and mortar mix washout;
- c) Chemicals (such as fertilizer, paint, oils, herbicides, pesticides);
- d) Litter; and
- e) Sanitary waste.

<u>See Addendum MCM #4-1 Land Disturbance, Illicit Discharge &</u> <u>Erosion Control Ordinance, Section 111 Definitions, POLLUTANT</u> <u>defined, Section 121 Discharge (containing pollutants) Prohibited.</u>

4.4.C The MS4 Operator shall establish authority for site inspections and enforcement of control measures. To the extent allowable by state, federal, and local law, all MS4

Operators shall implement procedures for inspecting construction/land disturbance projects.

See Addendum MCM #4-1 Land Disturbance, Illicit Discharge & Erosion Control Ordinance, Section 119 Inspections, Section 120 Enforcement and Penalties.

The construction site stormwater program shall implement at a minimum:

1. Identify priority sites for inspection based on nature of the construction activity, topography, disturbed area, and the characteristics of soils and sensitivity of, or proximity to, receiving water.

2. Construction site inspections shall include assessment of compliance with the MS4 Operator's construction site storm water runoff control ordinance or regulatory mechanism, and other applicable ordinances.

3. The inspections shall evaluate any structure that functions to prevent pollution of stormwater or to remove pollutants from stormwater and use enforcement polices to require BMPs are implemented and effective.

4. Final inspection, upon completion of the land disturbance and prior to final approval or occupancy of construction project. Ensure all disturbed areas have been stabilized, that all temporary erosion and sediment control measures are removed.

5. The inspections conducted by the MS4 Operator shall be documented with a checklist. The checklist must include structural BMPs and check on the self-inspection which are conducted by the construction site operator. These MS4 Operator checklists may be electronic.

See Addendum MCM #4-5 Sample Construction Site Pollution Prevention Inspection form with site specific BMP map.

4.4.D The construction site stormwater program shall include an established, escalating enforcement policy that clearly describes the action to be taken for violations.

The program shall have procedures to ensure compliance with the MS4 Operator's erosion and sediment control regulatory mechanism. This shall include the sanctions and enforcement mechanisms the permittee will use to ensure compliance and procedures for when certain penalties, injunctions or other measures will be used.

1. The MS4 Operator must have the authority to initiate a range of enforcement actions to address the variability and severity of noncompliance.

2. Enforcement responses to violations must consider the following criteria at minimum:

a) Degree and duration of the violation;

b) Effect the violation has on the receiving water;

3. Enforcement actions shall be timely in order to ensure the actions are effective. These procedures and actions must be written and available for MS4 staff for consistency and training purposes.

4. The MS4 Operator must have a minimum of two (2) enforcement actions they are able to use.

Possible enforcement actions include, but are not limited to:

a) Stop Work orders;

b) Verbal education or educational materials given to the construction site operator;

c) Written warnings or notice of violation;

d) Bonding or escrow requirements;

e) Fines/ penalties; and

f) Denials for previous non-compliance.

See Addendum MCM #4-1 Land Disturbance, Illicit Discharge & Erosion Control Ordinance, Section 119 Inspections, Section 120 Enforcement and Penalties.

Once a Stormwater violation/illicit discharge issue has been discovered, by Inspection discovery or, in some way brought to our attention: the procedures are the same. We make initial contact, point out the violation, explain why it's a violation and a verbal warning against creating the opportunity for this violation to reoccur. The responsible person is asked to have the violation abated within 3 calendar days. If the violation abatement has not occurred within those initial 3 days, they are given a written warning to have it abated within another 3 days or they will receive a citation. If abatement of the violation has still not happened within those 3 days, a citation is issued, and depending on the overall circumstances, a citation may be issued for each day the violation is still unabated. Once the responsible person appears in court on the citation(s), along with a fine, city staff will request of the judge, to order the abatement of the violation or, order the responsible person to reimburse the city for cost of the cleanup if the city is forced to use staff, equipment, and other resources to abate the violation.

4.4.E The MS4 Operator shall require the construction site operator to conduct inspections at minimum:

1. Every fourteen (14) days, when construction is active.

2. Within 72 hours of any storm event, and within 48 hours after any storm event equal to or greater than a 2-year, 24-hour storm has ceased.

Checklists used for these inspections conducted by construction site operators may be submitted to the MS4 Operator, or the MS4 Operator may verify that these inspections are being conducted by the construction site operator checklists during MS4 Operator inspections.

The MoDNR General Operating Permit obtained for each project and submitted to the city also contains this requirement and we utilize this tool to assist with enforcement of this regulation also.

<u>See Addendum MCM #4-6 Weekly Construction Site BMP Inspection form</u> <u>that ball site operators are required to complete and return a copy to the</u> <u>city.</u>

Each construction site operator is required to complete one of these inspections forms once a week and with 48 hours of a ½" or greater rainfall event. The operators are required to send the City a digital copy of every inspection form completed, to retain in our files.

There is a City inspector on every active construction site every day which completes random follow up checks of these submitted weekly inspection reports to insure the inspections are being done correctly and that the information submitted to us is true and factual.

4.4.F The MS4 Operator shall maintain an inventory of active public and private land disturbance sites, as defined in Section 4.4 of this permit. This may be supplemented with records such as a plan review checklist and email correspondence.

The inventory must contain:

1. Relevant contact information for each project (e.g., tracking number, name, address, phone, etc.);

2. Size of the project/ area of disturbance;

3. If the site is a priority site/ how high of priority;

The inventory of active sites must be updated as new projects are reviewed and projects are completed. If the MS4 Operator needs to develop this inventory, it shall be completed within one (1) year of this permit issuance.

This inventory list has been in place for several years and updated periodically. It is our goal to enhance the inventory list with the information listed above to bring this into full compliance within one (1) year of this permit issuance.

See pages 18 and 19 of the Illicit Discharge Detection and Elimination Plan at

https://www.nixa.com/home/showpublisheddocument/9698/63658 6140594670000

4.4.G The MS4 Operator shall track their oversite inspections. This may be done by retaining copies of records such as inspection checklists and email correspondence. The MS4 Operator must make these inventories available to the Department upon request.

The tracking must contain at a minimum:

- 1. Inspection dates;
- 2. Inspection findings; and,
- 3. Follow up actions including all enforcement actions.

The Construction Site Weekly Inspection Sheets are submitted to the city by the site operator (or their designee) and are kept in a digital file for each project. The inspections completed by City inspectors are kept in the same manor though 2 different forms are used. One is geared specifically for the operator (one page fill in the blank and circle YES/NO) (See Addendum MCM #4-6 Weekly Construction Site BMP Inspection form) and the other form is more involved with information on each BMP used (See Addendum MCM #4-5 Sample Construction Site Pollution Prevention Inspection form with site specific BMP map.)

4.4.H Existing permittees: Review the Stormwater Management Program including ordinances, permitting procedures, review procedures, inspection procedures and enforcement procedures to ensure compliance with these requirements. Any changes necessary to be in compliance with this permit shall be completed within the first year of this permit issuance.

The inventory of active sites must be updated as new projects are reviewed and projects are completed. If the MS4 Operator needs to develop this inventory, it shall be completed within one (1) year of this permit issuance.

This inventory list is in place however, it does need to be update and will be within one (1) year of this permit issuance.

4.4.1 Newly regulated permittees: If the MS4 Operator needs to develop this mechanism, the Management Plan shall describe the construction site stormwater plan and scheduled implementation. Development of this program shall be completed within the first three (3) years of the permit issuance. If the MS4 Operator's ordinance or regulatory mechanism is already developed, the permittee shall include a copy of the relevant sections with the Management Plan.

For new permittees, the inventory must be completed with one (1) year of permit issuance and then updated as new projects are permitted.

4.4.J The Stormwater Management Program must include procedures for the MS4 Operator to receive and consider information submitted by the public about land disturbance sites. This may be in combination with 4.2.D of this permit.

The City of Nixa sends out notifications to property owners/residents within 185' of the property in question. In the certified letter, residents are informed of the date, time and location of a public hearing to be held during a Planning and Zoning meeting. Additionally, there are two City *Council meetings that any concerned citizen/resident can come and voice* what concerns they may have. This process is repeated for property rezoning, preliminary plats for major subdivision developments, and annexations. The City also installs a temporary public hearing sign on the property in question. The City also is required to advertise any public hearing in a local paper. Every caller is encouraged to attend the meetings to voice their concerns to the decision makers. If someone is unable to attend a meeting they are encouraged to e-mail or send a letter stating their concerns. These are then added to the packet of information given to members of the Planning and Zoning commission and the City Council. If something of major concern is brought up, staff will investigate it further, even table the item for further review and bring it back at a later date, as needed. This process is intended to draw comments from the public whether it is a traffic increase concern, noise increase concern, stormwater quality or quantity concern, or other.

Citizens may also utilize the Service Request section of the City website at the following link <u>https://www.nixa.com/departments/public-</u>works/stormwater/submit-a-service-request.

4.4.K The MS4 Operator shall provide, or support access to, sediment and erosion control training for MS4 inspectors and plan reviewers at minimum once during this permit cycle. This education shall be tracked or documented.

STAFF & DEPARTMENT	DATE	TOPIC(S)	TRAINING PROVIDER/
			METHOD

TBD	TBD	TBD	TBD

Since the annual training date(s), exact topics and Trainer/Provider(s) for the entire permit cycle have not been determined at this time, that information will be included when preparing the annual MS4 Stormwater Management Program Report(s) for submittal to the Department.

4.4.L The MS4 Operator must provide written procedures outlining the local inspection and enforcement procedures to their inspectors to ensure consistency among the inspections.

Once a Stormwater violation/illicit discharge issue has been discovered by Inspection discovery or, in some way brought to our attention: the procedures are the same. We make initial contact, point out the violation and explain to them why it is a violation. They are then given a verbal warning against creating the opportunity for this violation to reoccur. They are asked to remediate the violation within 3 calendar days.

If the issue is not cleaned up within those 3 days, they are given a written warning to have it cleaned up/removed within another 3 days or they will receive a citation. If the violation is still not cleaned up/removed within those 3 days an initial citation is issued. Depending on the overall circumstances (severity and amount of pollutant), a citation may be issued for each day the violation remains unaddressed. Once the responsible person (or their representative) appears in court on the citation(s), along with a fine, city staff will request, of the judge, to order the cleanup/removal of the violation or, order reimbursement to the city for cost of the cleanup if the City is forced to use city staff, equipment and other resources to mitigate the violation.

<u>See Addendum MCM #4-5 Sample Construction Site Pollution Prevention</u> <u>Inspection form with site specific BMP map.</u>

4.4.M Using adaptive management, all MS4 Operators shall review, at minimum annually, their Construction Site Stormwater Runoff Control Program and evaluate the ordinances, review procedures, inspection procedures, enforcement procedures, and training procedures to ensure compliance with these requirements and determine if changes are needed. Any additional BMPs shall be acknowledged in the annual report.

Since the annual review date(s) for MCM 4 have yet to be determined, that information will be included when preparing the annual MS4 Stormwater Management Program Report for submittal to the Department.

	Annual review of MCM 4							
Year being reviewed	Date of review	Reviewer(s)	Were changes made and noted?					
2021	TBD	TBD	TBD					
2022	TBD	TBD	TBD					
2023	TBD	TBD	TBD					
2024	TBD	TBD	TBD					
2025	TBD	TBD	TBD					

This annual review may include but is not limited to the follow.

1.Evaluating the most common violations, how the violations are handled, how many are escalated.

2. If the education program can assist in reducing violations;

3. Determining if the site plans match the sites when violations arise or if additional items need to be evaluated at plan review;

4. Assessing public complaints being addressed in a timely manner; and

5. Evaluating if the inspections thorough and consistent across different sites.

List any additional <u>programmatic</u> BMPs and when they were added to the Stormwater Management Program. (Examples of programmatic BMPs include; onsite preconstruction visit, adopting a standard operating procedure for enforcement measures.)

If/when additional programmatic BMPs are add to the Stormwater Management Plan that information will be included be included when preparing the annual MS4 Stormwater Management Program Report(s) for submittal to the Department.

B. Benefits of a Construction Site Stormwater Runoff Program

On November 13, 1995, the City of Nixa adopted sediment and erosion control regulations as part of the General Conditions, Technical Specifications and Storm Water Management Plan. In February 2009 the City adopted is first official Stormwater Ordinance. Though it is a separate standalone ordinance, it is still considered as part to the City's Technical Specifications. The goal of the

regulations is to effectively minimize erosion and discharge of sediment by application of relatively simple and cost-effective Best Management Practices (BMPs).

Though the Stormwater ordinance regulations apply to all non-agricultural land disturbances activities in the City, they do not apply to construction sites less than one acre in size unless, that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.

Polluted stormwater runoff from construction sites often flows to storm sewer systems and ultimately is discharged into local rivers and streams. Sediment is usually the main pollutant of concern. Studies have shown sediment runoff rates from construction sites are typically 10 to 20 times greater than those of agricultural lands, and from 1,000 to 2,000 times greater than those of forest lands.

During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting situation, and the contribution of other pollutants from construction sites, can cause physical, chemical, and biological harm to our nation's waters.

Additional pollutants are also often present in stormwater runoff from construction sites and may result in the degradation of receiving water. Nutrients (nitrogen and phosphorus) are specific concerns and can cause significant impairment of stormwater quality.

In addition, solid and sanitary wastes, pesticides, oil and grease, concrete truck washout, construction chemicals, construction debris and metals may be carried by stormwater and cause a negative impact on receiving waters. These items all qualify as "Pollutants" as defined in addendum MCM #4-1 Land Disturbance, Illicit Discharge and Erosion Control, Stormwater Ordinance, therefore are prohibited.

C. Land Disturbance Program

The City of Nixa not only requires a MoDNR General Operating - Land Disturbance Permit, but we also require the owner/operator of any development project 1 acre in size or larger to obtain a city of Nixa Land Disturbance Permit also. Both must be in good standing and valid to be able to continue construction on the development.

D. Program BMPs

#1. Pre-Development Review Team

<u>Description:</u> The City has created a Pre-Development team that meets once a week to discuss preliminary information on prospective new developments. This meeting is conducted by the City's Planning and Development Director and the team is made up of representatives from Planning and Development, Street Department, Water-Wastewater Department, Electric Department, Director of Public Works, Asst. Director of Public Works, and Public Works Inspector (MS4 Coordinator).

<u>Measurable Goals:</u> At this meeting, preliminary information is presented to the Team to solicit initial concerns/comments. This process helps to identify potential issues (stormwater or other) prior to the final draft of construction documents. This process also helps to streamline the plan review process once the construction documents are submitted to the City for review.

<u>Rational for BMP:</u> The purpose of these Team meetings is to ensure all of the pertinent City staff and department heads have an opportunity to review and brainstorm topics or issues that might arise during the early stages of a proposed development.

Parties key to Implementation: P & Z Director, Street Department Superintendent, Water-Wastewater Superintendent, Electric Department Superintendent, Director of Public Works and Public Works Inspector (MS4 Coordinator).

#2. Pre-Construction Meetings

<u>Description:</u> These meetings are generally conducted a few days to a month prior to the start of construction. It is a final opportunity to discuss as a group, concerns, and expectations that each party might have. By discussing these concerns in this type of setting, each entity present can participate in the discussion and/or at least note what was said.

Stormwater concerns and expectations are discussed at these meetings, specifically advising the owner and contractor that strict adherence to the Sediment and Erosion control plan and permit requirements is crucial.

See addendum MCM #4-9 copy of Pre-Construction Meeting Agenda.

Generally, in attendance are representatives from the Electric Department, Street Department, Water-Wastewater Department, Planning & Development and Public Works Inspector (MS4 Coordinator), the project owner or their designee, representatives of the construction firm building the project, and personnel from the Engineering firm of record.

<u>Measurable Goals:</u> The intent is to as much as possible, eliminate confusion, conflict and disagreements (that tend to stall progress on projects) on the construction site once ground is broken, by discussing stormwater concerns and expectations ahead of time. The City will continue to hold these Pre-Construction meetings for every new project and will record the number of attendees and the party they represent.

<u>Rational for BMP:</u> Quality of workmanship, safety, scheduling, administrative issues (adherence to the City approved construction documents) and inspection are all discussion topics that may be discussed and are the principal reasons for these pre-construction meetings. A well-structured pre-construction meeting helps ensure that a project proceeds as smoothly as possible. It also helps to eliminate confusion and ruffled feathers when faced with those inevitable (unforeseen) issues that arise during any given project.

<u>Parties key to Implementation:</u> Representatives from: Project Owner, General Contractor, Engineering firm of record, City of Nixa.

#3. Development and Commercial Plan Review Process

<u>Description:</u> This Plan Review process helps to expedite the plan review process for local developments. The Planning and Development Department receives construction documents and delivers them to the Public Works Inspector. Who, in turn distributes them to the individual departments for review. One copy of construction documents is sent to the City's contracted stormwater engineering firm for review. They review the stormwater system as a whole, design criteria, pipe size, capacity of basins, discharge rates, etc.

All plans are also reviewed to ensure that proposed construction activities at sites of one acre and greater, including construction activities at sites that are part of a larger common plan of development meet the appropriate stormwater requirements including permit coverage under MODNR, the SWPPP, and appropriate BMPs.

<u>See addendum MCM #4-10 copy of Departmental Plan Review</u> <u>Routing Sheets.</u>

<u>Measurable Goals</u>: The City will continue this Development (and Commercial) plan Review process. The City will record and track the number plans and SWPPP's reviewed.

<u>Rational for BMP:</u> This plan review process is the second tier in a three Tier process (Tier 1: Pre-Development Team meetings, Tier 2: Plan review process and Tier 3: Pre-Construction meetings) to address stormwater (and other) concerns, regulations and expectations prior to the actual start of a development project.

<u>Parties Key to Implementation:</u> Public Works, Planning and Development, Nixa Fire Protection District

#4. Site Inspections and Enforcement

<u>Description:</u> The City will continue to conduct development and construction site inspections and enforcement. The purpose of these inspections is to assure that construction site operators are complying with the regulations set forth in the LDP, SWPPP and other approved construction documents. These inspections include but are not limited to site perimeter protection, inlet protection, vehicle tracking pad, track out deposited onto City streets or any construction site waste that may cause adverse impacts to water quality, including discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste. These inspections are conducted on all active (developments under construction, not yet released for home building) and non-active (no construction or building activities) sites that have a current Land Disturbance Permit.

The active sites are prioritized and are all inspected daily as the site Inspector makes rounds. These inspections include but are not limited to: installation and maintenance of stormwater BMPs, and installation of all other development infrastructure. The inspection results/concerns are noted in an electronic data base file for that project daily. Any stormwater issues that are discovered are passed on to the project superintendent or foreman that day, to be addressed within 48 hours.

In addition to these inspections listed above, that are completed by the Public Works Inspectors, the City Building Inspectors also help with the enforcement of Sediment and Erosion control regulations (silt soxx, silt fence, construction entrance, track out, curb inlet soxx, etc.) on the individual building lots and adjacent streets as the homes are being constructed. These inspectors are at or near most active building sites within the city on a regular basis and can keep a close eye on these BMPs. With that, they are key to helping the city achieve its goals in the reduction of sediment and erosion. Sediment and Erosion control is required to be installed at the start of each building project and is to be maintained in an effective condition throughout the duration until the site is stabilized to the maximum extent practicable.

Non-Active development sites are inspected once annually, more often if complaints are received. A copy of the inspection results is typically mailed to the owner of record with required corrective actions noted.

<u>See addendum MCM #4-5 copy of Stormwater Pollution Prevention</u> <u>Site Inspection Report.</u>

A final inspection will be completed, assuring all required development stormwater BMPs are in place and functioning properly, prior to release of final plat. The development BMPs are inspected periodically to ensure continued compliance. Once a building permit is acquired, the builder is required to install stormwater BMPs on that site, and they are inspected by the Building Inspectors along with called inspections.

<u>Measurable Goals:</u> The City will document the number of inspections completed and any follow-up activities including enforcement will be documented and maintained by the city. It is our goal that employees responsible for conducting site inspections will be trained annually and the city will record all training events and number of attendees.

<u>Rational for BMP:</u> Permit requirement. The purpose of these inspections are to determine the overall effectiveness of and compliance with the SWPPP plan and shall be used to identify the need for additional or modified BMP control measures.

<u>Parties key to Implementation:</u> Asst. Public Works Inspector, Public Works Inspector, properly trained City staff i.e. Building Inspector(s).

#5. Construction Operator Weekly BMP Site Inspections

<u>Description:</u> According to the MODNR Land Disturbance Permit the Permittee or his/her appointee is required to complete a weekly inspection report of the BMPs and outfalls on their development site.

"When practicable, the receiving stream shall also be inspected for 50 feet downstream of the outfall". They are required to record these inspection reports and make them available on site for review. Construction site operators are required to complete at a minimum once weekly and within 48 hours of a rain fall event of .5" or greater and retain on site for periodic review by city inspector or other stormwater Envionmental Agency.

<u>See addendum MCM #4-6 copy of the weekly construction site BMP</u> inspection form provided by the city.

Development construction sites are required to have a job trailer for storage of all substance that should not be stored outdoors, filter ring around the porta johns, concrete washout areas, trash dumpster (covered) and designate areas for equipment and material storage areas. These items are all required to be shown on the construction plans (Sediment and Erosion Control sheet) and are verified as part of the plan review process.

<u>Measurable Goals:</u> The City will require each construction site operator to submit copies of all weekly site inspections to the city for record retention.

Rational for BMP: Permit Requirement

<u>Parties key to Implementation:</u> Permittee or their appointee, Asst. Public Works Inspector, Public Works Inspector, other City staff trained to do these inspections.

E. Chapter Summery Table

BMP ID #	BMP	Activity	Measurable Goal	Due Date	Responsible Party
1	Pre- Development Review Team	Continue to meet once a week to discuss prospective new developments.	Continue to review preliminary information for initial concerns, comments	2021-2026	Team members

2	Pre- Construction Meetings	To discuss as a group, stormwater (and other) concerns and expectation that each party might have, prior to start of construction	As much as possible, eliminate confusion and conflicts ahead of time that might arise on site once ground is broken.	2021-2026 as projects are developed	Representatives from: Project Owner, General Contractor, Engineering firm, City staff.
3	Development (and Commercial) Plan Review	Review all construction plans and stormwater SWPPPs to ensure compliance with state, federal and local laws.	Record and track the number plans and SWPPP's reviewed.	2021-2026 As project plans are submitted	Electric Department, Water- Wastewater Department, Street Department, Stromwater Engineer, Public Works Inspector
4	Site Inspections and Enforcement	Continue to conduct construction site inspections and enforcement.	Record and track number of inspections and follow- up actions including enforcement	2021-2026	Asst. Public Works Inspector, Public Works Inspector, other properly trained City staff
5	Construction Operator Weekly BMP Site Inspections	Continue to require construction site operators to complete weekly SWPPP site inspections.	Require construction site operator to submit copy of weekly site inspections to City for record retention.	2021-2026 As long as there are active construction sites.	Asst. Public Works Inspector, Public Works Inspector, Construction site operators.

City of Nixa Code of Ordinances

Section 22-344 - Solid Waste Storage. Section 14-24 - Certain Conditions or Actions Declared Nuisances. Section 14-25 - Nuisance prohibited. Section 16-88 - Littering.

• Sec. 22-344. - Solid waste storage.

(a)

The occupant of every dwelling unit shall use a solid waste container provide by the city's approved waste disposal contractor; and all institutional, commercial or business, industrial or agricultural establishment producing solid waste within the corporate limits of the city, shall provide sufficient and adequate containers for the storage of all solid waste.

(b)

The occupant of every dwelling unit and of every institutional, commercial, industrial, agricultural or business establishment shall place all solid waste to be collected in proper solid waste containers, except as otherwise provided herein, and shall maintain such solid waste containers and the area surrounding them in a clean, neat and sanitary condition at all times.

(c)

Residential solid waste shall be stored in containers provided by the city's approved solid waste disposal contractor. Containers shall be leak-proof, waterproof, and fitted with a fly-tight lid and shall be properly covered at all times except when depositing waste therein or removing the contents thereof. The containers shall have handles, bails or other suitable lifting devices or features.

(d)

Commercial solid waste shall be stored in solid waste containers as approved by the director. The containers shall be waterproof, leak-proof and shall be covered at all times except when depositing waste therein or removing the contents thereof; and shall meet all requirements as set forth by section 22-347, rules and regulations.

(e)

Following the direction of city council, federal or state declaration of natural disaster(s) (tornado, ice storm, snow or the like) tree limps can be placed at the curb of city removal.

(f)

Solid waste containers not in compliance with this article are prohibited. (Prior Code, § 9-2; Ord. No. 1621, 11-2009; Ord. No. 1793, 8-19-2013)

• Sec. 14-24. - Certain conditions or actions declared nuisances; listing deemed nonexclusive.

The maintaining, using, placing, depositing, leaving or permitting to be or remain on any public or private property of any of the following items, conditions or actions are hereby declared to be and constitute a public nuisance and a violation of this chapter; provided, however, this enumeration shall not be deemed or construed to be exclusive, limiting or restrictive:

(1)

No property owner shall be permitted to allow weeds, grass, brush, briars, and other rank vegetation to grow in excess of 12 inches in height, exclusive of ornamental shrubs or flowers, vegetable crops, fruit trees, berry bushes, cover crops and domestic grains or other cultivated crops. A violation unabated for a period greater than seven days will warrant the issuance of a summons to the property owner. The property owner shall be responsible for all abatement costs. Owners of undeveloped land shall maintain their property so that weeds shall not exceed a height of 18 inches.

(2)

Accumulation of rubbish, trash, refuse, junk and other abandoned materials, metals, lumber or items offensive to the senses or a risk to health, safety and/or welfare.

(3)

Any condition which provides harborage for rats, mice, snakes and other vermin.

(4)

Allowing or permitting vegetation, grass or weeds to grow outside or extend beyond the boundaries of any lot or property to a length greater than six inches, to a height greater than 12 inches or encroach upon any sidewalk more than four inches.

(5)

Conditions contributing to or causing rank or noxious odors and stenches, as well as the conditions, substances or other causes which give rise to the emission or generation of such odors and stenches.

(6)

The pollution of any public well or cistern, stream, lake, canal or body of water by sewage or industrial wastes.

(7)

Abandoning, discarding or knowingly permitting to remain on premises or property, in a place accessible to children, any abandoned or discarded icebox, refrigerator or other airtight or semi-airtight container which has a capacity of 1½ cubic feet or more and which has a door or lid equipped with hinge, latch or other fastening device capable of securing such door or lid, without rendering such equipment harmless to human life by removing such hinges, latches or other hardware which may cause a person to be confined therein. No part of this subsection shall apply to any icebox, refrigerator or other airtight or semi-airtight container located in that part of a building occupied by a dealer, warehouseman or repairman of such products.

(8)

All furniture, machinery, discarded containers or any other appliance, article, item or equipment designed for use inside a dwelling unit if stored, placed or set upon the ground or on any open porch, in any attached carport or freestanding carport, or in any garage or shed that is without doors to conceal such articles.

(9)

To permit, cause, keep, maintain or allow a fence or partitioning containing barbed wire, razor wire, electric wire or razor ribbon fencing in any residential or commercially zoned district.

(10)

Dismantled, nonlicensed, inoperable or junk vehicles as defined herein.

(11)

Bricks, shingles, building materials, salvage materials including, but not limited to, auto parts, scrap metal, tires and any other trade materials stored, deposited, dumped discarded and/or abandoned on any section of property.

(12) Buildings, structures or other surfaces upon which graffiti exists.

(13)

Any flammable material which may endanger public safety.

(14)

All substances or things, which cause an odor disagreeable to the surrounding neighborhood.

(15)

Ashes, slop, filth, excrement, stones, straw, soot, rubbish, manure, offal, stagnant water, decaying animal matter, decaying fruit or vegetable matter, wrecks or parts of worn-out vehicles or machinery, scrap iron or other metals, cans, bottles, broken glass, discarded wearing apparel, dead animals or any other offensive or disagreeable substances or thing, dilapidated buildings or building materials which may be offensive to the sight or smell or a menace to health, safety, peace or comfort, or which may be or become harborers or breeding places for mosquitoes, ants, flies, rats, mice or other vermin, animals or insects, or which may provide shelter, food or protection for rodents, whether left or deposited upon private premises or vacant lots or upon any public property.

(16)

All mud, dirt, rocks or debris from construction sites, fields or pastures which fall on city streets from the loads, tires or bodies of vehicles driven from said sites onto city streets. Developers and contractors are required to provide the city with a route plan for construction traffic in and out of new subdivisions and development sites. Failure to do so will be a violation of this Code.

(17)

Any vehicle operable or not, parked off street in a residential district in a space not complying with the definition of "parking space" in the zoning ordinance of the city. In addition to the vehicle capacity of a residence including garage space and driveway space, one accessory space may be designated. This space must be constructed out of three-fourths-inch base rock, asphalt or concrete. If constructed of base rock, it must be bordered with landscaping timbers. Vehicles parked to the rear of the front elevation of the house must be covered with an appropriate cover or behind a privacy fence at least six feet tall. This includes storage of boats, campers, trailers, and all other accessory vehicles. Any vehicle not parked according to these guidelines will be considered in violation of the nuisance code.

(Prior Code, § 13-5; Ord. No. 1693, 7-2011)

• Sec. 14-25. - Nuisance prohibited.

(a)

It is unlawful for any owner or occupant having control of any lot or land or any part thereof in the city to cause, permit or maintain any nuisance on any such lot or land or contribute to the creation or maintenance of any nuisance as defined within this chapter; and it is further unlawful for any person or his agent, servant, representative or employee to cause or maintain a nuisance on the property of another, with or without permission.

(b)

Any person who shall cause, create or maintain a nuisance or contribute to any nuisance as defined within this chapter shall be guilty of violating the provisions hereof and shall be liable for all costs and expenses attendant upon the removal and/or correction of such a nuisance in addition to any penalties provided. Each day that a nuisance is maintained can be the basis of a separate offense.

(Prior Code, § 13-7; Ord. No. 1693, 7-2011)

• Sec. 16-88. - Littering.

A person commits the offense of littering if he or she places, deposits, or causes to be placed or deposited, any glass, glass bottles, wire, nails, tacks, hedge, cans, garbage, trash, refuse, or rubbish of any kind, nature or description on the right-of-way of any public road or state highway or on or in any of the waters in this state or on the banks of any stream, or on any land or water owned, operated or leased by the state, any board, department, agency or commission thereof or on any land or water owned, operated or leased by the federal government or on any private real property owned by another without the owner's consent.

(Prior Code, § 14-31; Ord. No. 858, 5-1994; Ord. No 1921, § 3, 12-19-2016)

State Law reference— Similar provisions, RSMo 577.070.

Procedures by which the City processes documents for proposed development projects. (4.4.J)

Once a developer or an engineer contacts the city with a concept that they wish to pursue, City staff will sit down with the applicant and determine what procedures they will need to undertake to get the process underway.

Once it is determined by the applicant and City staff that the project can be serviced by the city they proceed with the application process for annexation/preliminary plat. At this point a preliminary design is submitted that address lot layout and street configuration, water, sewer, and stormwater preliminary design.

The application is processed through the Planning & Zoning Commission and City Council. The application is reviewed by staff at the Pre-Development Team meeting, to identify conformance with city regulations and provide any concerns that need to be addressed by the developer.

All property owners within 185' of the project are notified by direct mailing along with signage placed on the project site and legal notification placed in the newspaper. The notifications provide information regarding the public hearing process including times and location for the public hearing. At the hearings staff and the engineer of record will provide a staff report on the project including the proposed stormwater design and what improvements will be made to meet City adopted regulations.

The general public are afforded the opportunity to address both the Planning & Zoning Commission and City Council to ask questions and voice any comments or concerns they have about the project, be it stormwater pollution or other. Voting by the Commission and City Council does not occur until the public hearing process has taken place.

Once the public hearing process has been completed and P&Z Commission and City Council have provided approval for the project the engineer of record provides the City with a set of construction plans. Staff review's the construction plans (see addendum <u>MCM #4-10 Sample Departmental Plan Review Routing Sheets</u>) for compliance with City adopted codes and regulations. Once the Construction plans are approved and a Pre-Construction meeting is held, the contractor may begin construction (see addendum <u>MCM #4-9 Sample Pre-Construction Meeting Agenda</u>).

These procedures as described works hand in hand with MCM #2 Public Notice and Public Hearing for review of Stormwater Documents.



SWPPP REVIEW CHECKLIST



Project Name:	Site Address:	
Project Applicant:		Contact Person:
Mailing Address:	Phone Number:	
City, State, Zip:		Email:
SWPPP Prepared By:		Contact Person:
Mailing Address:		Phone Number:
City, State, Zip:		Email:

MS4 SWPPP Reviewer:			SWPPP Date:		
Submittal Date:		Review Date:		Approval Date:	

REQUIREMENTS BASED ON SWPPP TYPE:

<u>YES</u>	<u>NO</u>	
		BASIC SWPPP - Sediment and Erosion Control Plan only
		FULL SWPPP

GENERAL REQUIREMENTS:

	<u>YES</u>	<u>NO</u>	
1			Purpose of Plan and Vicinity Map
2			Site Evaluation - Topography & Drainage, Soils, Runoff Water Quality, Receiving Waters
3			Site Construction Plan - Construction Activities, Construction Sequence
4			Stormwater Management Plan - Runoff Coefficient, Project Site, Stabilization BMP's, Structural BMP's
5			Potential Stormwater Pollutant Sources & Control Measures - Construction Silt & Dust, Offsite Sediment Tracking, Petroleum Products, Sanitary Wastes, Hazardous Wastes, Fertilizers, Paints, Concrete Trucks, Construction Waste Materials, Allowable Non-Stormwater discharges.
6			Best Management Practices - Good Housekeeping, Hazardous Materials, Spill Prevention and Response
7			Inspection, Maintenance and Reporting Procedures - Erosion and Sediment Controls, Non-Stormwater Controls, Reporting, Sediment and Erosion Control Inspection Form(s)
8			SWPPP Compliance Certification - Contractor Certifications, Engineer's Certification
9			Project Completion
10			Copy of MoDNR General Operating Permit
11			Construction Activities Record
12			Sediment and Erosion Control Plan
13			SWPPP Modification Form(s)
14			SWPPP Projected Rainfall Log
15			Other review comments on separate sheet

City of Nixa Storm Water Pollution Prevention Site Inspection Report
General Information
Project Name: 14 PARK PLACE PH. 4
NPDES MoDNR Permit #: MO-R109DX7 Physical Location: G4
Date of Inspection: 6/29/2017 Start/End Time: am am
Inspector's Name: DANNY NEWELL Inspector's Signature: D. S. NEWELL
Inspector's Title: PUBLIC WORKS INSPECTOR
Inspector's Contact Information: 417-725-2353 / PO BOX 395, NIXA, MO. 65714
Inspector's Oualifications: CISEC #329
Current Phase Being Inspected: 4
Type of Inspection: Weekly Yearly Post storm
Weather Information
Date of most recent storm event: 6/26/17 Approximate Duration (Hrs): 2
Approximate precipitation amount (Inches): 0.35
Weather at time of inspection: Clear Cloudy Rain Sleet Snow
Have any discharges (from the site) occurred since last inspection? YES NO
If YES, describe:
Other Comments
There are currently no housing starts in this phase at time of inspection. There are no
stormwater issues at time of inspection. There is one unbuilt lot left in this phase.

	BMP / Activity	Implemented	Maintenance	Comments
NO.	Diff / Receively		Required	
A	All slopes and disturbed	YES, NO, NA	YES, NO, NA	All slopes are adequately stabilized
	areas not actively being			no apparent problems areas at
	worked are properly			time of inspection.
	stabilized.			
в	Are natural resource areas (e.g.,	YES, NO , NA	YES, NO , NA	All slopes are adequately stabilized
	streams, wetlands, mature			no apparent problems areas at
	trees, etc.) protected with			time of inspection.
	barriers or similar BMPs?			
C	Are perimeter controls and	YES, NO, NA	YES, NO, NA	This was a temporary BMP through
	sediment barriers adequately			out the construction phase of this
	installed (keyed into			development and is no longer needed.
	substrate) and maintained?			
D	Are discharge points and	YES, NO, NA	YES, NO, NA	Appears to be free of sediment
	receiving waters free of any			deposit at this time.
	sediment deposits?			
E	Are storm drain inlets properly	YES, NO , NA	YES, NO, NA	No concerns at this time.
	protected?			
F	Is the construction entrance	YES, NO, NA	YES, NO, NA	This was a temporary BMP through
	preventing sediment from			out the construction phase of this
	being tracked into the street?	WEG NO MA	NEG NO NA	development and is no longer needed.
G	All trash and litter from	YES, NO , NA	YES, NO, NA	No concerns at this time.
	work site being collected			
	and placed in a covered			
	container.	VEC NO NA	VES NO NA	
н	All washout facilities	YES, NO, NA	IES, NO, NA	No concerns at this time.
	(i.e., paint, stucco,			
	concrete, etc.) are			
	available, clearly marked			
	and properly maintained.	YES NO NA	YES NO NA	No concerns at this time
, A.	All vehicle and equipment	110, NO , III	120, 110, 111	
	meintenence erees ere			
	free of spills, leaks, or			
	any other environmentally			
	detrimental material			
I.I	Are materials that are notential	YES, NO, NA	YES, NO, NA	No concerns at this time.
	storm water contaminants			
	stored inside or under cover?			
ĸ	Are non-storm water discharges	YES, NO, NA	YES, NO, NA	No concerns at this time.
	(e.g., wash water, dewatering)			
	properly controlled?			
	property controlled.			

101624	BMP	BMP	BMP	Corrective Action Required
	Location	Installed	Maintenance	And /or
NO	in the state of the second states in the	Now	Required	Comments
1	Silt fence S.E. corner of	YES, NO , NA	YES, NO , NA	This BMP is not currently installed
	property along stream.			there are no building activities
				in this phase of the development.
2	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #626 on east side			there are no building activities
	Peach Brook just north of			in this phase of the development.
	Brook Forest.			
3	Protection for double curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet boxes #629 & #630			there are no building activities
	on east side of Peach Brook			in this phase of the development.
	just north of Brook Forest.			
4	Protection for double curb	YES, NO, NA	YES, NO, NA	This BMP is not currently installed
	inlet boxes #627 & #628			there are no building activities
	on west side of Peach Brook			in this phase of the development.
	just north of Brook Forest.			
5	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #623 on east side			there are no building activities
	Peach Brook just north of			in this phase of the development.
	Brook Forest.			
6	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #622 along north			there are no building activities
	side of lot 162.			in this phase of the development.
7	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #621 along south			there are no building activities
	side of lot 161.			in this phase of the development.
8	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #620 on west side			there are no building activities
	of Peach Brook at lot line			in this phase of the development.
	140 / 141.			
9	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #619 on east side			there are no building activities
	of Peach Brook at lot line			in this phase of the development.
	157 / 158.			
10	Protection for single curb	YES, NO , NA	YES, NO, NA	This BMP is not currently installed
	inlet box #618 on east side			there are no building activities
	of Peach Brook at lot line			in this phase of the development.
	156 / 157.			



		- 1 1						
	City of Nixa Con	Struct	ion Sil	e BMI				
			/////					
Project Name:		Current phase being inspected:						
Project Location:		Weather: Clear Cloudy Rain Snow						
General Contractor:		Inspection start/end Times:						
Date of Inspection:		Date of last rainfall event:						
Inspector's name (print):		Duration of last rainfall event:						
Signature:		Approximate Rainfall Amount (in):						
Tit	le:	Type of Inspection:						
Qualifications:								
Telephone No.:		D Post Storm (within 24 hours of rainfall event that causes runoff)						
Areas of Inspection		Over All Condition			Requires Attention			
		Yes	No	n/a	Yes	No	n/a	
1	being worked are properly stabilized.							
2	All natural resource areas (streams & wetlands,							
2	All perimeter controls and sediment barriers				1			
5	are properly installed and maintained.							
4	All discharge points and receiving waters are free of sediment.			1				
5	All slopes are free of significant erosion?							
6	Construction entrance is stabilized and in an effective working condition.							
	Mud or rock being tracked out onto City streets is being regularly addressed.							
7	All trash from site is being collected daily and placed in covered trash dumpster.					anna Russi		
8	All operational storm drain inlets are properly protected.							
9	All washout facilities (paint, stucco, concrete, etc.) are clearly marked and properly maintained.							
10	All vehicle & equipment fueling, cleaning and maintenance areas are free of spills, leaks or any other environmentally detrimental material.							
11	All materials that are potential stormwater contaminants are stored inside or under cover.							
12	All non-stormwater discharges (wash water, de-watering, etc.) are being properly controlled.			6				

Describe corrective actions needed/taken: (attach additional sheet if needed)

Describe SWPPP revisions needed/completed: (attach additional sheet if needed)

A copy of this completed inspection form is to be mailed, e-mailed or handed to the City of Nixa Public Works Inspector at least once every seven days.



Nixa Public Works 1010 N. Eaglecrest Nixa, Missouri 65714 417-725-2353 www.nixa.com

LAND DISTURBANCE PERMIT

Permit Number:	MO-RA1067	71			
Project Name:	BLACKROC	K SUBDIV	ISION		
Project Address:	W. GOLD S	г.			
Permit Issued To:	BLACKROC	EK, LLC			
Date Issued:	06/22/17		Date Effective:	06/22/17	
Authorization Sigr	nature:	D. S. NE	WELL WELL, PUBLIC WO	RKS INSPECTOR	





Best Management Practices (BMP) Manual for Land Disturbance Activities 2016

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INTRODUCTION

Like many cities nationwide, Nixa's stormwater drainage system flows directly into local streams and lakes. When it rains, stormwater picks up and carries sediment and other pollutants into these waterways where it can affect water quality and the health of fish and other aquatic life. The Federal Clean Water Act was amended in 1987 to enact regulations to address the water quality impact of polluted stormwater runoff from construction sites and other sources. These Federal regulations are implemented through state and local agencies. Sites in Nixa that disturb 1 acre or greater, and sites that disturb less than 1 acre that are part of a larger common plan of development are required to obtain a land disturbance permit from both the Missouri Department of Natural Resources (MDNR) and the City of Nixa's Public Works Department.

The State and Local permits require a site-specific Stormwater Pollution Prevention Plan (SWPPP) that details the design, installation, and maintenance of effective BMPs to minimize the discharge of pollutants. Per the State permit, the SWPPP shall provide the following general information for each BMP that will be used:

- Physical description of the BMP
- Site and physical conditions that must be met for effective use of the BMP
- BMP installation/construction procedures, including typical drawings
- Operation and maintenance procedures for the BMP.

The purpose of this manual is to provide general information for each BMP for SWPPP preparers to utilize in the SWPPP. SWPPP preparers should supplement this general information with site-specific information for each BMP in a SWPPP, including as applicable: phasing, product types, site-specific or manufacturer's details, and site-specific conditions for removal.

Manufacturer's specifications, if available, should be followed when selecting and designing BMPs. Detailed guidance on BMP design, installation, and maintenance can also be found in MDNR's guide titled, "Protecting Water Quality: A field guide to erosion, sediment and stormwater Best Management Practices for development sites in Missouri and Kansas." This guide is available at <u>http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm</u>. Sites less than 1 acre that are not required to have a land disturbance permit and SWPPP should also install basic BMPs to minimize the discharge of sediment and should refer to this manual, the MDNR guide, and manufacturer's specifications for BMP design, selection, installation, and maintenance. This manual is not comprehensive; other BMPs may be acceptable.

PHASING/SEQUENCING

DEFINITION & PURPOSE

Phasing involves developing a schedule that includes the sequencing of construction activities with the implementation of construction site BMPs. The purpose of phasing is to reduce the amount and duration of soil exposed to erosion and to implement and maintain BMPs in coordination with the sequence of construction activities.

CONDITIONS FOR EFFECTIVE USE

A schedule of the sequence and timing of construction activities is a permit requirement for all sites that disturb 1 acre or greater. Projects should be phased when possible to reduce the amount and duration of soil exposed at any one time. The phasing plan should be developed during the project design phase. Disturbed areas in one phase should be stabilized before disturbing subsequent phases. When possible, land disturbance and construction in and around waterways should be scheduled during a typically dry weather period.

INSTALLATION/CONSTRUCTION PROCEDURES

Sequencing and Estimated Dates of Construction Activities shall be outlined in the SWPPP.

OPERATION & MAINTENANCE PROCEDURES

During inspections, verify that work is progressing in accordance with the phasing shown in the SWPPP and that BMPs are installed prior to the start of each construction phase. If phasing sequence has changed, update the Sediment and Erosion Control site plan, and document the update on the next regular site inspection report.

PRESERVATION OF EXISTING VEGETATION

DEFINITION & PURPOSE

Permanent preservation of existing vegetation and topsoil minimizes the area of disturbance, reducing the need for erosion and sediment control BMPs and the potential for violations. It also likely provides a financial benefit by reducing the cost of grading, BMPs, topsoil, and seeding. Preserved areas can provide long-term stormwater benefits through increased absorption of rainfall compared to turf grass areas with compacted soil.

CONDITIONS FOR EFFECTIVE USE

Preservation of existing vegetation requires planning and should be the first step in the design process. The site should be surveyed to identify high quality soils, trees, vegetation, and steep slopes to be preserved. The site improvements, including any temporary roadways, should be designed around these features and follow existing contours to reduce cutting and filling. Sediment control BMPs such as compost filter sock or silt fence may be desirable to protect the preservation area from significant sediment accumulation.

INSTALLATION/CONSTRUCTION PROCEDURES

Protection of preservation areas with temporary construction fencing and any sediment control BMPs shall be provided prior to the commencement of clearing and grubbing operations or other soil-disturbing activities. Construction materials, equipment storage, and parking areas should be located outside of protected areas where they will not cause root compaction.

OPERATION & MAINTENANCE PROCEDURES

During weekly and rain event inspections, verify that temporary construction fencing and any sediment control BMPs to protect preservation areas are still in place and operational. If the area to be preserved is adjusted during construction, update the Sediment and Erosion Control site plan and document it on the next regular site inspection report.

SITE CONDITIONS FOR REMOVAL

Temporary fencing and any sediment control BMPs shall be removed after final stabilization of the site has occurred.

COMPANION BMPs

• Tree Preservation

TREE PRESERVATION

DEFINITION & PURPOSE

Tree preservation is the process of protecting trees from damage related to construction activity. Tree preservation provides erosion control and long-term stormwater benefits by intercepting and absorbing rainfall. Trees also tend to increase property values and the marketability of a development. Additional benefits of trees include improved air quality, shading of buildings, and habitat for birds and people.

CONDITIONS FOR EFFECTIVE USE

Tree preservation requires planning and should be one of the first steps in the design process. The site should be surveyed to identify trees to be preserved based upon their size, species, condition, location, historical significance, or any combination of these factors. The site improvements, including any temporary roadways, should be designed around these trees. The site should also be designed to follow existing contours as much as possible. Cutting and filling can make it difficult to avoid grading within tree protection zones, reducing the number of trees that can be effectively preserved.

INSTALLATION/CONSTRUCTION PROCEDURES

Marking and fencing of trees shall be done prior to the commencement of clearing and grubbing operations or other soil-disturbing activities. Sites requiring a Land Disturbance Permit, tree protection fencing shall be installed prior to issuance of the City of Nixa permit. The critical root zone is generally 10 feet beyond the dripline of a tree. Fencing shall be located to protect as much of the critical root zone as possible. If the entire critical root zone cannot be protected, work may encroach into this zone on one side of the tree. Fencing should be at least 4 feet high and supported at a maximum of 10 foot intervals by metal T-posts or other approved methods sufficient to keep the fence upright and in place. T-posts shall be a minimum of 2 feet in the ground. In some cases, a layer of wood chip mulch may be used for temporary road access and to reduce compaction in and near tree protection areas. When used for this purpose, at least 12 inches of chips should be applied where vehicles will travel or park. Mulching may also be utilized within the tree protection zone during construction to protect the soil from compaction, conserve soil moisture and moderate soil temperature. Spread wood chips to a depth of 4 inches, leaving the trunk clear of mulch. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

At a minimum, inspect weekly for areas where fence has fallen and/or needs repair. No equipment, materials, and/or debris shall be stored within the tree protection zone fencing. When work requires encroaching within the tree preservation zone, a certified arborist shall be consulted before proceeding with construction activities.
SITE CONDITIONS FOR REMOVAL

Temporary fencing shall be removed after final stabilization of the site has been achieved.

COMPANION BMPs

• Preservation of Existing Vegetation and Mulching



FENCE INSTALLATION AND REMOVAL. 3- NO PRUING SHALL BE PERFORMED EXCEPT BY OR IN THE PRESENCE OF AN APPROVED

ARBORIST.

FENCING. THIS INCLUDES DURING

REQUIRE WORK TO CROSS THE **DRIPLINE, BORE MINIMUM 4' BELOW GROUND SURFACE THE** DISTANCE OF THE DRIPLINE. IF BORING 4" CAN NOT BE ACHIEVED CONTACT ARBORIST IMMEDIATELY TO MONITOR WORK.

SHALL BE REVIEWED BY AN ARBORIST PRIOR TO TRENCHING, EXCAVATING, OR CUTTING TO DETERMINE THE IMPACT ON ANY STRUCTURAL CRITICAL ROOTS AND THE CLOSEST POINT TO THE TREES THAT SOIL MAY BE DISTURBED.

3- ROOT PRUNING CAN BE ACCOMPLISHED WITH CIRCULAR SAWS OF VARYING TYPES AND/OR TO A DEPTH OF 18" OR TO THE

FLUSH WITH THE SIDE OF THE TRENCH CLOSEST TO THE TREE.

6- AN ARBORIST SHOULD REVIEW ANY ROOTS OVER 2 INCHED IN DIAMETER ENCOUNTERED DURING EXCAVATION AND/OR CONSTRUCTION ACTIVITIES TO DETERMINE STRUCTURAL STABILITY OF THE TREE.



E PROTECTI FNCF

DATE: 2016 DWG: SW-BMP-06

VEGETATED FILTER S TRIP

DEFINITION & PURPOSE

Vegetated filter strips are areas of vegetation that are used as sediment control practices during construction. Vegetation slows down stormwater runoff and filters out sediment.

CONDITIONS FOR EFFECTIVE USE

Vegetated filter strips are appropriate where a strip of existing vegetation can be left in place in downhill areas to provide sediment control in place of or in addition to other sediment control BMPs. They should be used in areas of sheet flow only. Level spreaders may be needed to ensure sheet flow. Filter strip width and length should be determined based on the size and slope of the drainage area and type of vegetation. See MDNR Guide Section 6-201. If the vegetated filter strip is part of a preservation area (see Preservation of Existing Vegetation), additional sediment control BMPs may be desired to protect the preservation area from excessive sediment deposition. Vegetated filter strips installed as a permanent stormwater quality control measure should not be used as a sediment control BMP.

INSTALLATION/CONSTRUCTION PROCEDURES

Existing vegetation that will be used as a vegetated filter strip should be marked and the width and length shown on the Sediment and Erosion Control plan prior to construction and designated as "Do Not Disturb". It may be desirable to fence off the filter strip to protect it from construction activities.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event of ¹/₂" or greater. Verify that the vegetated filter strip has not been removed or damaged by construction activities. Remove excessive sediment accumulation if needed for functionality. Seed areas of erosion or dead vegetation as needed. Install additional BMPs if the vegetated filter strip becomes ineffective, and update the Sediment and Erosion Control site plan and note it on the next regular site inspection report.

SITE CONDITIONS FOR REMOVAL

The vegetated filter strip should remain in place until the drainage area is stabilized, at which point it is typically replaced with permanent vegetation or, in the case of a phased site, replaced with improvements. The SWPPP should provide site-specific information on removal or replacement of the vegetated filter strip.

ALTERNATIVES

• Compost Filter Sock and Silt Fence

<u>COMPANION BMPs</u> • Preservation of Existing Vegetation



EROSION CONTROL BLANKETS

DEFINITION & PURPOSE

An Erosion Control Blanket (ECB) is a blanket of synthetic or natural fibers to protect soil from the erosive impact of precipitation and overland flow, typically on slopes and in channels. ECBs also retain moisture and facilitate the establishment of vegetation. Erosion Control Blankets are also sometimes referred to as Rolled Erosion Control Products (RECPs).

CONDITIONS FOR EFFECTIVE USE

Factors in the selection of ECB include soil conditions, steepness and length of slope, sheer stress, and type and duration of protection needed to establish desired vegetation. Products are available for a variety of uses and longevity, typically from 3 months to 36 months. Manufacturer's specifications should be followed in ECB selection. See MDNR Guide Section 6-97 for general guidance on ECB use and selection.

INSTALLATION/CONSTRUCTION PROCEDURES

The type of ECB shown on the plans should be installed immediately after completion of a phase of grading and/or seeding. Follow manufacturer's specifications for installation, particularly noting requirements for check slots, fastening devices (staples), and the need for firm contact with soil. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site until adequate vegetation is established. Repair erosion and/or undermining at top of slope. Repair undermining beneath blankets. Pull back the blankets, fill and compact eroded area, re-seed and then firmly secure the blankets. Reposition or replace blankets that have moved along the slope or have been damaged.

SITE CONDITIONS FOR REMOVAL

ECB is typically left in place and designed to degrade over time.

ALTERNATIVES

• Turf Reinforcement Mat



TURF REINFORCEMENT MAT

DEFINITION & PURPOSE

A Turf Reinforcement Mat (TRM) is a rolled mat of non-degradable synthetic material that provides a matrix to greatly reinforce the root system of the desired vegetation for permanent erosion protection in high flow channels and on critical slopes.

CONDITIONS FOR EFFECTIVE USE

Factors in the selection of TRM include soil conditions, steepness and length of slope, depth of flow, runoff velocities, and time required to establish desired vegetation. Manufacturer's recommendations should be followed in TRM selection. See MDNR Guide Section 6-97 for general guidance on TRM use and selection.

INSTALLATION/CONSTRUCTION PROCEDURES

The type of TRM shown on the plans should be installed immediately after completion of a phase of grading and/or seeding. Follow manufacturer's specifications for installation, particularly noting requirements for check slots, fastening devices (staples), and the need for firm contact with soil. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site until adequate vegetation is established. Repair erosion and/or undermining at the top of the slope. Repair undermining beneath mats. Pull back the mats, fill and compact eroded area, seed and then secure mats firmly. Reposition or replace mats that have moved along the slope or channel and secure firmly. Replace damaged mats.

SITE CONDITIONS FOR REMOVAL

TRMs are left in place permanently.

ALTERNATIVES

• Plastic Transition Mat

COMPANION BMPs

• Ditch Checks in channels and Fiber Rolls on slopes



HYDROSEEDING

DEFINITION & PURPOSE

Hydroseeding is a method of seeding that consists of applying a mixture of water, seed, wood fiber, and soil stabilizer (if used) with hydroseeding equipment.

CONDITIONS FOR EFFECTIVE USE

To select appropriate hydroseeding mixtures, an evaluation of site conditions shall be performed with respect to: soil conditions, site topography, season and climate, vegetation types, maintenance requirements, sensitive adjacent areas, water availability, and plans for permanent vegetation (if hydroseeding is done for temporary vegetation). Soil should be loose (un-compacted) at time of application. For best results, cover the hydroseed layer with a mulch layer to help protect the seed from wind and erosion, retain soil moisture, and control soil temperature during establishment. Mulching should also be used when there is not sufficient time in the season to ensure adequate vegetation establishment and coverage for erosion control. Conduct a soil test to determine if soil amendments are needed. Fertilizer should only be applied if a soil test indicates it is needed. The hydroseeding mixture should be determined by an industry professional. See MDNR Guide Section 6-87 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Hydroseeding should be done immediately after completion of a phase of grading. Hydroseeding can be accomplished using a multiple-step or one-step process. The multiple-step process ensures maximum direct contact of the seeds to soil. When the one-step process is used to apply the mixture of seed, fiber, etc., the seed rate shall be increased to compensate for all seeds not having direct contact with the soil. Follow-up applications shall be made as needed to cover weak spots. Avoid overspray on existing vegetation, waterways, sidewalks, and roadways. Straw or other mulch should be applied to reduce the erosive capacity of stormwater and keep soil and seed in place.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Hydroseeded areas should be inspected for failures and re-seeded and mulched within the planting season, using not less than half the original application rates.

ALTERNATIVES

- Sod
- Turf Reinforcement Mat
- Control Blankets

SEEDING

DEFINITION & PURPOSE

Seeding is used to establish temporary or permanent vegetation in order to protect exposed soil from erosion.

CONDITIONS FOR EFFECTIVE USE

The SWPPP should include a site-specific seeding specification for permanent seeding and for temporary seeding if needed. See MDNR Guide Section 6-71 Temporary Seeding and Section 6-77 Permanent Seeding for other specifications and guidance. Conduct a soil test to determine the need for soil amendments. Specifications for topsoil and soil amendments should be followed to ensure vegetation establishment and growth. Fertilizer should only be applied if a soil test indicates it is needed. Use additional stabilization (Erosion Control Blankets, etc.) on slopes steeper than 3:1 and in areas of concentrated flow.

INSTALLATION/CONSTRUCTION PROCEDURES

Seeding should be done immediately after completion of a phase of grading, or in areas where construction activity has ceased for 14 days. Follow seeding specification for topsoil, soil amendments, seed type, seeding rate, and seeding dates. Apply straw or other mulch (see Mulching). Water immediately, to a depth of 4 inches.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hour after every rain event that causes stormwater runoff to occur on-site. Protect seeded areas from vehicular and foot traffic. Reseed and mulch areas that have not sprouted within 21 days of planting. Repair damaged or eroded areas and reseed/mulch as needed. Do not mow until 4 inches of growth occurs. During the first 4 months, mow no more than 1/3 the grass height. Seeded areas should be repaired and reseeded/mulched for one year following permanent seeding to ensure successful establishment.

ALTERNATIVES

• Sod and Hydroseed

SODDING

DEFINITION & PURPOSE

Sod is a mat of grass with an established root system used to provide immediate vegetation for erosion control.

CONDITIONS FOR EFFECTIVE USE

Sod is an effective way to achieve immediate erosion protection in areas of sheet flow and low concentrated flows with velocities less than 5 feet/second. A soil test should be performed to determine if soil amendments are needed. Fertilizer should only be applied if a soil test indicates it is needed.

INSTALLATION/CONSTRUCTION PROCEDURES

Install immediately after finish grading. Remove debris larger than 1 inch in diameter and concentrated areas of smaller debris. Level and roll soil lightly to provide an even grade and firm the surface. Soil should not be excessively wet or dry. Lay first row of sod perpendicular to the slope or direction of flow. Lay subsequent rows tightly against previous rows with joints staggered in a brick-like pattern. Fill minor gaps with good soil and roll entire surface to ensure contact. Stake, staple and/or net corners and centers of sod strips as required, especially in areas of concentrated flow. Water the sod immediately after installation, enough to soak 4 inches into the soil without causing runoff. For additional guidance see MDNR Guide Section 6-107.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Water the sod as often as necessary to maintain moist soil to a depth of at least 4 inches. Reposition areas of sod that have moved along the slope. Remove sediment accumulations, and replace sod if necessary. Repair and replace sod in eroded areas as needed. Do not mow sod until 3 inches of new growth occurs. During the first 4 months, mow no more than 1/3 the grass height.



LAY SOD IN A STAGGERED PATTERN WITH STRIPS BUTTED TIGHTLY AGAINST EACH OTHER.

ON SLOPE > 3;1 USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS.

INSTALLATION OF SOD GRASS



LAY SOD PERPENDICULAR TO THE DIRECTION OF FLOW. USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS

INSTALLATION OF SOD IN WATERWAYS



SEDDING

01 - 01 - 16
DWG:
SW-BMP-17

MULCHING

DEFINITION & PURPOSE

A layer of organic material designed to protect exposed soil or freshly seeded areas from erosion by eliminating direct impact of precipitation and slowing overland flows. Mulch materials include grass, hay, straw, wood chips, wood fibers, and shredded bark.

CONDITIONS FOR EFFECTIVE USE

Mulching can be used in areas of sheet flow for temporary soil stabilization on disturbed areas and applied to seeded areas to protect the seed and retain moisture for plant establishment. It is essential to seeding success in most conditions. In landscape areas, mulch is installed for permanent use. Where slopes are 3:1 or greater, hydraulic mulch-bonded fiber matrix, erosion control blankets, or turf reinforcement mats should be used. See MDNR Guide Section 6-91 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install immediately after grading landscaped areas or after seeding in other areas. Grade area and remove all debris larger than 1 inch if area is to be vegetated and mowed in the future, larger than 2 inches if area is to be permanently mulched. If area is to be seeded, follow requirements of seeding. Spread mulch evenly and anchor by crimping it into the ground or using netting.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site until adequate vegetation is established. For permanent mulch, inspect annually. Protect from vehicular and foot traffic. Repair damaged or eroded areas, and reseed and replace mulch as needed.

SITE CONDITIONS FOR REMOVAL

Mulching is biodegradable and will remain in place.

SOIL BINDERS

DEFINITION & PURPOSE

Soil binders are materials applied to the soil surface to temporarily prevent water-induced erosion of exposed soils on construction sites. These materials must be made for this purpose and Safety Data Sheet available upon request. Soil binders also provide temporary dust, wind, and soil stabilization (erosion control) benefits. The useful life of most products is 3 to 6 months.

CONDITIONS FOR EFFECTIVE USE

Soil binders should be used in areas of sheet flow only. Soil binders are typically applied to disturbed areas requiring short-term, temporary protection and in combination with other BMPs, such as perimeter controls, seeding, and mulching. Because soil binders can often be incorporated into the work, they may be a good choice for areas where grading activities will soon resume. Binders can also be applied to stockpiles to prevent water and wind erosion. See MDNR Guide Section 6-103 on Dust Control for more information on soil binders.

INSTALLATION/CONSTRUCTION PROCEDURES

Consider drying time for the selected soil binder, and apply with sufficient time before anticipated rainfall. Soil binders shall not be applied during or immediately before rainfall. Soil binders may not cure if low temperatures occur within 24 hours of application. Follow manufacturer's specifications for application rates, pre-wetting of application area, and cleaning of equipment after use. Use the recommendations to maximize usefulness and avoid formation of pools or impervious areas where stormwater cannot infiltrate.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site, looking for damage from vehicles, runoff, or freeze-thaw conditions. Reapply product or utilize additional BMPs.

SITE CONDITIONS FOR REMOVAL

Soil binders are typically left in place to degrade naturally.

COMPANION BMPs

• Seeding and Hydroseeding

SLOPE DRAINS

DEFINITION & PURPOSE

A slope drain is a pipe or lined channel which extends from the top to the bottom of a cut or fill slope.

CONDITIONS FOR EFFECTIVE USE

These structures are designed to convey concentrated runoff to protect exposed s lopes from upstream runoff. They can be used for sheet flow and concentrated flow. Slope drains typically extend beyond the toe of the slope to a stable area or outlet. They should be designed by a registered design professional. See MDNR Guide Section 6-153 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install concurrently with diversion devices, as soon as cut and fill operations have occurred. Install according to plans. Typical installation is as follows. Install slope drain down the slope, perpendicular to slope contours, extending beyond the toe of slope. At top of slope, grade a diversion channel toward the slope drain. Install flared end or t-section at pipe inlet. Section should be well entrenched and stable so water can enter freely. Ensure that all pipe connections are secure and watertight. Securely anchor the exposed section of the drain with stakes. Install flared end section at pipe outlet and discharge into a sediment trap or other stabilized outlet. Protect area around inlet with filter fabric. Protect outlet with rip rap or other energy dissipation device.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on site. Remove sediment and trash accumulation at inlet. Repair settlement, cracking, or piping holes. Repair leaks or inadequate anchoring along pipe. Remove sediment and stabilize eroded areas at outlet. Extend the outlet if necessary.

SITE CONDITIONS FOR REMOVAL

Remove concurrently with upstream diversion device after slope has been stabilized. Stabilize the exposed areas where the slope drain and diversion device were removed.

ROBUST ALTERNATIVES

• Conveyance Channel

COMPANION BMPs

• Plastic Transition Mat and Rip-Rap



TEMPORARY STREAM CROSSING

DEFINITION & PURPOSE

A temporary stream crossing is a structure placed across a waterway that allows vehicles to cross the waterway during construction to minimize erosion and downstream sedimentation.

CONDITIONS FOR EFFECTIVE USE

Temporary stream crossings are installed at sites where construction equipment or vehicles need to frequently cross a waterway, and when alternate access routes are not feasible. They should be designed by a registered design professional. Appropriate permits (404, 401, etc.) must be obtained. Design considerations include: current and proposed watershed conditions, average and peak discharge (typically, 2-year rainfall intensity event), effect on water surface elevation off-site, velocity, sediment removal, and protection of fish and trees. General guidelines for a low water crossing include: light traffic, bank height less than 5 feet, and perpendicular to flow or with a slight upstream arc. General guidelines for a culvert crossing include: sized for 2-year rainfall intensity event with 1 foot freeboard and no flooding of offsite areas, pipe parallel to flow, embankment perpendicular to channel or with a slight upstream arc, rip rap on exposed faces sized for overtopping during a peak storm period. See MDNR Guide Section 6-29 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install during periods of dry weather. Installation may require dewatering or temporary diversion of the stream. Procedures are specific to the type of crossing used. Generally, provide a stable means to bypass normal channel flow prior to disturbing the channel. Stabilize the channel bottom, install culvert (if used), grade and compact access ramps and soil embankment, install fabric, stone, and rip rap according to design.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site, checking for: blockage in channel, debris buildup, erosion of abutments, channel scour, rip rap displacement, piping of soil, and structural weakening. Remove sediment and trash accumulation. Repair and stabilize eroded areas. Extend rip rap if necessary.

SITE CONDITIONS FOR REMOVAL

Remove as soon as alternative access is available. All foreign materials should be removed from c reek. The streambed/banks should be returned to the original contour and stabilized if necessary.



WATER DIVERSIONS

DESCRIPTION & PURPOSE

Water diversions consist of practices that intercept and divert water around a construction site.

CONDITIONS FOR EFFECTIVE USE

A water diversion is implemented when work is performed in a body of water or when runoff needs to be diverted around a construction site to keep the runoff clean. Diversion of stream flow should generally be combined with other in-stream BMPs downstream of the diversion such as check dams to act as secondary measures for sediment control. Excavation of a bypass channel or passing the flow through a pipe is appropriate for the diversion of streams generally less than 20 feet wide, with flow rates less than 99 cubic feet/second. Water diversions may be used with other practices, such as pumps. Pumped diversions are suitable for intermittent and low flow streams. Temporary berms, excavated channels, or a combination of both can be used to divert runoff around a construction site. Diversions should be designed by a registered design professional. See MDNR Guide Section 6-143 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install the diversion according to the plans prior to starting construction in the area that water will be diverted around. When working in a body of water, install downstream sediment controls such as check dams before installing the diversion to catch any sediment released during installation.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Remove debris and sediment from area.

SITE CONDITIONS FOR REMOVAL

Remove the water diversion when work in the area is completed.

COMPANION BMPs

• Dewatering and Temporary Stream Crossing



DUST CONTROL/WIND EROSION

DEFINITION & PURPOSE

Practices of controlling wind-borne dust include phasing, preservation of trees and existing vegetation, minimization of soil disturbance, mulching, watering, wind barriers, and soil binders.

CONDITIONS FOR EFFECTIVE USE

Phase work to the extent practical to minimize the amount of area disturbed at one time (see Phasing/Sequencing). Preservation of grass and trees and the use of solid board fences may also serve as wind barriers. For areas not subjected to traffic, vegetation provides the most practical method of dust control and should be established as early as possible. Effectiveness of application of water, adhesives, and chemical treatment depends on soil, temperature, humidity and wind velocity. See MDNR Guide Section 6-103 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Use dust control when clearing and grading activities create blowing dust, especially during periods of dry weather. Water shall be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution. Place barriers at right angles to prevailing wind at intervals of about 10 times their height to control soil blowing. Paved areas that have soil on them from construction sites should be cleaned with street sweeper. Mulching offers a fast and effective means of controlling dust when properly applied. Binders and tackifiers should be used on organic mulches. NOTE: If calcium chloride or spray-on adhesives are used for dust control, a permit may be required from MDNR. Follow manufacturer's specifications for binders and tackifiers.

OPERATION & MAINTENANCE PROCEDURES

Check areas where mulch or binders have been applied for dust control and adjust/reapply as needed, according to manufacturer's specifications.

SITE CONDITIONS FOR REMOVAL

Dust control practices can be terminated when stabilization has been achieved.

ROBUST ALTERNATIVES

• Binders and Tackifiers

CONSTRUCTION EXIT

DEFINITION & PURPOSE

A stabilized exit to a construction site is designed to minimize the amount of sediment tracked from the site on vehicles and equipment. Mud and sediment fall off of tires as they bounce along the stabilized entrance.

CONDITIONS FOR EFFECTIVE USE

Limit the number of points of ingress/egress and locate them where it is safe for construction vehicles and equipment to access public road. Avoid placing construction exit in low areas, where stormwater can accumulate and discharge off site. If possible, locate where permanent roads will eventually be constructed. See MDNR Guide Sections 6-7 through 6-15 for construction exit and robust alternatives.

INSTALLATION/CONSTRUCTION PROCEDURES

Install prior to the start of construction. Properly grade and compact each construction entrance/exit to prevent runoff from leaving the site. Install culvert under entrance if needed to maintain positive drainage. Install woven geotextile fabric and cover with 3 to 6" aggregate to a depth of 6". Construction exit should have a length of 50' and a turn radius of 25' or full width of roadway. All contractors, subcontractors, and suppliers should be instructed to utilize construction entrance/exit before entering or exiting unstable areas.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Add a new lift of rock, or turn stones when voids become inundated with sediment and pad becomes smooth. Keep all temporary roadway ditches clear. Immediately remove any mud, rock or debris tracked onto paved surfaces. Use a street sweeper adjacent with the construction exit to reduce track out from site.

SITE CONDITIONS FOR REMOVAL

Remove exit when vehicles and equipment will no longer access unpaved areas.

ROBUST ALTERNATIVES

• Rumble Plate, Bamboo Mat, Automated Wheel Wash Systems

COMPANION BMPs

- Triangular Foam Perimeter control
- Street cleaning
- Stabilized gravel access road



STREET CLEANING

DEFINITION & PURPOSE

Street cleaning includes shoveling, brooming, sweeping and/or vacuuming to remove track-out of sediment from paved public roads.

CONDITIONS FOR EFFECTIVE USE

Shoveling should be used to remove mud layers and large dirt clods. Sweeping and vacuuming may not be effective when paved roads are wet or muddy.

INSTALLATION/CONSTRUCTION PROCEDURES

If track out is present, street cleaning should be performed as soon as possible, at the end of the work day, and before rain events. If not mixed with debris or trash, consider incorporating the removed sediment back into the project. Otherwise, sweeper waste should be disposed in a solid waste dumpster on or off-site. *Do not wash any sediment or debris down the storm drain.*

OPERATION & MAINTENANCE PROCEDURES

Inspect ingress/egress access points daily, and clean tracked sediment as needed and/or required.

COMPOST FILTER SOCKS

DEFINITION & PURPOSE

A compost filter sock is a mesh tube filled with composted material used to control sediment through settling and filtration.

CONDITIONS FOR EFFECTIVE USE

Compost filter socks are generally placed along the perimeter of a site, at intervals along a slope, or as ditch checks to slow down runoff and retain sediment, allowing cleaned water to flow through. Compost material shall be screened ≤ 2 inches. Filter socks generally come in 8", 12", and 18" diameters. Compost filter socks can be used for sheet flow and small concentrated flows. Common industry practice is that drainage areas should not exceed 0.25 acres per 100 feet of sock length and flow should not exceed one cubic foot per second. Manufacturer's specifications should be followed for selecting the sock diameter. See MDNR Guide Section 6-167 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install prior to disturbance of the site. Follow manufacturer's specifications. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Prevent vehicles and machinery from damaging sock. Remove accumulated sediment generally when it reaches half the height of the sock, replace broken stakes, and repair or replace sections that are torn.

SITE CONDITIONS FOR REMOVAL

Removal of sock can occur after permanent vegetation is established. The mesh material can be cut open and removed, leaving the compost to degrade naturally.

ROBUST ALTERNATIVES

- Tie Down Composted River Sock
- Silt fence



COMPOST FILTER Sock

DATE: 01-01-16 DWG: SW-BMP-31

DITCH CHECK

NOTE: FOLLOW MANUFACTURER'S SPECIFICATIONS





PERIMETER CONTROL

NOTES:

-- USE 2"X2"X2.5' WOODEN STAKES SPACED EVERY 10', OFFSET EVERY 5' ON OPPOSITE SIDE OF SOCK. -- TIE ROPE TO FOUR STAKES ALTERNATING SIDES.

-- LEAVE 30' BETWEEN TIED STAKES.



SILT FENCE

DEFINITION & PURPOSE

A silt fence consists of a run of filter fabric, stretched, trenched in the ground and attached to anchored posts. Silt fence used as a perimeter control BMP encourages ponding of runoff and settling of sediment from stormwater.

CONDITIONS FOR EFFECTIVE USE

Install silt fence along slopes, at bases of slopes, and around the perimeter of a site as a final barrier to sediment being carried off site. Silt fence should follow level contour lines with ends turned upslope in a J-Hook. Silt fence should never be used in areas of concentrated flow. Common industry practice is that drainage areas should not exceed 0.25 acres per 100 feet of fence length. See MDNR Guide Section 6-137 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install silt fence prior to disturbance and at intervals during construction of fill slopes. Follow Manufacturer's Specifications. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Remove sediment buildup once it accumulates to 6 inches. Replace torn/clogged fabric, and repair loose fabric and broken stakes.

SITE CONDITIONS FOR REMOVAL

Remove silt fence after permanent vegetation is established. Remove fence, grade trench area and vegetate.

ALTERNATIVES

• Compost Sock



DITCH CHECKS

DEFINITION & PURPOSE

Ditch checks are used in channels to reduce water velocity, dissipate energy, and contain sediment in ditches. A ditch check is constructed of 12" or greater compost filter sock, rock-lined geotextile or rock bags.

CONDITIONS FOR EFFECTIVE USE

Ditch checks should be placed at specified intervals to slow velocities and provide adequate sediment storage capacity. Ditch checks should be designed by a registered design professional based on the hydraulics/hydrology of the site. See MDNR Guide Section 6-191 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Immediately following excavation of ditch line, install ditch checks according to plan specifications. Ditch checks need to be installed perpendicular to the ditch. It is important to establish elevation of center mass to be lower than the outside edges. Water should never be allowed to flow around ends of a check dam, as this will cause erosion and deteriorate ditch walls.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur onsite. Remove accumulation of trash and debris. Remove sediment when depth reaches one-half of the ditch check height. Repair/restore ditch check structure, if necessary, to original configuration.

SITE CONDITION FOR REMOVAL

Remove ditch checks after stabilization of ditch line. Clean out sediment. Remove materials that make up ditch checks.

ALTERNATIVES

• Triangular Dikes

ROBUST ALTERNATIVES

• Check Dam and Pyramid Sock



CHECK DAMS

DEFINITION & PURPOSE

Check dams reduce flow velocity, allowing sediment to settle out. A check dam is a device constructed of rock, rock bags, or proprietary products placed across a natural or man-made channel or swale. They are similar to ditch checks but designed to be more robust. Not to be constructed from silt fence.

CONDITIONS FOR EFFECTIVE USE

Check dams should be designed by a registered design professional and consists of one or more dams placed at intervals in channels and swales to slow velocities, reducing erosion and allowing sediment to settle out. They can also be used as an alternative to a sediment basin for sites with a drainage area of 20 acres or less. They can also be used as a secondary sediment control measure in streams but should be combined with water diversion and other BMPs. See MDNR Guide Section 6-187 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install before disturbing vegetation in contributing drainage area and immediately following excavation of channels or swales. Check dams must be placed perpendicular to flow of water. Install geotextile filter fabric below rock. When using rock bags, no geotextile is needed. Check dam must be long enough to assure that center mass is lower than outside edge so that water will run over the middle and not undermine outside edges.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Remove accumulation of trash and leaves. Remove sediment when depth reaches one-half of the check dam height. Repair/restore dam structure, if necessary, to original configuration.

SITE CONDITIONS FOR REMOVAL

Remove check dam after contributing areas have been stabilized. Clean out sediment. Remove check dam material and return steam or channel back to original condition.

ROBUST ALTERNATIVES

• Constructed Conveyance Channel and Diversion Practices



INLET PROTECTION

DEFINITION & PURPOSE

A temporary sediment control barrier placed around an inlet that minimizes sediment from entering the storm drain.

CONDITIONS FOR EFFECTIVE USE

All functional inlets that drain disturbed areas should have inlet protection. The type of inlet protection should be determined based on the type of inlet, drainage area, slope, and whether the inlet is in a high traffic area. Types of inlet protection include gravel bags and proprietary inserts and covers. Compost filter sock or silt fence can be used for protection of area inlets where the sock and fence can be properly staked into the ground. Compost filter sock may also be used on pavement for curb inlet protection but gravel bags may be a better choice in high traffic areas because of their higher flow rate.

INSTALLATION/CONSTRUCTION PROCEDURES

Install before land disturbing activities begin on existing inlets, or immediately after installation of a new inlet. Gravel bags may be placed either as a j-hook on the upstream end of the inlet or as a full barrier, sometimes stacked 2 bags high, across the entire opening of the inlet). Create an overflow bypass in the inlet protection structure so that excessive ponding of water around the inlet will not become a safety issue.

OPERATION & MAINTENANC E PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Remove sediment and construction debris that impedes flow to the inlet, and replace or repair poorly functioning inlet protection.

SITE CONDITIONS FOR REMOVAL

Remove after contributing drainage areas have been adequately stabilized.

ROBUST ALTERNATIVES

• Inlet Filter Inserts


GRAVEL BAGS

DEFINITION & PURPOSE

Open mesh nylon or burlap bags of gravel designed to pond water and cause sediment to settle out.

APPROPRIATE APPLICATIONS

Gravel bags may be implemented on a project-by-project basis with other BMPs.

CONDITIONS FOR EFFECTIVE USE

Type of Flow: Sheet flow and concentrated flow. Gravel bags can be used alone or with other BMPs. They can be used as inlet protection, check dams in streams and channels, outfall protection, for water diversions, to create temporary sediment basins, and as barriers.

INSTALLATION/CONSTRUCTION PROCEDURES

Time of installation is dependent upon the function gravel bags are intended to perform. When used as a linear control for sediment removal, install along a level contour and turn ends of gravel bag row up slope (j-hook style) to prevent flow around the ends. When used for concentrated flows, stack gravel bags to required height using a pyramid approach. The upper rows of gravel bags should overlap joints in lower rows.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Replace or stabilize any damaged bags or bags that have moved out of place. Repair wash-outs or other damages as needed. Inspect gravel bags for sediment accumulations, and remove sediment when accumulation reaches $\frac{1}{2}$ the height of the structure.

SITE CONDITIONS FOR REMOVAL

Remove upon completion of upstream/upslope work and vegetation/stabilization of contributing runoff areas.



FIBER ROLLS/WATTLES

DEFINITION & PURPOSE

Fiber rolls or straw wattles are a rolled erosion control product filled with straw, flax, rice, coconut fiber material, or composted material. Each roll is wrapped with UV-degradable polypropylene netting or with biodegradable materials like burlap, jute, or coir. These devices are slope dissipaters that reduce velocity of runoff as sheet flow and catch sediment on steep slopes.

CONDITIONS FOR EFFECTIVE USE

Fiber rolls can be used in areas of low shear stress including: along the toe, top, face, and at grade breaks on exposed and erodible slopes to shorten slope length and spread runoff as sheet flow, at the end of a downward slope where it transitions to a steeper slope, along the perimeter of a project (less than 1/3 acre) or down-slope of a stockpile, and down-slope of other exposed soil areas. See MDNR Guide Section 6-195 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install fiber roll immediately after rough grading and prior to seeding or mulching. On slopes, install fiber rolls along the contour with a slight downward angle at the end of each row to prevent ponding at the midsection. Turn the ends of each fiber roll upslope (like a j-hook) to prevent runoff from flowing around the roll. Determine using manufacturer's specification the vertical spacing for slope installations. Straw wattles can float or move if not properly staked and trenched in.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on site. Remove sediment accumulation when it reaches $\frac{1}{2}$ the height of the roll/wattle. Repair or replace split, torn, unraveled, or slumping fiber rolls.

SITE CONDITIONS FOR REMOVAL

Fiber rolls are typically left in place on slopes. If they are removed after stabilization has been achieved, collect and dispose of the accumulated sediment.

ROBUST ALTERNATIVES

• Compost Sock

COMPANION BMPs

• Erosion Control Blanket



DEWATERING OPERATIONS

DEFINITION & PURPOSE

Dewatering operations are practices using dewatering bags, filter socks, rock bags or a suction pump with skimmer to manage the discharge of pollutants when stormwater and non-stormwater must be removed from a construction site. Water cannot be directly pumped into storm sewer system, streams, or lakes without first going through a sediment control BMP.

CONDITIONS FOR EFFECTIVE USE

These practices are implemented for removing standing stormwater and allowable nonstormwater discharges from construction sites. Non-stormwater removal includes groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area and are authorized discharges in the state land disturbance permit. Site conditions will dictate the design. A dewatering plan should be submitted as part of the SWPPP detailing the location of dewatering activities, equipment, BMPs and discharge point. Additional permits or special permission from other agencies may be required for some dewatering operations. It is best if stormwater is allowed to settle in the trap or basin for a minimum of 24 hours after a storm event. The intake hose of the dewatering pump should be elevated off the bottom. Dewatering discharges must not cause erosion at the discharge point. See MDNR Guide Section 6-207 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Implement the dewatering plan detailed in the SWPPP as needed to dewater work areas.

OPERATION & MAINTENANCE PROCEDURES

Dewatering operations should be closely attended when in use to ensure BMPs are functioning properly. Accumulated sediment removed during the maintenance of a dewatering device can be incorporated into the site.

SITE CONDITIONS FOR REMOVAL

Remove the dewatering operation when dewatering the site is no longer necessary.



SEDIMENT BASIN

DEFINITION & PURPOSE

A sediment basin is a temporary settling pond designed to slowly release runoff, detaining it long enough to allow sediment to settle out. Sediment basins may also be retrofitted to permanent stormwater detention or retention basins after construction has ended.

CONDITIONS FOR EFFECTIVE USE

The basin should be designed by a registered design professional. Sediment basins are required by the state land disturbance permit for each drainage area with 10 or more acres disturbed at one time and shall be sized to contain a volume of at least 3,600 cubic feet per each disturbed acre draining thereto. Other similarly effective BMPs can be specified if a sediment basin is impractical. Sediment basins must have a stabilized spillway and utilize outlet structures that withdraw water from the surface unless infeasible. Basins should be located as close to the sediment source as possible. A sediment basin should not be used in areas of continuously running water (live streams) or in areas where failure of the embankment will result in loss of life, damage to homes or structures, or prevent the use of roadways or utilities. See MDNR Guide Section 6-209 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Sediment basins should be constructed according to the design plans prior to disturbance of the drainage area.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Remove trash accumulation at outlet. Remove sediment accumulations at a minimum when the basin is 50% full. Any sediment accumulation must be removed prior to converting the sediment basin into a permanent stormwater basin. If not removed, the accumulated sediment reduces the basin's capacity and makes it difficult to achieve adequate vegetation. Repair and reseed any erosion damage on spillway. Repair settlement, cracking, piping holes, or seepage at embankment. Replace gravel around riser if basin does not drain properly.

SITE CONDITIONS FOR REMOVAL

If the basin is to be converted to a permanent stormwater basin, it will remain in place. For temporary sediment basins, remove after upstream areas are stabilized. Grade surface as appropriate and vegetate immediately.

ALTERNATIVES • Sediment Traps and Check Dams

COMPANION BMPs

• Gravel Bags

SEDIMENT TRAP

DEFINITION & PURPOSE:

A sediment trap is a temporary pond where sediment-laden stormwater is detained, allowing sediment to settle out before runoff is discharged through a stabilized spillway/dewatering pipe.

CONDITIONS FOR EFFECTIVE USE

Sediment traps should be designed by a registered design professional. Sediment traps can be used where runoff can be directed into them at low velocities, typically at the outlets of stormwater diversion structures, channels, slope drains, construction site entrances, vehicle wash areas, or other runoff conveyances. The maximum drainage area is 5 acres. They should be located where sufficient access for sediment removal is available. See MDNR Guide Section 6-177 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install sediment trap prior to disturbance of all other natural vegetation. When excavating an area for a sediment trap, make sure the side slopes are no steeper than 2:1 and the embankment height is no more than 5 feet from the original ground surface. Install an outlet pipe and riser if necessary. Place and compact fill to construct embankments and the spillway. To reduce velocity of runoff from the trap, line the outlet with rip rap And gravel over the riser pipe.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after rain events that cause stormwater runoff to occur on site. Remove trash accumulation. Remove sediment accumulations once sediment reaches $\frac{1}{2}$ the design depth.

SITE CONDITIONS FOR REMOVAL

Remove after upstream areas are stabilized. Grade surface as appropriate and vegetate.

ROBUST ALTERNATIVES

Sediment Basin

COMPANION BMPs

- Gravel Bags and Compost Sock
- Composted Filter Sock and Triangular Foam Log

STOCKPILE PROTECTION

DEFINITION & PURPOSE

Geotextiles or plastic covers may be placed over stockpiles or disturbed soil areas to protect against wind and/or water erosion. Compost filter sock or sediment fence may also be used when necessary to retain stockpiled sediment.

CONDITIONS FOR EFFECTIVE USE

Applications include small graded areas and stockpiles. The use of plastics and impermeable geotextiles may result in 100% runoff, which may cause erosion problems in the areas receiving the increased velocities and flow. Additional BMPs may need to be installed. Covers can be secured in place with wire staples or sandbags. Avoid stockpiling on impervious surfaces, near storm drains, and on steep slopes. Stockpile side slopes should not exceed 2:1. When installing on slopes, key into the top of the slope and along edges to prevent infiltration of surface water under the geotextile. Seams are typically taped or weighted down their entire length. Off-site borrow/fill areas should also be protected by adequate sediment and erosion control BMPs, and if part of a job ≥ 1 acre, their location should be noted within the SWPPP.

INSTALLATION/CONSTRUCTION PROCEDURES

Installation should occur when stockpile is generated, dependent upon intended use.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site, checking for erosion, undermining, and anchorage failure. Any failures shall be repaired immediately. If washout or breakages occur, the material shall be re-installed after repairing the damage to the slope.

SITE CONDITIONS FOR REMOVAL

Remove upon establishment of other temporary stabilization BMPs, or after permanent stabilization has occurred.

ROBUST ALTERNATIVES

• Stabilizing stockpile with vegetation.

COMPANION BMPs

• Perimeter control BMP



PROTECTION OF PERMANENT INFILTRATION PRACTICES DURING CONSTRUCTION

DEFINITION & PURPOSE

Permanent infiltration practices are post-construction BMPs which are designed to improve the quality and manage the volume of stormwater runoff by encouraging natural infiltration on-site. These practices, which include, but are not limited to, grass swales, infiltration basins and trenches, and pervious pavement and pavers, must be protected during construction in order to prevent them from becoming clogged with sediment and/or compacted by equipment.

CONDITIONS FOR EFFECTIVE USE

In areas where infiltration practices will be installed, soil compaction should be minimized by limiting equipment/vehicle traffic. The first step in protecting permanent infiltration practices during construction is to utilize phasing to minimize the exposure of these structures to sediment. Install pervious pavement, infiltration basins and trenches after all upstream areas have been stabilized. If this is not possible, protect pervious paving with a perimeter control BMP, or leave plastic used for curing in place until all upstream areas have been stabilized. Protect infiltration trenches and basins by placing inlet protection in curb cuts and perimeter control where necessary.

INSTALLATION/CONSTRUCTION PROCEDURES

Before construction, utilize phasing to schedule installation of permanent infiltration practices after stabilization of upstream areas. Use the site map to locate the staging area and stockpiled material away from areas where infiltration practices will be installed. Install structural BMPs immediately following construction of the infiltration practice. See standards and specifications for the BMPs which will be utilized. BMPs may include Phasing, Compost Filter Sock, Gravel Bags, and Inlet Protection.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after every rain event that causes stormwater runoff to occur on-site. Make sure that areas that will be used for permanent infiltration practices are not becoming compacted by equipment/vehicle traffic, material storage, or other construction activities. Loosen and prepare compacted soil as needed. Remove accumulated sediment from behind structural BMPs. Excavate sediment accumulation in infiltration basins, swales and trenches. If basins and/or trenches will be used as sediment traps during construction to manage stormwater volume, they must be completely excavated prior to adding subbase, base and surface materials for conversion into permanent infiltration practices. Sediment accumulation in pervious paving requires cleaning by sweeper/vacuum truck. Never use a broom to sweep dirt off pervious pavement.

SITE CONDITIONS FOR REMOVAL

Remove after upstream areas are stabilized.

COMPANION BMPs

• phasing/sequencing

HOUSEKEEPING

DEFINITION & PURPOSE

Housekeeping refers to construction site management measures that are designed and implemented to minimize discharge of pollutants from the site. Chemicals, hazardous materials, solid waste, human waste and construction debris are some materials stored on site that can be sources of stormwater pollution without proper BMPs and good housekeeping. Follow manufacturer's specifications and refer to safety data sheets for proper use and disposal of chemicals.

CONDITIONS FOR EFFECTIVE USE

An effective management system requires training and signage to promote proper storage, handling and disposal of materials. Storage areas should be regularly inspected for compliance. Plans should contain notes clearly stating requirements for addressing potential pollutants. Provide sufficient temporary toilet facilities to serve the number of workers on the site. Temporary sanitary facilities should not be placed on top of storm inlets or near waterways. Secondary containment can be added at the base of portapotties to address leaks/spills. The porta-pottie can be tied down using t-posts to prevent tipping over. Collection of trash and construction debris should be in covered dumpsters. Products should be stored in original containers and tightly sealed. Fueling should be done in areas that do not receive a substantial amount of runoff and do not drain directly to lakes, creeks, streams, rivers, sewers, groundwater, wetlands, or road ditches. Place waste receptacles near area of work and empty them on a regular basis. All fueling activities present on the site shall adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers. Hazardous wastes shall be managed according to Missouri Hazardous Waste Laws and Regulations. Install appropriate signage. Post guidelines for proper handling, storage and disposal of materials, and emergency spill clean-up on site. See MDNR Guide Section 2 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Good housekeeping starts concurrently with work at the site.

OPERATION & MAINTENANCE PROCEDURES

Inspect for good housekeeping in storage areas and throughout the site weekly and within 48 hours of every rain event which causes stormwater runoff to occur on site. Maintenance of temporary toilet facilities should be frequent and thorough. Make necessary corrections and repairs.

SITE CONDITIONS FOR REMOVAL

Housekeeping measures can be removed at the completion of the project.

POLLUTION PREVENTION PROCEDURES (GENERAL POLLUTION NOTES)

SPILL PREVENTION CONTROLS

Keep a spill kit on-site with equipment necessary for spill clean-up. Equipment and materials include, but are not limited to: brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sawdust, oil-absorbent booms, and trash containers.

FUELING, MAINTENANCE OF EQUIPMENT & VEHICLES

No fueling, servicing, maintenance or repair of equipment or machinery should be done within 100 feet of a stream, or within 150 feet of a classified stream, losing stream, or sinkhole. Tarps or drop cloths and drip pads should be used when servicing, repairing, or performing maintenance on construction equipment in the field. When work is complete, the contaminated materials should be disposed of appropriately.

WASHING OF EQUIPMENT & VEHICLES

No wash water is allowed to discharge into storm drains or drainage way without proper treatment.

PESTICIDES, HERBICIDES, INSECTICIDES, FERTILIZERS & LANDSCAPE MATERIALS

Exposure of these chemicals to precipitation and stormwater on-site should be minimized.

DIESEL FUEL, OIL, HYDRAULIC FLUIDS, OTHER PETROLEUM PRODUCTS & CHEMICALS

All fueling facilities present on the site shall adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers. All fuel, oil, and other fluids exposed to precipitation shall be stored in watertight, structurally sound, closed containers. Minimize the discharge of fluids from spills and leaks by implementing chemical spill and leak prevention and response procedures, including, but not limited to, installation of containment berms and use of drip pans. Machinery should be kept out of the waterway as much as possible.

HAZARDOUS OR TOXIC WASTE

Hazardous wastes shall be Missouri Hazardous Waste Laws and Regulations. Post guidelines for proper handling, storage and disposal of materials, and emergency spill cleanup on site. An accurate, up-to-date inventory of materials delivered and stored on-site should be kept. Retain original labels and safety data sheets. All paint, solvents, petroleum products, petroleum waste products and storage containers such as drums, cans, or cartons shall be stored using best management practices.

Materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers with proper labels. Store bagged and boxed materials on pallets. Cover bagged and boxed materials during nonworking days and prior to rain events. Incompatible materials, such as ammonia and chlorine, must not be stored in the same temporary containment facility. Containers for proper disposal of waste paints, solvents, and cleaning compounds shall be provided. All hazardous wastes that are transported, stored, or used for maintenance, cleaning, or repair shall be managed according to the provisions of the Missouri Hazardous Waste Laws and Regulations. For guidance, contact 1-800-361-4827.

CONCRETE WASH-OUT PIT

DEFINITION & PURPOSE

Concrete wash-out pits are used to contain concrete wash-out when cement truck chutes, drums and/or hoses are rinsed out after delivery to construction site. Disposal can occur when concrete wash-out becomes a solid. Concrete wash-out water is a pollutant because of the high pH level and chemical additives in the wash-out. Concrete wash-out management prevents the contamination of stormwater with high Ph and additives that may cause adverse impact to water quality.

CONDITIONS FOR EFFECTIVE USE

Concrete wash-out pits must be implemented on construction projects where concrete slurries are generated. Wash-out should be located a minimum of 50 feet from storm drains, ditches, and 100 feet from classified streams, losing streams or sinkholes. Design concrete wash-out pits to sufficiently hold all liquid and concrete waste. Plastic liner should be a minimum of 10 mil. polyethylene sheeting. See MDNR Guide Section 6-63 for additional guidance.

INSTALLATION/CONSTRUCTION PROCEDURES

Install concrete wash-out pits prior to concrete pouring activities. See Typical Detail.

OPERATION & MAINTENANCE PROCEDURES

Inspect every week and within 48 hours after a rain event that causes stormwater runoff to occur on-site. Remove and dispose of solid concrete material. Wash-out facilities must be cleaned when volume reaches 75% of capacity. Cover the concrete wash-out pit before predicted rain events to prevent overflow.

SITE CONDITIONS FOR REMOVAL

Remove concrete wash-out pit when concrete wash-out activity ceases.

ALTERNATIVES

• Return unwanted concrete back to concrete batch plant to wash-out, proprietary disposal boxes, roll-off Dumpster





DATE:	
PROJECT:	
SUBJECT:	

Pre-Construction Meeting AGENDA

□ Opening Statement:

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- \circ $\;$ Audio recording notice and/or "minutes" information.
- Sign-in Sheet and introductions (sign-in sheet to be attached to minutes).

□ Discussion Items – City Development

□ Discussion Items – City Public Works

0	General	Pg. 2
0	Water	Pg. 3
0	Sewer	Pg. 4
0	Streets	Pg. 4
0	Electric	Pg. 5
0	Drainage/Detention	Pg. 5
0	Stormwater/SWPPP	Pg. 6
0	Request for Plan Revision	Pg. 7
Discus	ssion Items – Engineer	
Discus	ssion Items – Contractor	
Discus	ssion Items – Missouri Gas Er	nergy
□ Discus	ssion Items - Other Third Part	y Utilities

□ Minutes shall be made available to all attendees



GENERAL

- □ Inspections will be made per the City of Nixa Technical Specifications and approved plans/specifications for the project.
- □ Are all required off-site water, sewer, drainage, street and electric easements acquired?
- □ It shall be the sole responsibility of the contractor to contact the utility suppliers and arrange for any necessary modifications required to facilitate construction activities. Any variation from the approved plans shall require a completed **Request for Plan Approval (attached)**.
- □ It shall be contractor's responsibility to keep rock, mud and other debris from adjacent streets by construction equipment throughout the day and at the end of each work day. <u>Construction entrance requirements.</u>
- □ Contractors shall provide a <u>construction traffic plan</u> for approval at the preconstruction conference and be responsible to notify all related contractor agencies.
- □ No pipe shall be backfilled until it has been approved by the Public Works Inspector.
- □ All City inspections shall be made during regular City business hours unless prior arrangements for inspections have been made. All costs (including overtime) associated with inspections outside normal hours will be charged to the contractor.
- □ Testing of water and wastewater lines shall meet the City of Nixa specifications. It shall be the Contractor or Developer's responsibility to notify <u>City of Nixa</u>, a minimum of 24 hours prior to the scheduled testing. It shall also be the Contractor's responsibility to have all necessary equipment needed to perform the testing on site and ready to proceed with testing at the scheduled time. Failure to make these arrangements may necessitate rescheduling the test.
- □ All utility road crossings shall be properly bedded and the trench backfilled with ³/₄" base rock. The fill material shall be installed in lifts no more than 6" thick and each lift shall be compacted individually to grade.
- □ The City of Nixa will issue building permits only after all requirements have been met:
 - Water and Sewer have been tested and approved by both the City <u>and</u> the Missouri DNR.
 - $\circ\,$ All electric service is installed and energized and all street lights are in place.
 - All streets are substantially complete (final asphalt course not required).
 - All drainage and SWPPP items are in place and BMP's are approved.
 - All grading is approved.



- Prior to any changes to City approved specifications or approved construction plans, contractors shall be responsible for completing a Request for Plan Revision (Form found on Page 9 of this document.) all appropriate signatures will be required and copies distributed to all parties.
- No boring or cutting of concrete or asphalt surfaces shall be allowed unless prior City approval is obtained in writing. Encroachment permits may be obtained from the Public Works Inspector, 725-2353.

□ Damage to all individual lot utilities, sidewalks, curb, gutter and property pins shall be the responsibility of the person named on the building permit.

WATER

- □ Upon completion of waterline construction, no existing water valves shall be operated unless City Personnel are notified and are present. Contractor shall notify City personnel prior to making connection to the City's water distribution system.
- □ A 1" PVC post shall be placed by all meter pits to prevent damage to the meter after installed. (See Detail Drawing A-1 in the Technical Specifications)
- □ A #12 insulated copper tracer wire shall be placed on top of all water mains and at all meter boxes and valves. Tracer wires within meter boxes and valves shall be extended to the top of the box plus 12-inches and back to the main in a continuous run. Any necessary stripping or splicing of the tracer wire shall be repaired with an approved watertight connector over the damaged area. (See Detail Drawing B-3 in the Technical Specifications)
- □ All water mains shall be Class 200 SDR 21 pipe.
- □ The water meter lids and valve boxes shall be set at final grade elevation by the contractor. Should final grade elevation change due to yard work, the builder responsible for the yard work shall reset meter lids and valve boxes to the revised grade. The cost incurred for raising meter setters shall be the responsibility of the builder.
- □ These requirements are not intended to include all waterline construction information. The Developer/Contractor shall refer to the Water Specifications in the City of Nixa Technical Specifications Book for additional information.
- □ All water main construction shall comply with Missouri Department of Natural Resources "Design Guide for Community Public Water Supplies", and the City of Nixa Technical Specifications.
- □ The Developer shall be solely responsible for making connection to the City's existing water main and shall meet all construction specifications and guidelines set forth in this document.



SEWER

- □ All new sewer construction shall be completed and accepted by the City before final tie in to the City system. This may be completed by keeping the two systems physically separated or by plugging the new system at the City connection point until approval has been completed.
- □ It shall be the responsibility of the Developer/Contractor to insure that all manholes on the street shoulders are at curb level at final grade.
- □ All manholes placed within the street shall be flush with the final pavement and meet Technical Specification details.
- □ The Public Works Inspector shall be contacted for inspection of all laterals prior to backfilling.
- □ All sewer piping shall be SDR 35 for lines with less than 10 feet of cover and SDR 21 for all lines with more than 10 feet of cover. All piping between manholes shall be constructed of the same material while the material type will be dictated by the deepest portion of the section.
- □ At the location of the sewer tees there shall be an "S" painted on the curb. A PVC pipe stake shall be set vertically to indicate the sewer lateral connection location.
- □ These requirements are not intended to include all sewer line construction information. The Developer/Contractor shall refer to the Sewer Specification in the City of Nixa Technical Specifications Book for additional information.

STREETS:

- □ All proposed street construction shall be placed on a suitable subgrade. Where over excavation is required, suitable, consistent material shall be placed to bring the excavation to subgrade elevations. (See Detail Drawing D-1 in the Technical Specifications).
- □ All fills above 24" (including backfill for over excavation) shall be compaction tested at every 1 foot intervals. Compaction must meet 95% and certified by a qualified individual or agency. A Copy of the compaction test results shall be given to the Public Works Inspector. Compaction test shall be completed for each 100 linear foot of roadway. The City will not be responsible for compaction testing.
- □ The Public Works Inspector shall inspect all compaction tests and street subgrade prior to base rock placement and after base rock placement. It shall be the responsibility of the Developer/Contractor to contact the City to arrange for these inspections.
- □ Public Works Inspector shall inspect asphalt and concrete installations.
- □ These requirements are not intended to include all street construction information. The Developer/Contractor shall refer to the Street Specifications in the City of Nixa Technical Specifications Book for additional information.



UNDERGROUND ELECTRIC AND STREET LIGHTS:

- □ Standard street lights are to be placed every 200 feet on straight runs. At cul-desacs, lights shall be placed at the end of the cul-de-sac and spaced as indicated on straight runs.
- □ Easements shall be provided for constructing buried and overhead electric lines to poles.
- □ Subdivisions that opt to construct underground electric shall install the water line at 4-foot and the gas at 7-foot distance behind curb on the same side of street. Underground electric shall be installed 14-foot and the sewer line at 7-foot distance behind the curb on the opposite side. The water meters shall be on every other lot line, located on the right-of-way/easement line and the electric meters are to be placed on alternate lots.
- □ The City does not stock maintenance or repair parts for street lighting other than standard lights included in this document. The developer shall contact the City Electric Superintendent to obtain pricing information for optional types of street lights if desired. Optional street lighting may require special agreement assuring future parts and materials necessary for maintenance as well as cost for same.
- □ Where Secondary, primary and 3-phase or any combination thereof are run together in the same ditch; they should be place as follows: Secondary place closest to the property line and primary next toward the curb; three phase shall be closest to the curb.

DRAINAGE/DETENTION:

- □ All stormwater drainage shall be conveyed through concrete lined ditches or installed in pipe unless a grass lined ditch is allowed by the City of Nixa Development Department and a written approval is obtained.
- □ The Contractor shall place sod on the entire floor of the ditch and shall be responsible for maintaining all sod through the first growing season after placement.
- □ Contractor shall spray hydro mulch on interior and exterior sides and floors of all detention basins in areas where a 4 foot concrete trickle channel is constructed within the basin. Seeding and strawing shall be allowed within those basins where an 8 foot concrete low flow channel is constructed. (See Detail Drawing G-1 in the attached Appendix) The contractor/Developer shall be responsible for proper cover through the first full growing season.

STORMWATER/SWPPP PLAN

□ Contractor shall provide erosion control by placing BMP's (Best Management Practices) at strategic locations within the project. BMP's shall consist of Silt Soxx material or Silt Fences. (See Detail Drawing G-17 in the Technical Specifications)



\Box	The Developer shall be responsible for maintenance of all required detention
	basins for a period of one year after City's acceptance of the work. Additionally,
	the Developer will be responsible to maintain and meet all MS4 requirements
	until such time as the permit can be terminated.

□ Recordkeeping shall meet the details specified in the land disturbance permit. This includes but is not limited to: weekly BMP inspections that are to be completed and kept on site. These BMP inspections are to also be completed within 48 hours of a ½" rainfall event. Any other recordkeeping required by the MS4 General Operating Land Disturbance Permit.

□ No construction work shall start prior to the installation, inspection, and approval of the Stormwater BMP's

□ All areas outlined in the General Operating Land Disturbance Permit and the SWPPP Plan will be enforced including maintenance of required temporary BMP's.

SERVICE OWNERSHIP / RESPONSIBILITY:

Upon acceptance (final plat approval), all production, main distribution, service lines and other facilities such as transformers and meters are the responsibility of the City of Nixa. Customer's service lines include all piping and facilities from the outlet side of all meters or sewer service from the "Y" location is the responsibility of the customer. All customer lines shall be installed, maintained and repaired to meet currently adopted codes and ordinances of the City of Nixa. Transfer of commodity such as electricity and water also transfers ownership on the outlet side of the meter.

*IF IN DOUBT CONCERNING ANY OF THE CITY REQUIREMENTS OR ORDINANCES, CONTACT THE APPROPRIATE CITY DEPARTMENT. FAILURE TO COMPLY WITH ANY DISCUSSION ITEM MAY BE CAUSE FOR A STOP WORK ORDER, EXPOSURE OF COMPLETED WORK OR A LACK OF WILLINGNESS ON THE CITY'S PART TO ACCEPT PART OR ALL OF THE WORK.



III. REQUEST FOR PLAN REVISION

DATE:	
PROJECT:	
SUBJECT:	
	_ REQUEST ORIGINATED FROM OWNER
	_ REQUEST ORIGINATED FROM ENGINEER REOUEST ORIGINATED FROM CITY
	_ REQUEST ORIGINATED FROM CONTRACTOR
MESSAGE:	

This is to certify that the following design/construction methods have been discussed and approved by the Engineer and City of Nixa.

Street Sub Grade/ Base Rock	Waterlines
Street Curb/Gutter/Pavement	Sewer Lines
Stormwater Facilities	Stormwater Detention/ Conveyances
Electric Facilities	Other

CHANGE DESCRIPTION:

Signature of Engineer

Signature of City Official

Signature of Contractor

*Only the change information discussed are included in the Approval. All signatures are to be obtained before change is approved and copies of signed approval given to all parties.



FEES

All fees are due at pre-construction meeting and i	nclude:
Storm Water Review fee (Acct #16-600-43002)	Date of payment
Storm Water Fee-In-Lieu of (Acct #16-600-42504)	Date of payment
Electric Service fee (Acct #01-700-40470)	Date of payment
Street Lights (Acct #01-700-40450)	Date of payment
Miscellaneous Fees:	_
\$	Date of payment
FINAL PLAT	
Building permits will normally be issued:	
 Upon completion of all public im Final plat recorded at Christian 	provements County.
It is the responsibility of applicant for damages to which subcontractor caused the damage.	O City right-of-way and easements regardless of
I have read and understand the above procedures and building code regulations and by signing this form, a	I requirements as they pertain to city development and acknowledge compliance with these rules.
Signature of Applicant:	Date:
Printed Name of Applicant:	
Signature of Engineer:	Date:
Printed Name of Engineer:	
PROJECT	



MS4 COMPLIANCE PLAN REVIEW SHEET (SEDIMENT & EROSION CONTROL)

Project Name:
Date Plans Received:
Date Plans submitted to Department for review:
Date Review Completed: (Sign and Date)
Date comments submitted to Planning Department:
Date addendums or other reply received:
Date of second review (if needed):

MS4 Checklist, Evaluate threats to water quality:

(X) Soil erosion potential.

(X) Site slope.

(X) Project size and type.

(X) Sensitivity of receiving waterbodies.

(X) Discharge flow type (pipe or sheet flow).

(X) Location of discharge point in relation to receiving water.

(X) Proximity of the site to receiving waterbodies; and

(X) Other factors relevant to the MS4 service area.

Comments

Please include sheet numbers

Please call for inspection of all stormwater BMP's as soon as they are installed.

As per the plans, these BMP's will need to be maintained in an effective condition throughout the duration of this project.

As per the MDNR Land Disturbance Permit, the weekly BMP inspections will need to be done on time and kept on site for occasional review.

Sediment and Erosion Control sheet should be updated to reflect any changes to the approved plans as they occur, i.e. location change for silt soxx, job trailer, dumpster, etc.



ASST. PUBLIC WORKS DIRECTOR PLAN REVIEW SHEET

Project Name:
Date Plans Received:
Date Plans submitted to Department for review:
Date Review Completed: (Sign and Date)
Date comments submitted to Planning Department:
Date addendums or other reply received:
Date of second review (if needed):
Comments

	Comments
Please include sheet numbers	



STREET DEPARTMENT PLAN REVIEW SHEET

Date Plans Received: Date Plans submitted to Department for review: Date Plans submitted to Department for review: Date comments submitted to Planning Department: Date addendums or other reply received: Date of second review (if needed): Comments	Project Name:
Date Plans submitted to Department for review: Date Review Completed: (Sign and Date) Date comments submitted to Planning Department: Date addendums or other reply received: Date of second review (if needed): Comments Please include sheet numbers	Date Plans Received:
Date Review Completed: (Sign and Date) Date comments submitted to Planning Department: Date addendums or other reply received: Date of second review (if needed): Comments Please include sheet numbers	Date Plans submitted to Department for review:
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Please include any separate comments or attachments, that need to be submitted with this sheet.



WATER & WASTEWATER DEPARTMENTS PLAN REVIEW SHEET

Project Name:
Date Plans Received:
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Date Review Completed: (Sign and Date)
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Comments

Comments			
Please include sheet numbers			



ELECTRIC DEPARTMENT PLAN REVIEW SHEET

Project Name:
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Comments
Comments
Please include sheet numbers

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One & Two Family Residential Construction Sediment & Erosion Control Guidelines

As you may or may not be aware, the EPA with the help of MoDNR has instituted a Stormwater Pollution Prevention Program entitled: National Pollution Discharge Elimination System (NPDES). Within this NPDES program is information outlining the Municipal Separate Storm Sewer System (MS4) program. This document contains requirements that: any municipality, county or other form of government that has a population of 10,000 or more has a "Duty to Comply".

The City of Nixa, as a regulated small MS4 has been given this Duty to Comply. Among other things, the City of Nixa is required to: "develop, implement, and enforce a Stormwater Management Plan (SWMP). This plan is designed to reduce the discharge of pollutants from the City of Nixa's regulated small MS4 to the maximum extent practicable. Furthermore, the intent of this SWMP is to protect water quality, and to satisfy the appropriate requirements of the Missouri Clean Water Law".

This handout contains guide lines and procedures sufficient for typical One & Two Family construction. It is not intended to address all circumstances that may occur during construction. The goal of this handout is to educate home builders so they can eliminate or reduce the amount of sediment that leaves their construction sites. Since our streets and storm drain systems convey stormwater to lakes and rivers, it is important that we keep these sediments and pollutants off City streets and out of the City's storm sewer system.

Best Management Practices:

Otherwise known as BMP's. These include but are not limited to: temporary vehicle tracking pads, silt fence material, silt soxx material, seeding, erosion control blankets, construction phasing, grass buffer strip or any other device or procedure that helps reduce erosion and sediment loss.

Installation Sequencing:

The following is the order in which most BMP's are to be utilized:

1. Grass Buffer Strips – Ensure that the existing grass buffer strip along the curb lines are not disturbed. If grass is already established, and a buffer strip of 10 feet wide can be left in place, we would ask you to do so.

2. Inlet Protection – Ensure that all storm drain inlets that receive stormwater runoff from your project are properly protected.

3. Perimeter Control – Devices such as silt fence, wattles or silt soxx material must be properly installed on all areas where runoff can potentially leave your site.

4. Track Out – All debris that is tracked off site onto the city street is to be removed at the end of each work day.

5. Grading/Excavating – All BMP's should be installed prior to any grading or excavation. Dewatering for any trenching or excavation must be done in such a manner as to not deposit sediment downstream. Wattles, silt soxx material, sedimentation basins or some other means of removing sediment from dewatering must be used prior to discharging water off site. Discharge water should be clear.

6. Stockpiles – Perimeter control should be installed around all stock piles.

7. Backfill and rough grading – Care should be taken to avoid disturbing the grass buffer strips.

8. Maintenance – All BMP's should be maintained so the devices are functioning properly. All sediment should be removed from the streets, gutters and inlets at the end of each work day and after each rain event in which sedimentation occurs.

9. Final Grading – All BMP's should be left in place until the site has adequate vegetation established (70% vegetative coverage on 100% of the project).
10. Seeding or Sodding – Should be done as soon as practicable.

Permit Holders Responsibility:

1. If a lot is part of a subdivision, the NPDES permit holder (the original developer) for that development must comply with said permit regulations and Stormwater Pollution Prevention Plan (SWPPP) for the life of the project (until such time the permit can be terminated). If a development is sold in its entirety to another entity or if another entity purchases enough lots to add up to 1 acre, then the Sediment & Erosion Control responsibility for the lots purchased falls on the purchasing entity.

2. Ensure that adequate BMP's are in place and functioning until the project is complete (last lot is built out).

3. Provide periodic inspection of BMP's at least once a week and after a significant rainfall event.

4. Maintain all BMP's in working order. Remove accumulated sediment from inlet protection, perimeter control and other BMP devices as needed.

Maintenance requirements:

1. Maintain the grass buffer behind the curb at all times.

2. All perimeter controls that are: collapsed, torn down, or ineffective, are to be replaced or repaired as needed.

3. Remove accumulated sediment from perimeter control BMP's when sediment reaches 1/3 the height of the device.

4. Remove accumulated sediment from inlet protection when it accumulates.

Inspections – City:

The City of Nixa Building Inspectors will conduct erosion and sediment control inspections in conjunction with routine building inspections to ensure that the appropriate erosion and sediment control measures are in place and properly secured. The first inspection will occur during footing inspection. It is expected that: the grass buffer strip is maintained (if applicable), inlet protection and perimeter control be installed, stockpiles protected, and vehicle tracking pads installed (if practicable). BMP's that are not installed or are installed improperly will result in a failed footing inspection. At all subsequent inspections, the BMP's will be subject to inspection to make sure they are working properly. If at any time during construction, sediment deposits are found off the construction site, a stop work order may be issued until the deposit(s) are removed and the proper BMP's have been established. Upon final completion of the project the entire site must be properly stabilized. This can be done through sodding or seed and straw on the entire site. Only when vegetation is adequately established (70%) vegetative cover on 100% of the project) may the sediment control devices be removed.

Construction BMP's:

The following items are examples of the types of BMP's that should be on every site. Additional BMP's may be required depending on the site, its topography, location, layout, etc.

Grass Buffer Strip, Right-of-way Vegetation:

If the lot has established turf grass, it is requested that during construction this 10' grass strip behind the curb be left undisturbed during the excavation for the house. This grass buffer strip is the road right-of-way area directly behind the curb to the beginning of the property line. This right-of-way grass buffer strip vegetation helps to prevent sediment from being discharged into the streets and storm sewer system. If this area has not been seeded or if work is required in the right-of-way, then additional BMP's may be required to prevent sediment from leaving the property.

Perimeter Control:

Perimeter control is required on all downstream areas of the site where runoff can potentially leave the site. Items that can be used for perimeter control include but are not limited to: silt fence material, silt soxx material, seeded soil berm, or straw bales.

Silt Fence is the most common type of perimeter control used. To be effective the silt fence must be installed correctly. To achieve this, the bottom of the fence must be installed in a 6-inch-deep trench and anchored with dirt spoils from trenching.

Silt Soxx material (also known as fiber rolls, fiber logs, sediment logs or wattles) are typically made of straw, wood fiber and even rock, bound by a net to form the shape of a tube or log. They are typically 6 to 12 inches in diameter and vary in length. These can also be laid continuous as perimeter protection. The logs are held in place by staking. They are easy to install and work great for providing perimeter control next to sidewalks, as inlet or curb and gutter.

Inlet Protection:

Inlet protection is required on all storm sewer inlets (curb inlet and area inlets) located downstream of any construction site where stormwater runoff may occur. The inlet protection must be installed prior to disturbing the ground, and only removed when vegetation on the lot is adequately established.
Miscellaneous Items:

Other pollution control items that need to be addressed during construction include: site waste control, concrete washout, and dewatering. During construction, all construction waste on site should be put in an approved container with a lid. Care should be taken to prevent debris and garbage from being blown off site. Hazardous materials such as gas, oils, paints and solvents should be stored in proper containers and indoors to prevent leaks and should be disposed of properly. A concrete washout area should be constructed in a manner & location so as to not discharge off site. Washing concrete out into the street or into stormwater inlets is considered an illegal discharge. All water from dewatering practices must be clear before it is discharged off site. If the water is turbid or sediment laden it must be treated with appropriate BMP's before discharging offsite. This may include using a de-watering filter bag, dewatering into a sedimentation basin or through a series of filter logs to filter out the sediment. Sediment laden water that is discharged off site is considered an illegal discharge.

For more information concerning the City of Nixa's Sediment & Erosion Control Ordinance or the MS4 program; contact the City of Nixa Building Regulations Department at (417) 725-5850, or the City of Nixa Public Works Department at (417) 725-2353, or online <u>www.nixa.com</u>.



Proper Silt Soxx or Fiber Roll Installation



Proper Curb Inlet Protection Installation



Proper Area Inlet Protection Installation

