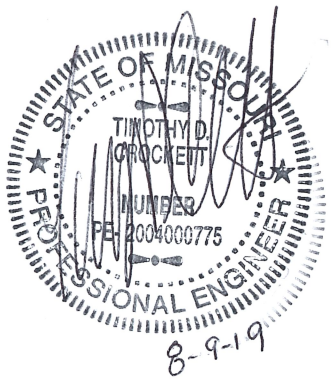
STORM WATER POLLUTION PREVENTION PLAN

FOR

Kansas City Surgical & Dental Office

Date:
August, 2019



PREPARED BY:

CROCKETT
ENGINEERING CONSULTANTS
1000 W. Nifong Blvd., Bldg. 1, • Columbia, Missouri 65203

GENERAL PROJECT INFORMATION

PROJECT

Kansas City Surgical & Dental Office

PROJECT LOCATION

The project site is located in Section 20, Township 48, Range 31 in Lee's Summit, Jackson County Missouri.

General Location: SW Corner of I-470 & Strother Rd.

GENERAL DESCRIPTION OF PROJECT

Site construction of office building and associated site improvements

PROJECT PROPERTY OWNER

Name: Kansas City Surgical & Dental, LLC

Address:

City: State: MO Zip:

Phone: (816) 806-6242

Contact: Gregory Lohr

GENERAL CONTRACTOR

Name: _____

Address: _____

City: _____State:____Zip:_____

Phone: _____Fax:_____

Contact: _____

CONSULTANT

Crockett Engineering Consultants

1000 W. Nifong Blvd., Bldg. 1

Columbia, MO 65203

Phone: 573.447.0292

Contact: Tim Crockett

EROSION CONTROL INSPECTOR

Name: _____

Address: _____

City: _____State: ____ Zip: _____

Phone: _____Fax:_____

Contact: _____

NOTE: The Owner must designate an approved **EROSION CONTROL INSPECTOR**, who will be responsible for the inspection logs, updating the **SWPPP**, and reporting to the site manager any noncompliance findings.

The **GENERAL CONTRACTOR** shall notify the **EROSION CONTROL INSPECTOR** when a precipitation event occurs.

The person selected to conduct inspections should be knowledgeable in the principles and practices of erosion and sediment controls, possess the technical skills to assess conditions at the construction site that could impact stormwater quality, and assess the effectiveness of any erosion and sediment control measures selected.

SWPPP OBJECTIVES

- Stabilize the site as soon as possible
- Protect slopes and channels
- Reduce impervious surfaces and promote infiltration
- Control the perimeter of the site
- Protect adjacent receiving waters
- Follow pollution prevention measures
- Minimize the area disturbed and the duration of bare soil exposure

SWPPP REQUIREMENTS

- Cover/Title Page
- Project and SWPPP contact information
- Site and activity description, including the site map
- Identification of potential pollutant sources
- Description of controls to reduce pollutants
- Maintenance/inspection procedures
- Records of inspections and follow-up maintenance of BMPs
- SWPPP amendments
- SWPPP certification

REMINDER

- The SWPPP must remain on site until the site has been closed out.
- A copy of the permit and/or NOI needs to be attached to the SWPPP.
- Modifications and updates to BMPs or drainage areas on the project site should be recorded in or attached to the SWPPP.
- Any additional Federal, State, or Local permits need to be attached to the SWPPP.
- The SWPPP, as well as all supporting documentation (permits, inspection reports, addendums, to the SWPPP, location map, site plan, NOI/NOT etc.), must be retained for three (3) years.
- SWPPP's are meant to be changed during the course of the construction process. The goal of the SWPPP is to keep sediment on the project sites and assure water quality standards. If BMPs or procedures are not attaining this goal, then the SWPPP may be changed or updated in order to better address specific conditions.

SITE MAP CONSIDERATIONS

Site maps should show the construction activities and stormwater management practices for each major phase of construction (e.g., initial grading, infrastructure, construction, and stabilization). Site maps should identify the following features:

- Areas and features to be protected
- Disturbed areas (locations and timing of activities)
- Clearing limits
- Identify locations of structural and non-structural BMPs
- Identify locations of Post-construction BMPs
- Areas of stabilization
- Indicate locations of material, waste, borrow, or equipment storage

Site maps should be kept up to date showing changes that have been made to BMPs and for stabilization methods as the site progresses. The Missouri State Operating Permit requires that the SWPPP and site map be kept up to date, so mark up the site map with the locations and dates of any changes being made. Also include the current locations of the following:

- Portable toilets
- Material storage, vehicle and equipment fueling and maintenance areas
- Concrete, paint and stucco washouts
- Dumpster containers
- Spill kits
- Stockpiles
- Any other non-structural non-stormwater BMPs, temporarily removed structural BMPs or changes to the structural BMPs

PROJECT PLANNING & DESIGN

SOIL DISTURBING ACTIVITIES for this project will include the following (check all that apply):

- ☐ Clearing and grubbing of existing vegetation
- ☐ Construction of sediment basins and stormwater detention
- ☒ Stripping of topsoil within the limits of construction
- ☒ Stockpiling and re-spreading topsoil
- ☒ Utility trench excavation and backfill
- ☒ Preparing subgrade for paved areas
- ☒ Backfilling curbs and sidewalks
- ☐ Disposal areas for excess excavated material
- ☐ Borrow areas for fill material
- ☒ Construction of compacted fill areas for residential/commercial building construction
- ☐ Other (specify): _____

NOTE: The Site Plan must be submitted with the SWPPP.
Limits of Land Disturbance must be clearly shown on the Erosion and Sediment Control Plan**.**

WHAT IS THE FUNCTION OF THE CONSTRUCTION ACTIVITY?

- ☒ Clearing/Grading
- ☒ Commercial/Residential Subdivision
- ☐ Municipality

SITE RUNOFF CHARACTERISTICS

Total Site Area: 1.80 Acres

Estimated Area to be disturbed by all activities: 1.80 Acres

Note: Attach State Operating Permit if area to be disturbed is one (1) acre(s) or more.

Runoff Coefficient prior to development: .40

Runoff Coefficient after development: .80

Name Watershed and Receiving Waterbody: Little Blue River

Pre-Development Peak 10 year outflow: 3.2 cfs

Post-Development Peak 10 year outflow: 6.3 cfs

PROJECT PLANNING & DESIGN

Endangered or threatened species/critical habitats on or near the project? ☐ Yes ☒ No

Description of species and/or critical habitat:_____

Steps taken to address the impact of construction:_____

Historic Sites on or near the construction site: ☐ Yes ☒ No

Steps taken to address the impact of construction:_____

Will there be work done in a 404/401 stream or creek? ☐ Yes ☒ No

Steps taken to address the impact of construction:

NOTE: A Limited Stream Assessment must be submitted

Are there any impaired waters on the site? ☐ Yes ☒ No

If yes, has a Total Maximum Daily Load (TMDL) been developed? ☐ Yes ☐ No

GENERAL DESCRIPTION OF STORMWATER MANAGEMENT PLAN

To ensure that this project does not promote or aggravate an existing off-site erosion, siltation, or drainage problem, erosion best management practices (BMP's) are to be implemented on this site. The BMP's that have been chosen for this site are silt fence, rock ditch check and sediment trap. Due to the clearing of this site in the manner as shown by the grading plan, it is expected that additional silt laden runoff will be generated. To ensure proper containment of said silt laden runoff, silt fence, rock ditch check and sediment trap will be utilized to filter the runoff prior to it leaving the site. The above referenced erosion control devices are to be placed in areas of highly concentrated flows or sources of point flow and sheet flow. A construction entrance will also be used during construction to help prevent silt leaving the site on tires of construction vehicles.

GENERAL DESCRIPTION OF STORMWATER FACTOR AFFECTING RUNOFF

The existing conditions of this site include an open pasture with 2-5% slopes. The 2.20 acre site includes the following features. During construction the site will manage runoff with traditional BMP practices including silt fence, rock check dams sediment trap. The post-development site will manage the increase in impervious area by diverting runoff to detention and bioretention ponds to filter out siltation and other sediments on our site from entering the downstream waters. With the use of these factors the discharge runoff rate on this site will be less than the existing conditions.

CONSTRUCTION PHASE

IMPORTANT RECORDED DATES (to be filled in during construction activities)

Major grading activities begin and end (dates): _____

Construction temporarily or permanently ceased (dates):_____

Stabilization measures initiated (dates): _____

BLASTING (list all contractors who will perform blasting work or handle explosives. Attach insurance certificates for all contractors on this list):

_____

_____

GENERAL SEQUENCE OF CONSTRUCTION:

Describe the general sequence/phasing of construction. (Address any critical construction sequences, time restrictions, etc. of which the contractor must be aware in planning his activities.)

This project will be completed in two general phases. The first task of construction will be the installation and inspection of all erosion control facilities. These facilities must be placed as per the approved land disturbance plan and SWPPP. Once the facilities have been properly installed, the rough grading of the site can begin. Slopes shall be fine, seeded, and mulched as soon as practical to provide a stabilized surface.

The second phase will include the installation of sanitary sewer, utilities, and paving. After paving, the curb areas shall be backfilled and the building pad fine graded. All disturbed areas shall be seeded and mulched. The erosion control facilities shall remain in place throughout this process. The disturbed areas are to be periodically inspected to check for wash-outs, gulleys, scouring, etc. Should any of these situations exist, the affected area shall be regarded, reseeded, and remulched.

CONSTRUCTION SITE BEST MANAGEMENT PRACTICES

(check all that apply):

- [x] Scheduling
- [ ] Preservation of Existing Vegetation
- [ ] Hydraulic/Wood Mulch
- [ ] Hydroseeding
- [ ] Soil Binders
- [ ] Straw Mulch
- [ ] Slope Drains
- [ ] Geotextiles, ECBs, or TRMs
- [ ] Earth Dikes/Swales & Lined Ditches
- [ ] Outlet Protection/Velocity Dissipater
- [ ] Stream bank Stabilization
- [ ] Other (specify)_____

TEMPORARY SEDIMENT CONTROL BMPS:

- [x] Silt Fence
- [ ] Sediment Trap
- [ ] Top Soil Diversion Berm
- [ ] Sandbag Barrier
- [x] Storm Drain Inlet Protection
- [ ] Sediment/Desilting Basin
- [ ] Rock Check Dam
- [ ] Gravel Bag Berm
- [ ] Street Sweeping and Vacuuming
- [ ] Other (specify)_____

WIND EROSION & TRACKING CONTROL BMPS:

- [x] Wind Erosion Control
- [ ] Entrance/Outlet Tire Wash
- [x] Stabilized Entrance/Exit
- [ ] Other (specify)

GOOD HOUSEKEEPING BMPS:

- [ ] Water Conservation Practices
- [ ] Dewatering Operations
- [ ] Temporary Stream Crossing
- [ ] Clear Water Diversion
- [ ] Potable Water/Irrigation
- [x] Concrete Curing
- [x] Concrete Finishing
- [x] Paving & Grinding Operations
- [ ] Illicit/Illegal Discharge
- [ ] Detection Vehicle & Equipment
- [ ] Cleaning Vehicle & Equipment Fueling
- [ ] Vehicle & Equipment Maintenance
- [ ] Material/Equipment Use Over Water
- [ ] Other (specify) _____

WASTE MANAGEMENT & MATERIALS POLLUTION CONTROL BMPS:

- [x] Spill Prevention/Control
- [x] Stockpile Management
- [x] Concrete Waste Management
- [x] Solid Waste Management
- [ ] Liquid Waste Management
- [x] Material Delivery/Storage/Use
- [x] Contaminated Waste Management
- [ ] Hazardous Waste Management
- [ ] Sanitary/Septic Waste Management
- [ ] Other (specify)

PERMANENT STABILIZATION BMPS:

- [ ] Velocity Dissipation
- [ ] Vegetative Buffers
- [ ] Sod Channel Lining
- [ ] Riprap Channel Lining
- [ ] Other (specify)

NOTE: All temporary BMPs must be in place before construction can begin.

ENVIRONMENTALLY SENSITIVE AREAS

WETLAND PROTECTION:

Protection methods for wetlands include:

- Appropriate setbacks that preserve the wetlands or wetland functions;
- Wetland mitigation, including wetland replacement;
- Wetland restoration or enhancement.

SINKHOLE OR CAVE-RELATED NON-BUILDABLE AREAS:

- No grading or installation of parking areas, streets or other infrastructure within non-buildable areas.

DEVELOPMENT IN SINKHOLE DRAINAGE AREAS WITHOUT DISCHARGE TO SINKHOLE:

- Development may occur in the immediate sinkhole drainage area if alternative surface drainage is provided away from the sinkhole,
- The water shall stay in the same surface drainage basin,
- The water shall not go into another sinkhole drainage area off the applicant's property.
- The immediate sinkhole drainage area which cannot be provided with an alternative drain- age system can be deleted from the development area.

DEVELOPMENT IN SINKHOLE DRAINAGE AREAS WITH DISCHARGE TO SINKHOLE: The sinkhole can be used for limited surface runoff drainage where alternative surface drainage methods cannot be provided if the following conditions are met:

- Runoff from the development is completely retained in a retention or detention basin.
- Enough runoff is diverted from the sinkhole drainage area so that the development of the remaining area does not increase the total quantity or deteriorate the water quality of runoff into the sinkhole.
- Where the sinkhole outlet is off site, either the runoff leaving the subject property must be shown to be no greater in flow or in quantity than that which existed before development, or easements must be obtained from owners of property where any increase in flow or quantity of water must go to reach the sinkhole outlet.

FILLING IN SINKHOLES AND SINKHOLE DRAINAGE AREAS:

- No street shall be placed below an elevation of at least one (1) foot above the sinkhole ponding elevation and only when collapse of the sinkhole will not adversely affect the road.
- No increase in the ponding elevation will be allowed by grading or filling without a stormwater analysis approved by the Director.
- It shall be unlawful for any person to place, dump or deposit trash, debris, rubbish, brush, leaves, grass clippings, yard waste, hazardous waste or similar materials within a sinkhole.
- The alteration of land in a sinkhole by means of grading or the use of motorized equipment without a permit is not allowed.

BUFFER ZONE LIMITATIONS AND PROHIBITIONS:

- Natural vegetative cover must be retained within a buffer zone.
- All construction activities including grading and filling are prohibited.
- Wastewater disposal or irrigation is prohibited.

BUFFER ZONE WIDTHS:

- Wetlands (at least 50 ft.)
- Sinkholes (shall not be less than 150 ft., or greater than 300 ft. from the sinkhole eye)
- Other environmentally sensitive areas (the buffer zone shall be at least 50 feet)

GENERAL PRACTICES

GENERAL PRACTICES FOR CONSTRUCTION SITE RUNOFF CONTROL:

- Clearing and grading of natural resources shall not be permitted;
- Clearing techniques that retain natural vegetation and natural drainage patterns shall be used to the *maximum extent practicable*;
- Clearing shall not begin until all sediment control devices have been installed and have been stabilized;
- Cut and fill slopes *shall be no greater* than 3:1, except as approved by the City;
- Phasing shall be required on all sites disturbing greater than 40 acres;
- Soil must be stabilized within 14 days of clearing or inactivity of construction;
- Soil stockpiles shall be protected from allowing sediment to leave the site;
- Techniques shall be employed to prevent the blowing of dust or sediment from the site;
- Techniques that divert upland runoff past disturbed slopes shall be employed;
- Sediment controls shall be provided in the form of settling basins or sediment traps or tanks, and perimeter controls;
- Adjacent properties shall be protected by the use of a vegetated buffer strip, in combination with perimeter controls wherever possible;
- When a watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided. *Note:* Work done within a waterway may need additional federal or state permits;
- A temporary access road or driveway shall be provided at all sites;
- Temporary boundary markers shall be clearly visible and installed at 100 foot intervals prior to clearing, joined with marking tape or fencing, to delineate stream buffer limits.

GENERAL PRACTICES FOR MAINTENANCE AND INSPECTIONS:

- All control measures shall be inspected at least once per week and within a time period not to exceed 48 hours following any storm event resulting in runoff on site;
- Parts that have been finally stabilized shall be inspected once per month. All perimeter controls shall be inspected weekly for proper anchorage, leakage, or tears on the control material;
- The responsible party shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least five (5) years;
- Built-up sediment will be removed from silt barriers when it has reached 1/3 of the height of the barrier;
- Sediment basins shall have built-up sediment removed when 1/3 of the basin volume is filled;
- All measures shall be maintained in good working order;

GOOD HOUSEKEEPING

SPILL PREVENTION:

PETROLEUM PRODUCTS

- Construction equipment and vehicles shall be monitored for leaks and receive regular preventative maintenance to ensure proper operation and reduce the risk for leaks or spills.
- Petroleum products shall be stored in clearly labeled and tightly sealed containers or tanks.
- Any soil contaminated by fuel or oil spills shall be removed and disposed of properly.
- Above-or-below ground petroleum storage facilities must be set back 300 feet from any stream.
- Storage for oils, greases, paints, fuels, and chemicals shall be provided with secondary containment.

FUELING AND SERVICING

- Above-or-below ground fueling storage facilities must be set back 300 feet from any stream.
- Up to 500 gallons of gasoline or diesel fuel is allowed, but must remain outside the stream buffer.
- Secondary containment for fuel shall be provided.

MUD TRACKING

- The permittee is responsible for keeping sediment and debris off streets.

CONCRETE TRUCK WASHOUT

- Washout shall not discharge surplus concrete or drum wash water on the site in such a manner that promotes contact with storm waters or natural streams discharging from the site.

HAZARDOUS MATERIALS

- All hazardous materials shall be disposed of according to state regulation or the manufacturer's recommendations.

FERTILIZERS

- Fertilizers shall be applied following manufacture's recommendations.
- Fertilizers shall be stored in a covered area or in watertight containers.
- Partially used products shall be properly sealed and stored to avoid spills or leaks.
- Up to 20 gallons of liquid fertilizer or pesticide and up to 100 pounds of granular fertilizer or pesticide storage is allowed if set back from stream 300 feet.
- Storage must remain out of the stream buffer.

CONSTRUCTION WASTE

- All construction waste material shall be collected, deposited, and stored in a manner to prevent contact with storm waters discharging from the site and shall be disposed of by a licensed solid waste management contractor.
- No waste shall be buried on site.

SANITARY WASTE

- A licensed sanitary waste management contractor shall collect all sanitary waste from portable units that will be maintained on a regular basis from any site that cannot provide other means of sanitary waste disposal.

GOOD HOUSEKEEPING

AIR EMISSIONS:

BURNING

- Any burning on the site requires a permit from the Missouri Department of Natural Resources. Call the Northeast Regional office at 660-385-8000.

DUST CONTROL

- The contractor is required by Missouri State law to control dust from the site.
- Watering must be provided in unstabilized areas and mulch applied as soon as possible.

OTHER GOOD HOUSEKEEPING PRACTICES:

- Whenever possible, all of a product will be used up before disposing of the container in accordance with Missouri State law.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site manager shall inspect materials daily to ensure proper use, storage, and disposal.
- All paint containers will be tightly sealed and stored when not required for use. Excess paint will not be dumped into the stormwater system, but will be properly disposed of according to Missouri State law.

SPILL CONTROLS:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- If the permittee or an authorized representative has knowledge of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into stormwater, the storm drain system, or water of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release.
- The permittee or authorized representative is required to notify emergency response agencies of the occurrence via emergency dispatch services and the MDNR Environmental Emergency Response in accordance with 40 CFR 117 and CFR 302 as soon as they have knowledge of the discharge of any hazardous substance or petroleum product in excess of the reportable quantity.
- The applicant shall notify by telephone and in writing the Department of Natural Resources, water Pollution Control Program, Post Office Box 176, Jefferson City, MO 65102, 1-800-361-4827, of any oil spills or if hazardous substances are found during the prosecution of work under this permit.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one.

SAMPLING REQUIREMENTS:

- There are no sampling requirements required as a part of this plan.

LOG OF CHANGES TO THE SWPPP

Document changes to the SWPPP here. These should include additions of new BMPs, replacement of failed BMPs, changes in construction activities and times, changes in personnel, inspection, and maintenance procedures, and updates to the site map.

UPDATE	DATE

SCHEDULING

PHYSICAL DESCRIPTION

This BMP involves developing, a schedule that includes sequencing of construction activities with the implementation of construction site BMPs such as temporary soil stabilization (erosion control) and temporary sediment control measures for every project. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

APPROPRIATE APPLICATIONS:

Construction sequencing shall be scheduled to minimize land disturbance for all projects at all times.

CONDITIONS FOR EFFECTIVE USE:

All land disturbing activities.

WHEN BMP IS TO BE INSTALLED:

Scheduling should take place during the planning stages and be modified throughout the duration of the project.

STANDARDS AND SPECIFICATIONS:

Developing a schedule and planning the project are the very first steps in an effective storm water program. The construction schedule shall be incorporated into the SWPPP. Develop the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, pouring foundations, installing utilities, etc., to minimize the active construction area during the rainy season. Schedule major grading operations for the non-rainy season when practical. Incorporate staged seeding and re-vegetation of graded slopes as work progresses. Consider the appropriate planting time for specified vegetation when establishing permanent vegetation.

OPERATION AND MAINTENANCE PROCEDURES:

Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions. Amend the schedule when changes are warranted.

CHECK DAMS

PHYSICAL DESCRIPTION

Check dams reduce scour and channel erosion by reducing flow velocity and encouraging sediment settlement. A check dam is a small device constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary product placed across a natural or man-made channel or drainage ditch.

APPROPRIATE APPLICATIONS:

Check dams can be placed at intervals along drainage swales or channels. The top of the downstream check dam should be level with the base of the upstream check dam. Check dams can also be used during the establishment of grass linings in drainage ditches or channels or in temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings. Not to be used in streams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Moderate concentrated flow.

WHEN BMP IS TO BE INSTALLED:

Check dams can be installed prior to disturbance of natural vegetation in the contributing drainage area or immediately after construction of a drainage way.

STANDARDS AND SPECIFICATIONS:

Check dams should be placed at a distance and height to allow small pools to form behind them. Install the first check dam approximately 16 feet from the outfall device and at regular intervals based on slope gradient and soil type. For multiple check dam installation, backwater from the downstream check dam should reach the toe of the upstream dam. High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding.

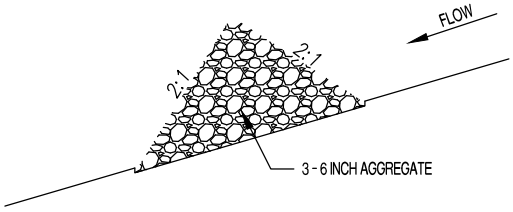
OPERATION AND MAINTENANCE PROCEDURES:

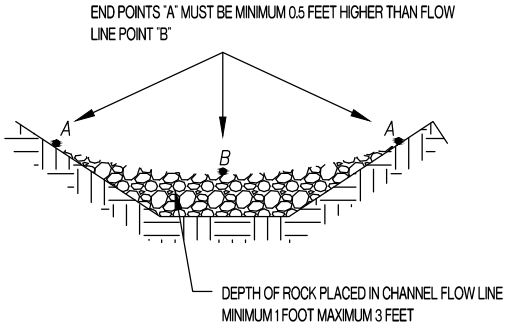
Inspect at least every week and after every storm. Remove trash and leaf accumulation. Remove sediment when depth reaches one-half of the check dam height. Repair/restore dam structure, if necessary, to original configuration to protect the banks.

SITE CONDITIONS FOR REMOVAL:

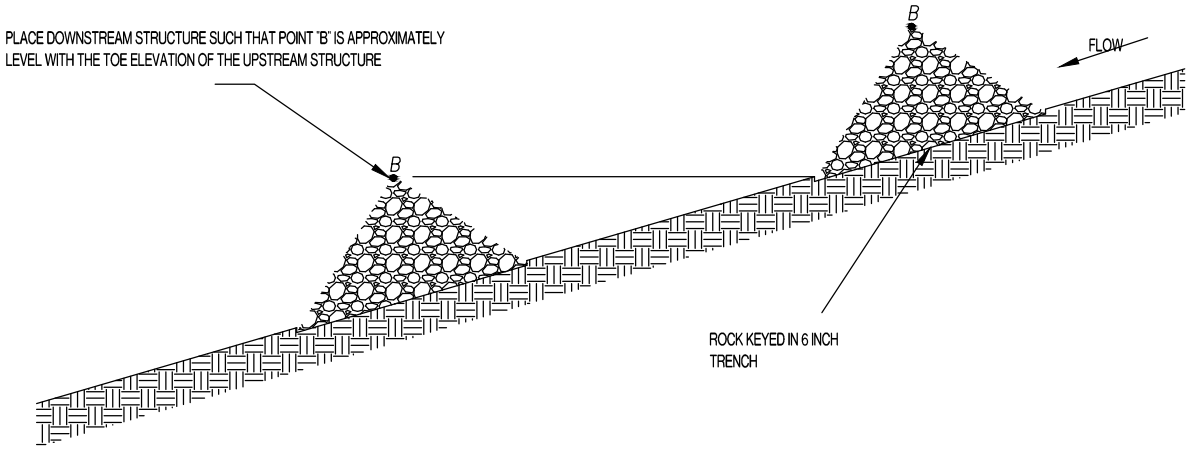
Remove after contributing areas have been adequately stabilized and vegetation is adequately established in drainage way. Regrade and vegetate the area.

CHECK DAMS





FRONT VIEW



SIDE VIEW

NOTE:

ROCK CHECK DAMS SHALL BE USED ONLY FOR DRAINAGE AREAS LESS THAT 10 ACRES UNLESS APPROVED BY THE ENGINEER.

SITE/CIVIL ENGINEER:

CROCKETT
ENGINEERING CONSULTANTS
2608 North Stadium Boulevard
Columbia, Missouri 65202
(573) 447-0292

www.crockettengineering.com

Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151304

CONSTRUCTION ENTRANCE/EXIT

PHYSICAL DESCRIPTION

A stabilized entrance to a construction site which 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 travel along the stabilized entrance.

APPROPRIATE APPLICATIONS:

At locations where it is safe for construction vehicles and equipment to access existing streets, preferably at the location of future streets or drives.

CONDITIONS FOR EFFECTIVE USE:

Site conditions will dictate design and need. Ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL 6˝ below surface of entrance.

WHEN BMP IS TO BE INSTALLED:

Install stabilized construction entrance/exit prior to vehicles or equipment accessing unpaved areas. This will most likely the first BMP to be installed on the site.

STANDARDS AND SPECIFICATIONS:

Limit the points of entrance/exit to the construction site. 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. Place fabric and cover with aggregate, forming a diversion across the entrance, if needed, to direct runoff away from the roadway. Require all employees, subcontractors, and suppliers to utilize the stabilized construction access.

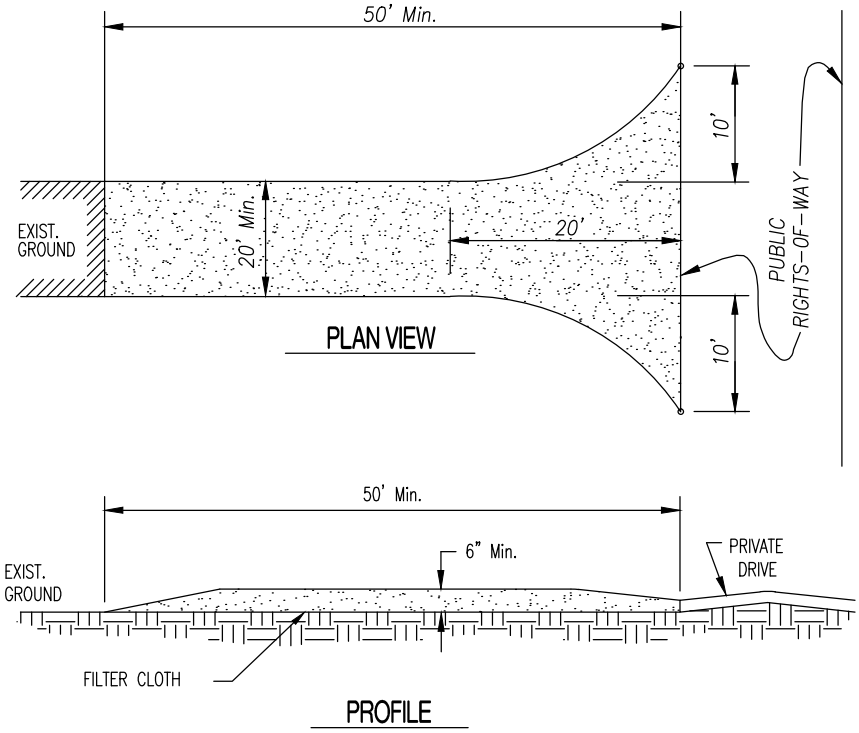
OPERATION AND MAINTENANCE PROCEDURES:

Inspect routinely for damage and assess effectiveness of the BMP. Remove sediment and clods of dirt from construction entrance continuously. Replace rock, as necessary, to maintain a clean surface for traffic. Repair any areas that have settled. Keep all temporary roadway ditches clear. Immediately remove any mud or debris tracked onto paved surfaces.

SITE CONDITIONS FOR REMOVAL:

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

CONSTRUCTION ENTRANCE/EXIT



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" STONE.
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 3:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. PERIODIC INSPECTION AS NEEDED MAINTENANCE SHALL BE PROVIDED WEEKLY AND AFTER EACH RAIN EVENT GREATER THAN 1/2".

SITE/CIVIL ENGINEER:

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CURB AND GUTTER INLET PROTECTION

PHYSICAL DESCRIPTION

A temporary sediment control barrier consisting of a filter media, such as compost filter socks, gravel and mesh, sandbags, gravel bags, etc., around a curb and gutter inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding may occur during and after rainfall events.

APPROPRIATE APPLICATIONS:

Place protection at inlets where runoff may contain sediment-laden water.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Contributing Area: Maximum of 1 acre.

WHEN BMP IS TO BE INSTALLED:

Install inlet protection immediately after installation of the inlet, or prior to land disturbing activities beginning on the contributing upstream area to the inlet.

STANDARDS AND SPECIFICATIONS:

Typical types of curb and gutter inlet protection include: fabricated inlet filters (follow manufacturer´s instructions), compost filter sock (make sure that both ends of the sock are anchored accordingly), gravel and wire mesh (construct and anchor wood frame, fasten wire mesh and fabric to frame and place the gravel on top of the entire structure), sandbags and 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). Incorporate an overflow bypass into the inlet protection structure in areas, such as heavy traffic streets, where excessive ponding of water around the inlet may become a safety issue. Sediment controls behind the curb will be necessary to prevent the discharge of sediment in these bypasses.

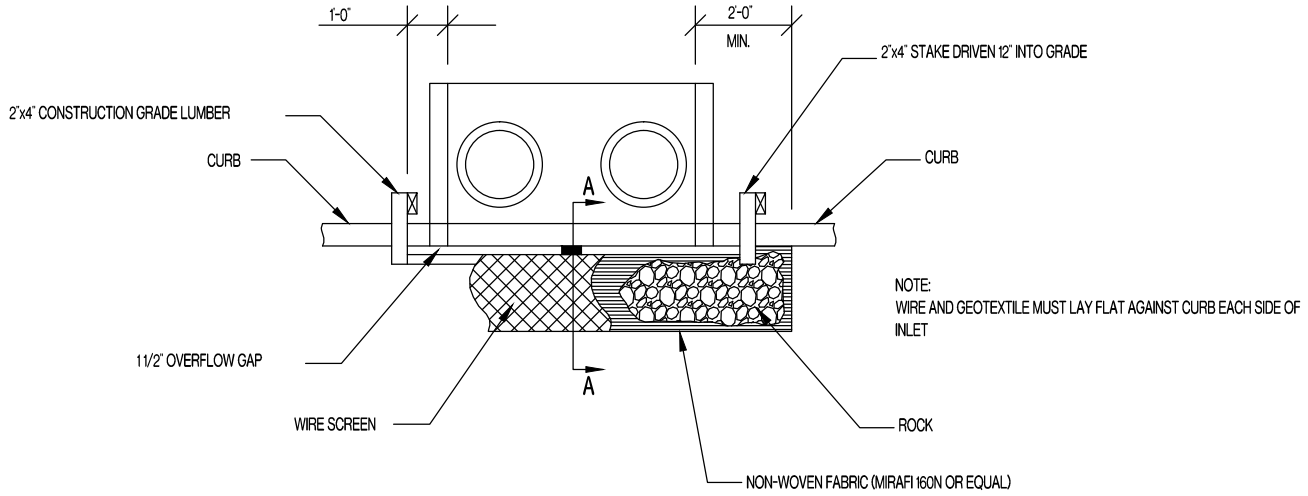
OPERATION AND MAINTENANCE PROCEDURES:

Inspect inlet protection of all media types weekly and after each ½˝ rainfall event to make sure they are functioning properly. Remove trash and debris. Remove sediment from the inlet protection when half of the protection structure height has been filled. Repair elements to original configuration as needed.

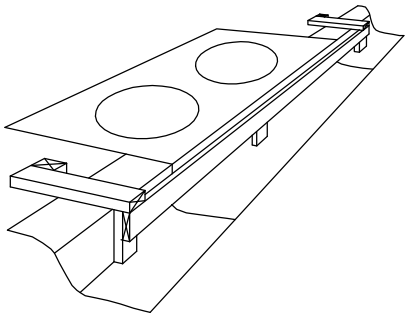
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

CURB AND GUTTER INLET PROTECTION

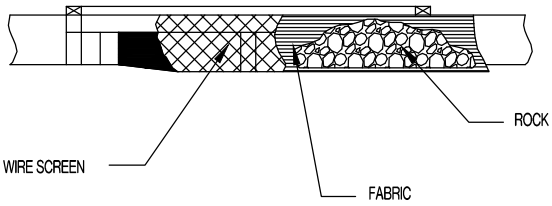


PLAN

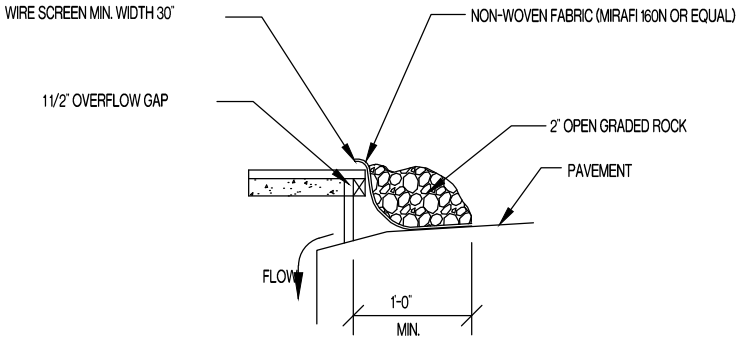


WOODEN FRAME ON VERTICAL CURB

NOTE: ALTERNATIVELY, ROCK CAN BE PLACED IN A FILTER FABRIC BAG (SIMILAR TO SANDBAG) AND PLACED IN THE OPENING WITHOUT THE WOODEN FRAME.



ELEVATION



SECTION A-A

SITE/CIVIL ENGINEER:
CROCKETT
ENGINEERING CONSULTANTS
2608 North Stadium Boulevard
Columbia, Missouri 65202
(573) 447-0292
www.crockettengineering.com
Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151304

DROP INLET PROTECTION

PHYSICAL DESCRIPTION

A temporary sediment control barrier consisting of a filter fabric around a recessed area inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding may occur during and after rainfall events.

APPROPRIATE APPLICATIONS:

At recessed area or yard inlets where runoff may contain sediment-laden water.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Contributing Area: Maximum of 1 acre.

WHEN BMP IS TO BE INSTALLED:

Place inlet protection immediately after installation of the inlet, or prior to land disturbing activities beginning on the contributing upstream area to the inlet.

STANDARDS AND SPECIFICATIONS:

Typical types of drop inlet protection include: manufactured filtering product or silt fence frames. Follow the manufacture´s instruction for placement of proprietary products. For the silt fence protection, install a wood frame, dig a trench around the inlet for fabric to be buried, fasten fabric tightly to frame, backfill and compact trench. Alternatively, a sod filter can be installed by preparing and fertilizing the soil around the inlet and installing sod for a distance of at least 4 feet in each direction. The sod should be staked, stapled and/or netted at the corners and center of sod strips as required and then watered immediately. For safety, inlet protection structures which pond water onto streets, parking lots or driveways should be designed to have some method for allowing excess water from large storms to bypass or overflow.

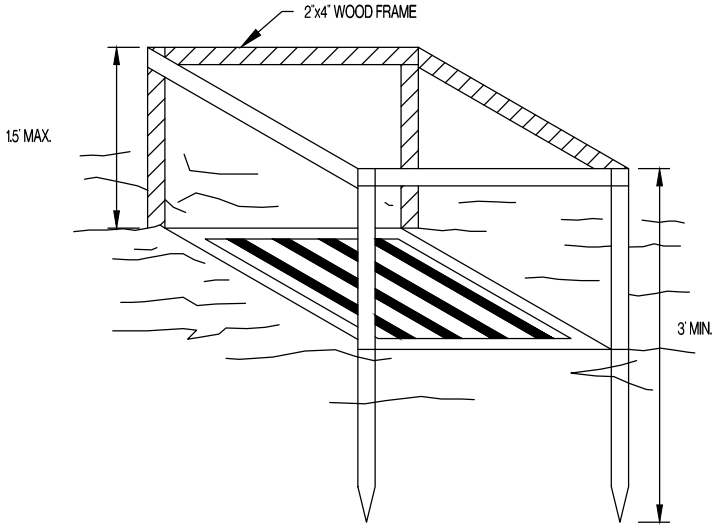
OPERATION AND MAINTENANCE PROCEDURES:

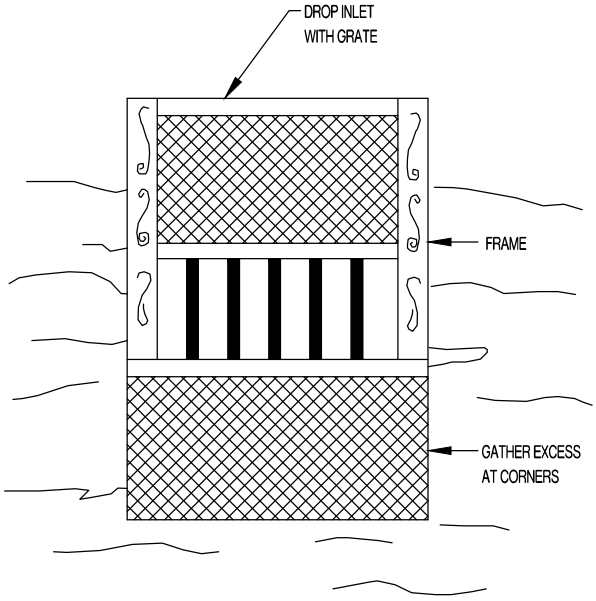
Inspect inlet protection of all media types weekly and after each significant rainfall event to make sure they are functioning properly. Remove trash and debris. Remove sediment from the inlet protection when half of the protection structure height has been filled. Repair elements to original configuration as needed.

SITE CONDITIONS FOR REMOVAL:

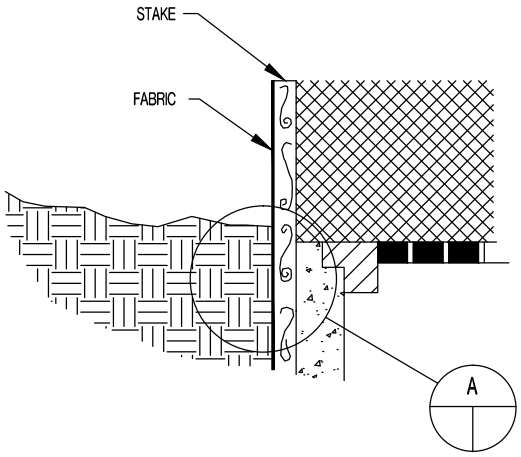
Remove after contributing drainage areas have been adequately stabilized.

DROP INLET PROTECTION

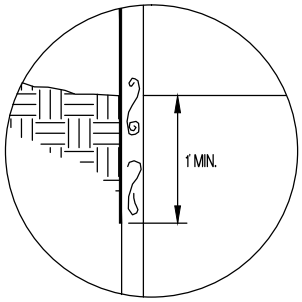




PERSPECTIVE VIEWS
NOT TO SCALE



ELEVATION OF STAKE AND
FABRIC ORIENTATION



DETAIL A
NOT TO SCALE

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DUST (WIND EROSION) CONTROL

PHYSICAL DESCRIPTION

Wind erosion control consists of applying water and/or other dust palliatives as necessary to prevent or alleviate erosion by the forces of wind. Alternatives to applying water or other dust palliatives include mulch or vegetative cover, wind barriers, and minimization of soil disturbance.

APPROPRIATE APPLICATIONS:

This practice is implemented on all exposed soils subject to wind erosion.

CONDITIONS FOR EFFECTIVE USE:

Effectiveness depends on soil, temperature, slope, aspect, humidity and wind velocity.

WHEN BMP IS TO BE INSTALLED:

Dust control should be performed routinely, especially in advance of and during periods of dry weather.

STANDARDS AND SPECIFICATIONS:

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. Phase work to the extent practical to minimize concurrent areas of soil disturbance. For areas not subjected to traffic, vegetation provides the most practical method of dust control and should be established as early as possible. Wind barriers such as solid board fences, snow fences, burlap fences, crate walls, and similar materials can be used to control air currents and blowing soil. Barriers placed at right angles to prevailing wind currents at intervals of about 10 times their height are effective in controlling soil blowing. Paved areas that have soil on them from construction sites should be cleaned regularly. Mulching offers a fast and effective means of controlling dust when properly applied. Binders and tackifiers may need to be used on organic mulches. NOTE: If calcium chloride or spray-on adhesives are used for dust control, a permit may be required from MoDNR.

OPERATION AND MAINTENANCE PROCEDURES:

Check areas that have been protected to ensure coverage.

SITE CONDITIONS FOR REMOVAL:

Dust control should be implemented when soils are exposed until cover is established

NON-SEDIMENT POLLUTION CONTROL

PHYSICAL DESCRIPTION

These control measures are designed to prohibit chemicals, hazardous materials, solid waste, human waste and construction debris from polluting stormwater. Pollutants carried in solution or as surface films on runoff will be carried through most erosion control and sediment capture BMPs. Keeping substances like fuel, oil, asphalt, paint, solvents, fertilizer, soil additives, concrete wash water, solid waste, human waste and construction debris from polluting runoff can be accomplished to a large extent through good housekeeping on the site and following the manufacturer´s recommendations for disposal.

APPROPRIATE APPLICATIONS:

Temporary sanitary facilities, collection, storage and fueling areas should be located onsite in an area that does not receive a substantial amount of runoff from upland areas and does not drain directly to lakes, creeks, streams, rivers, sewers, groundwater, wetlands, or road ditches.

CONDITIONS FOR EFFECTIVE USE:

An effective management system requires training and signage to promote proper storage, handling and disposal of materials, and follow up observations of actions and inspection of storage areas by management. Plans should contain notes clearly stating requirements for addressing potential pollutants.

WHEN BMP IS TO BE INSTALLED:

Pollution control practices should begin immediately and continue throughout the project.

STANDARDS AND SPECIFICATIONS:

Place waste receptacles near area of work. All fueling facilities 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 cleanup on site. Provide sufficient temporary toilet facilities to serve the number of workers on the site.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect activities on a regular basis. Inspect storage areas and control devices at least every week and after every storm. Maintenance of temporary toilet facilities should be frequent and thorough. Make necessary corrections and repairs.

SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

NON-SEDIMENT POLLUTION CONTROL

STANDARD NOTES:

General pollution notes:

1. Handling and disposal of hazardous materials:

DO: Prevent spills
Use up products completely
Follow label directions for disposal
Remove lids from empty bottles and cans when disposing in trash
Recycle wastes whenever possible

DON´T: Don´t pour waste into sewers or waterways on the ground
Don´t pour waste down the sink, floor drain or septic tanks
Don´t bury chemicals or containers, or dispose of them with other waste
Don´t burn chemicals or containers
Don´t mix chemicals together

2. Containers shall be provided for collection of all waste material including construction debris, trash, petroleum products and any hazardous materials to be used onsite. All waste material shall be disposed of at facilities approved for that material.

3. No waste materials shall be buried on-site.

4. Mixing, pumping, transferring or otherwise handling construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.

5. Equipment fueling and maintenance, oil changing, etc., shall be performed only in an area designated for that purpose. The designated area is equipped for recycling oil and catching spills.

6. Concrete wash water shall not be allowed to flow directly to storm sewers, streams, ditches, lakes, etc without being treated. A sump or pit shall be constructed to contain concrete wash water.

NON-SEDIMENT POLLUTION CONTROL

7. All paint, solvents, petroleum products and petroleum waste products, and storage containers (such as drums, cans, or cartons) shall be stored according to BMPs. The materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers. All containers shall be inspected for leaks or spillage during the once per week inspection of BMPs. If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto soil, the soil shall be dug up and properly disposed of. Spills on pavement shall be absorbed with sawdust, kitty litter or product designed for that purpose and disposed of at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. These materials will be removed from the site and recycled or disposed of in accordance with MoDNR requirements.

8. State law requires the party responsible for a petroleum product spill in excess of 50 gallons to report the spill to MoDNR (537-634-2436) as soon as practical after discovery. Federal law requires the responsible party to report any release of oil if it reaches or threatens a sewer, lake, creek, stream, river, groundwater, wetland, or area, like a road ditch, that drains into one of the above.

9. Sufficient temporary toilet facilities to serve the number of workers on the site shall be provided. The facilities shall be serviced frequently to maintain a sanitary condition.

SEEDING/MULCHING

PHYSICAL DESCRIPTION

Establishment of vegetation by spreading grass seed designed to protect exposed soil from erosion by eliminating direct impact of precipitation and slowing overland flow rates. Once established, the vegetative cover will also filter pollutants from the runoff.

APPROPRIATE APPLICATIONS:

Exposed soil after a phase of rough or finish grading has been completed, or areas where no activity will occur for 14 days.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow (additional stabilization is necessary).

Minimum Rates: Permanent seeding should consist of 90% tall fescue and 10% annual ryegrass. Seed mixture should be applied at 400 pounds/acre. Temporary seeding shall consist of any combination of tall fescue, annual ryegrass, millet, wheat or oats. Seed mixture should be applied at 200 pounds/acre. Dormant season seeding, seed mix should consist of 80% tall fescue, 10% annual ryegrass and 10% spring oats. Seed mixture is to be applied at 600 pounds/acre.

Acceptable Dates: Permanent seeding may be done March 1 to June 1 and August 15 to November 1. Temporary seeding can occur during any season, however winter is the least tolerant. Dormant season seeding includes December 15 to February 29.

WHEN BMP IS TO BE INSTALLED:

Seed and mulch should be applied immediately after rough or finished grading is completed.

STANDARDS AND SPECIFICATIONS:

Install upstream BMPs to prevent erosion and protect the area to be seeded. Complete grading and remove all debris larger than 1 inch. Loosen compacted soils to a depth of 4 inches. Groove or furrow on the contour if necessary. Spread loose topsoil at a depth of 4 inches.

Soil amendments should be applied per soil tests. When these are not available, lime shall be applied at the rate of 1500 pounds effective neutralizing material per acre. Soils with a pH of six or higher need not be limed. When soil tests are not available, a 13-13-13 grade fertilizer shall be appled at a rate of 500 pounds/acre for permanent seeding and a 10-10-10 grade fertilizer shall be applied at the rate of 200 pounds/acre. Mix soil amendments (lime, fertilizer, etc.) into the top 4 inches of soil.

SEEDING/MULCHING

Plant seed ¼ to ½ inches deep using a cyclone seeder, drill, cultipacker seeder, or hydro-seeder. Roll lightly to firm surface. Cover seeded area with mulch. Install additional stabilization (erosion control blankets, netting, bonded fiber matrix, etc.) on slopes steeper than 3:1 and in areas of concentrated flow. Water seeded area immediately. Provide enough water to soak 4 inches into the soil without causing runoff.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least weekly and after every storm. 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 and stabilize 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.

SILT FENCE

PHYSICAL DESCRIPTION

A silt fence is a length of filter fabric stretched between anchoring posts spaced at regular intervals along the site at low/downslope areas. The filter fabric should be entrenched in the ground at least 6˝. When installed correctly and inspected frequently, silt fences encourages the ponding of runoff and can be an effective barrier to sediment leaving the site.

APPROPRIATE APPLICATIONS:

Installed along slopes, at base of slopes, and around the perimeter of a site as a final barrier to sediment being carried off site. Silt fence should not be used in areas of concentrated flow or as check dams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow only

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length.

Slope Length: The slope length above the fence should not exceed 100 feet.

WHEN BMP IS TO BE INSTALLED:

Silt fence should be installed prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

If a standard-strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This increases the effective life of the fence. The maximum life expectancy for synthetic fabric silt fences is about 6 months, depending on the amount of rainfall and runoff. The fence should be designed to withstand the runoff from a 10-year peak storm event. Generally, drive posts for fence line, dig trench to required dimensions in front of posts for fabric burial, attach wire mesh to posts (if necessary), attach fabric to posts-allowing required length below ground level to run fabric along bottom of trench, and backfill and compact soil in trench to protect and anchor fabric. Alternate (and actually preferred) construction procedures include installing the fence by slicing it into the ground with specialized equipment.

OPERATION AND MAINTENANCE PROCEDURES:

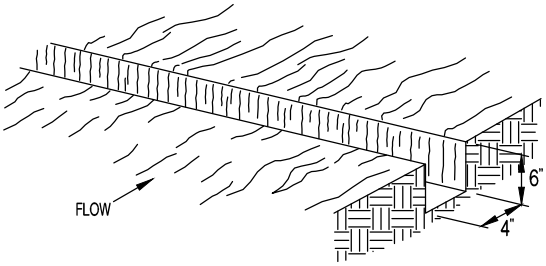
Inspect at least every week and after every storm. Monitor and remove sediment buildup that is deeper than ½ the fence height. Replace torn/clogged fabric; repair loose fabric. Repair unstable or broken posts. Stabilize any areas susceptible to undermining. Add additional fencing if necessary to provide adequate protection.

SITE CONDITIONS FOR REMOVAL:

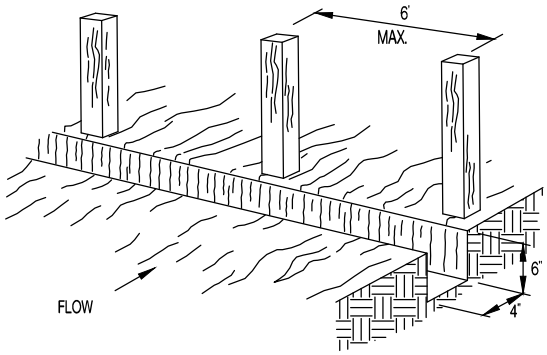
After permanent vegetation of slope is established, remove fence, regrade trench area and vegetate.

SILT FENCE

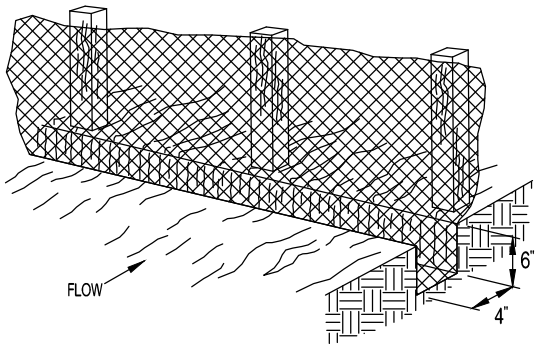
1. EXCAVATE A 6"x4" TRENCH



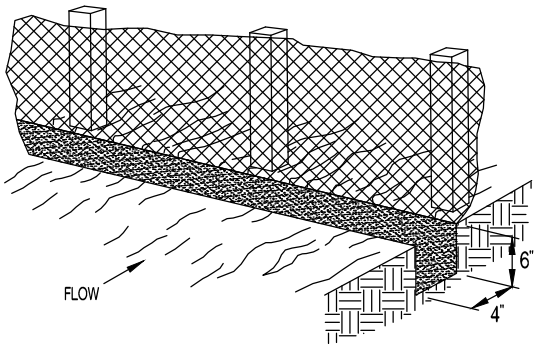
2. SET THE STAKES ALONG THE DOWN SLOPE SIDE OF THE TRENCH.



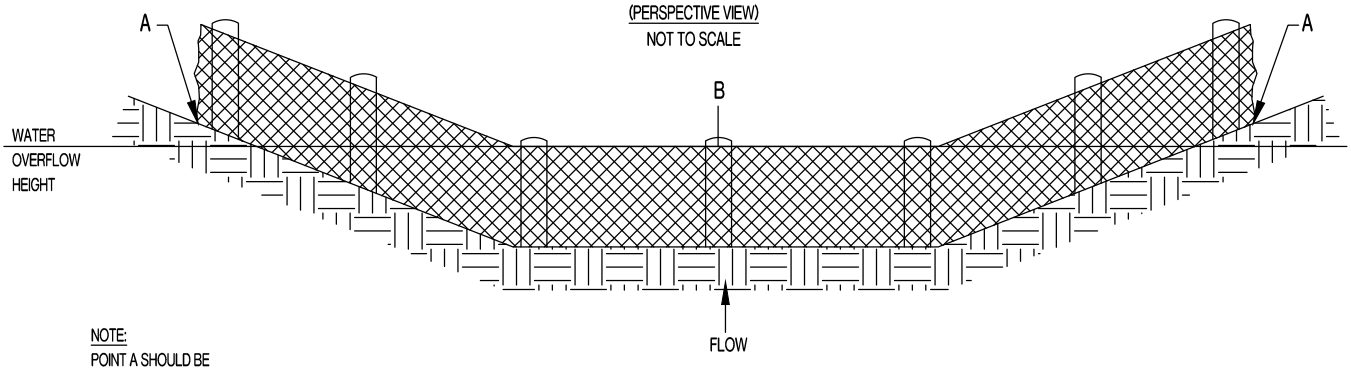
3. STAPLE GEOTEXTILE MATERIAL TO STAKES AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.



4. BACK FILL AND COMPACT THE EXCAVATED SOIL OVER THE GEOTEXTILE IN THE TRENCH.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)
NOT TO SCALE



NOTE:
POINT A SHOULD BE HIGHER THAN POINT B.

DRAINAGE WAY INSTALLATION
(FRONT ELEVATION)
NOT TO SCALE

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SILT FENCE

SILT FENCE NOTES:

A) INSTALLATION

1. THE HEIGHT OF SILT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE THE GROUND SURFACE.
2. THE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SECURELY SPLICED TOGETHER ONLY AT SUPPORT POSTS, WITH A MAX 6 INCH OVERLAP.
3. DIG A TRENCH AT LEAST 6 INCHES DEEP AND 4 INCHES WIDE ALONG THE TRENCH ALIGNMENT.
4. DRIVE POSTS AT LEAST 24 INCHES INTO THE GROUND ON THE DOWNSLOPE SIDE OF THE TRENCH. SPACE POSTS A MAXIMUM OF 6 FEET APART.
5. THE SEDIMENT FABRIC SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING A MINIMUM OF ONE INCH LONG, HEAVY-DUTY WIRE STAPLES OR TIE-WIRES, AND EIGHT INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE THE BOTTOM 1 FOOT OF FABRIC IN THE MINIMUM-OF-6-INCH DEEP TRENCH, LAPPING TOWARD THE UPSLOPE SIDE. BACK FILL WITH COMPACTED EARTH OR GRAVEL.
7. IF A SILT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE, PLACED ON A CONTOUR, WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH SEDIMENT FABRIC SHALL BE USED WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
8. TO REDUCE MAINTENANCE, EXCAVATE A SHALLOW SEDIMENT STORAGE AREA IN THE UPSLOPE SIDE OF THE FENCE. PROVIDE GOOD ACCESS IN AREA OF HEAVY SEDIMENTATION FOR CLEAN OUT AND MAINTENANCE.
9. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
10. INSTALLATION WITH SLICING METHOD IS PREFERRED.

B) TROUBLESHOOTING:

1. DETERMINE THE EXACT LOCATION OF UNDERGROUND UTILITIES, BEFORE FENCE INSTALLATION SO UTILITIES ARE NOT DISTURBED.
2. GRADE ALIGNMENT OF FENCE NEEDED TO PROVIDE A BROAD, NEARLY LEVEL AREA UPSTREAM OF FENCE TO ALLOW SEDIMENT COLLECTION AREA.

C) INSPECTION MAINTENANCE:

1. INSPECT SILT FENCES AT LEAST ONCE A WEEK AND AFTER EACH 1/2" OF RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY AND COMPLETELY STABILIZED.

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SODDING

PHYSICAL DESCRIPTION

Sod consists of a ¾ inch to 1 inch mat of vigorous turf, free from disease, insects and weeds. Sod prevents raindrops from disrupting the soil structure and causing erosion. Sod slows water runoff and acts as a filter when sediment laden runoff crosses over the sodded area.

APPROPRIATE APPLICATIONS:

Typically installed in areas requiring immediate erosion protection, such as swales or detention ponds and as filter strips, around inlets, and adjacent to curbs. Also installed in areas requiring immediate aesthetic appearance or function such as entrances to new subdivisions and off site construction areas.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and low concentrated flows with velocities less than 5 fps.

WHEN BMP IS TO BE INSTALLED:

Sod should be installed immediately after finish grading, installation of area inlets, and installation of underground services and foundations of new homes.

STANDARDS AND SPECIFICATIONS:

Rough grade area and remove all debris larger than ½ inch in diameter and concentrated areas of smaller debris. Soil preparation of area to be sodded shall be determined by tests to determine lime and fertilizer requirements. Scarify soil and level to provide an even grade. Soil should not be excessively wet or dry. Lay first row of sod perpendicular to the slope or direction of flow. Butt subsequent rows tight against previous rows with strips staggered in 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 areas of concentrated flow. Water should be applied immediately after installation of sod. Provide enough to soak 4 inches into the soil without causing runoff.

OPERATION AND MAINTENANCE PROCEDURES:

Water sod daily for 3 weeks, enough to soak 4 inches into the soil without causing runoff. Reposition areas of sod that have moved along the slope. Remove sediment accumulations, replace sod if necessary. Repair any eroded areas, replace sod, and stabilize as needed. Do not mow until 3 inches of new growth occurs. During the first 4 months, mow no more than 1/3 the grass height.

STRAW BALE DIKE

PHYSICAL DESCRIPTION

A straw bale dike consists of a series of straw (or hay) bales butted firmly end to end and anchored in place with stakes placed along the low/downslope areas of a site. The straw bales should be entrenched in the ground. When installed correctly and inspected frequently, straw bale dikes encourage the ponding of runoff and can be an effective barrier to prevent sediment from leaving the site in stormwater runoff.

APPROPRIATE APPLICATIONS:

Installed along slopes, at base of slopes, and around the perimeter of a site as a final barrier to sediment being carried off site. Straw bale dikes should not be used in areas of significant concentrated flow as check dams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and minimal concentrated flow.

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length. For minor swales where the dike will serve as a ditch check, the drainage area shall not exceed 2 acres.

Slope Length: The slope length above the fence should not exceed 100 feet. Reduce this as the area above the dike steepens.

WHEN BMP IS TO BE INSTALLED:

Straw bale dikes should be installed prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

The maximum life expectancy for straw bale dikes is about 3 months, depending on the amount of rainfall and runoff. The dike should be designed to withstand the runoff from a 10-year peak storm event. The dike should be installed on level ground at least 10 feet from the toe of the slope. Excavate a trench at least 4″ deep and a bale width wide and long enough that the end bales are upslope of the sediment pool. Anchor bales by driving two 36″ long 2″x2″ hardwood stakes through each bale until nearly flush with the top. Drive the first stake toward the previously laid bale to force the bales together. Wedge loose straw into any gaps between the bales. Backfill and compact the excavated soil against the bales to ground level on the downslope side and to 4″ above ground level on the upslope side.

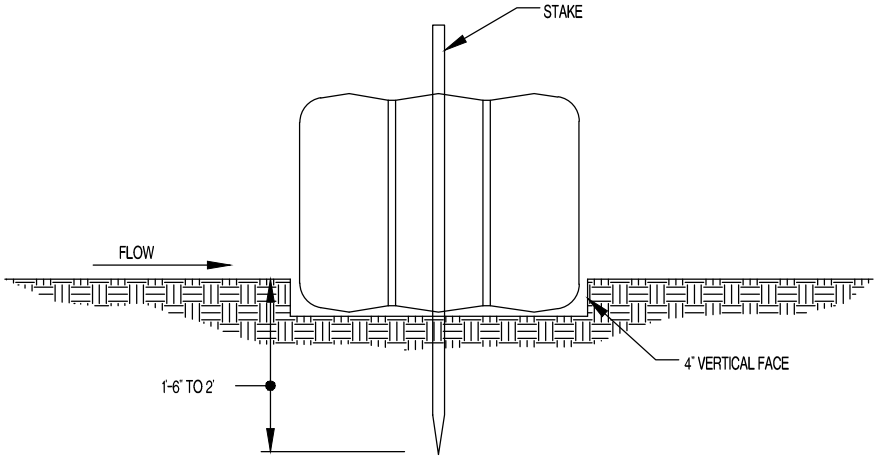
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment buildup that is deeper than ½ the dike height. Replace deteriorated or damaged bales. Repair unstable or broken stakes. Stabilize any areas susceptible to undermining. Add additional bales if necessary to provide adequate protection.

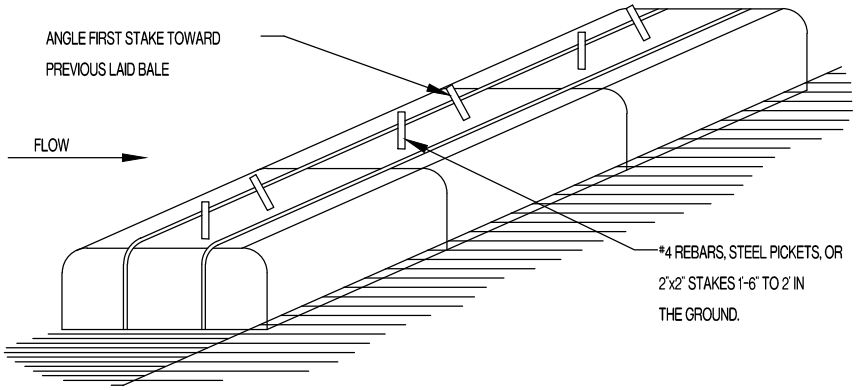
SITE CONDITIONS FOR REMOVAL:

After permanent vegetation of slope is established, remove the dike, regrade trench area and vegetate.

STRAW BALE DIKE



EMBEDDING DETAIL



ANCHORING DETAIL

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE AT LEAST ONCE A WEEK AND AFTER EACH 1/2" RAIN. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY.
5. BALES SHALL BE REMOVED BY THE OWNER WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

SITE/CIVIL ENGINEER:
CROCKETT
ENGINEERING CONSULTANTS
2608 North Stadium Boulevard
Columbia, Missouri 65202
(573) 447-0292

www.crockettengineering.com

Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151304

WASHDOWN STATION

PHYSICAL DESCRIPTION

An area located at stabilized construction access points to remove sediment from tires and undercarriages, and to prevent sediment from being transported onto public roadways.

APPROPRIATE APPLICATIONS:

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

CONDITIONS FOR EFFECTIVE USE:

A downstream sediment trapping BMP is needed to treat dirty runoff from the washdown station. These stations require a supply of wash water and a turnout or doublewide exit to avoid having entering vehicles drive through the wash area.

WHEN BMP IS TO BE INSTALLED:

Washdown stations should be installed along with the stabilized construction entrance/exit, prior to vehicles or equipment accessing unpaved areas.

STANDARDS AND SPECIFICATIONS:

Grade and compact area for drainage under washdown pad. Install wash rack, which should be designed and constructed/manufactured for anticipated traffic loads. Provide a drainage ditch, grade that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff. Install water supply and hose. Post signs in advance of the station indicating that all muddy vehicles and equipment must use the station prior to exiting the site.

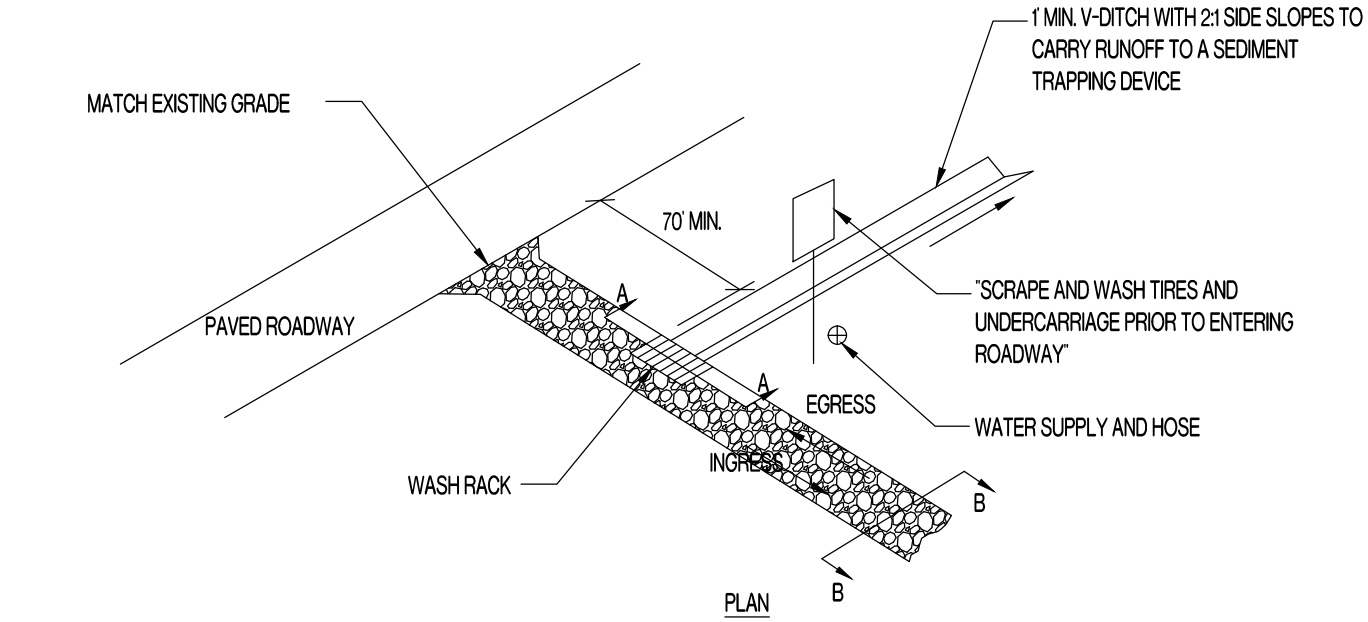
OPERATION AND MAINTENANCE PROCEDURES:

Remove accumulated sediment in wash rack and/or sediment trap on a daily basis or as needed to maintain system performance. Repair any areas that have settled. Replace rock if necessary to maintain a clean surface.

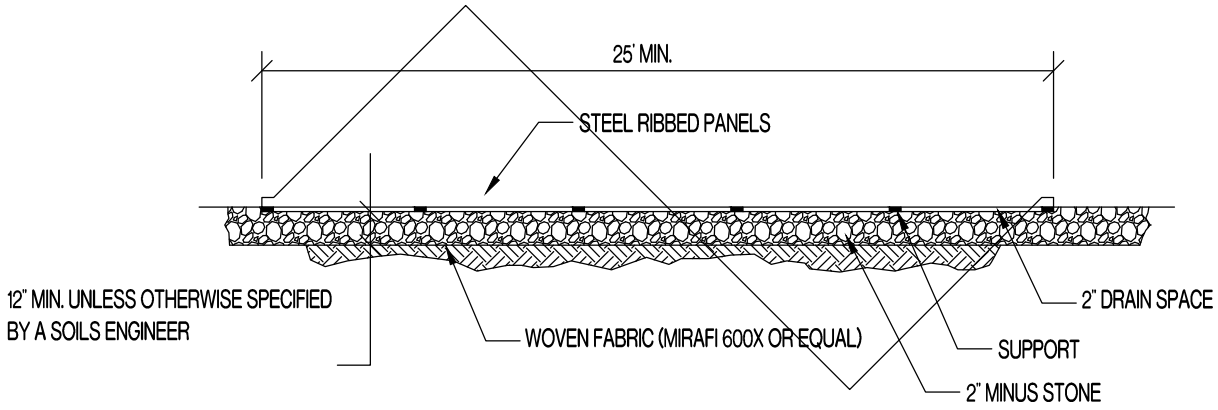
SITE CONDITIONS FOR REMOVAL:

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

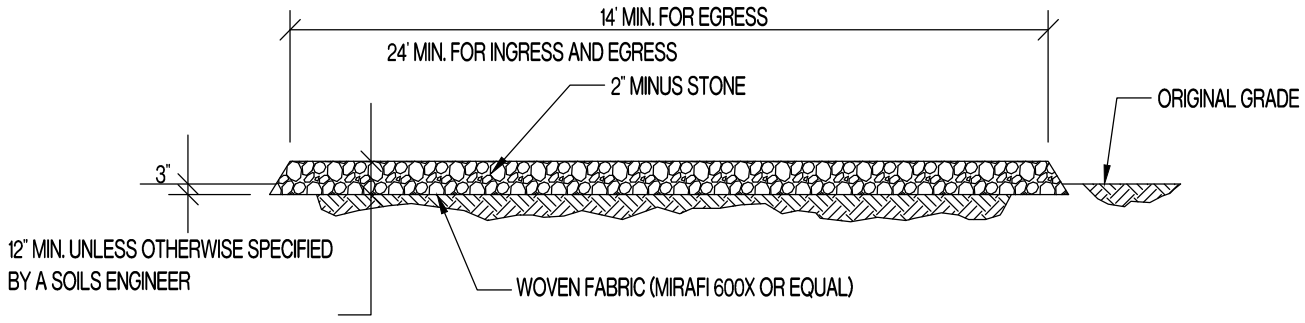
WASHDOWN STATION



PLAN



SECTION A-A



SECTION B-B

SITE/CIVIL ENGINEER:

CROCKETT

ENGINEERING CONSULTANTS
2608 North Stadium Boulevard
Columbia, Missouri 65202
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STORMWATER CONSTRUCTION SITE INSPECTION REPORT

GENERAL INFORMATION

Project Name:	
Location:	
Date of Inspection:	Start/End Time:
Inspector´s Name:	
Inspector´s Title:	
Inspector´s Contact Information:	
Completed Boone County´s Inspector Training course for Construction Sites? ☐Yes ☐No	
Describe present phase of construction:	
Type of Inspection: ☐Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event	

WEATHER INFORMATION

Has there been a storm event since the last inspection? ☐Yes ☐No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):

Weather at time of this inspection?
☐Clear ☐Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐Snowing ☐High Winds
☐ Other: Temperature:

Have any discharges occurred since the last inspection? ☐Yes ☐No
If yes, describe:

Are there any discharges at the time of inspection? ☐Yes ☐No
If yes, describe:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Inspector/ Printed Name and Title Date

SITE-SPECIFIC BMPS

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	☐Yes ☐No	☐Yes ☐No	
2	☐Yes ☐No	☐Yes ☐No	
3	☐Yes ☐No	☐Yes ☐No	
4	☐Yes ☐No	☐Yes ☐No	
5	☐Yes ☐No	☐Yes ☐No	
6	☐Yes ☐No	☐Yes ☐No	
7	☐Yes ☐No	☐Yes ☐No	
8	☐Yes ☐No	☐Yes ☐No	
9	☐Yes ☐No	☐Yes ☐No	
10	☐Yes ☐No	☐Yes ☐No	
11	☐Yes ☐No	☐Yes ☐No	
12	☐Yes ☐No	☐Yes ☐No	
13	☐Yes ☐No	☐Yes ☐No	
14	☐Yes ☐No	☐Yes ☐No	
15	☐Yes ☐No	☐Yes ☐No	
16	☐Yes ☐No	☐Yes ☐No	
17	☐Yes ☐No	☐Yes ☐No	
18	☐Yes ☐No	☐Yes ☐No	
19	☐Yes ☐No	☐Yes ☐No	
20	☐Yes ☐No	☐Yes ☐No	

OVERALL SITE ISSUES

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1. All inactive slopes and disturbed areas have been stabilized.	☐Yes ☐No	☐Yes ☐No	
2. Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	☐Yes ☐No	☐Yes ☐No	

3. Are all sanitary waste recepti-cles placed in secondary con-tainment and free of leaks?	☐Yes ☐No	☐Yes ☐No	
4. Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	☐Yes ☐No	☐Yes ☐No	
5. Are discharge points and receiving waters free of any sediment deposits?	☐Yes ☐No	☐Yes ☐No	
6. Are storm drain inlets properly protected?	☐Yes ☐No	☐Yes ☐No	
7. Is the construction exit preventing sediment from being tracked into the street?	☐Yes ☐No	☐Yes ☐No	
8. Is trash/litter from work areas collected and placed in covered dumpsters?	☐Yes ☐No	☐Yes ☐No	
9. Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	☐Yes ☐No	☐Yes ☐No	
10. Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	☐Yes ☐No	☐Yes ☐No	
11. Are materials that are potential stormwater contaminants stored inside or under cover?	☐Yes ☐No	☐Yes ☐No	
12. Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐Yes ☐No	☐Yes ☐No	
13. (Other)	☐Yes ☐No	☐Yes ☐No	

NON-COMPLIANCE

Describe any incidents of non-compliance not described above: