

CONSTRUCTION ROAD

PHYSICAL DESCRIPTION - A stabilized pathway providing vehicular access to a remote construction area designed to reduce rutting, tracking of mud in wet weather, and creation of dust in dry weather. The "roadway" can be constructed of aggregate over fabric, asphaltic concrete or Portland cement concrete based on the longevity of the project, required performance, and site conditions. Roadways should follow the natural terrain to the extent possible.

WHERE BMP IS TO BE INSTALLED - On long travel paths on unpaved areas, adjacent to bodies of water, and in areas where poor soil is encountered.

CONDITIONS FOR EFFECTIVE USE OF BMP

Drainage: Road ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL 6" below surface of road.

WHEN BMP IS TO BE INSTALLED - First order of work, prior to vehicles or equipment accessing remote areas.

INSTALLATION / CONSTRUCTION PROCEDURES

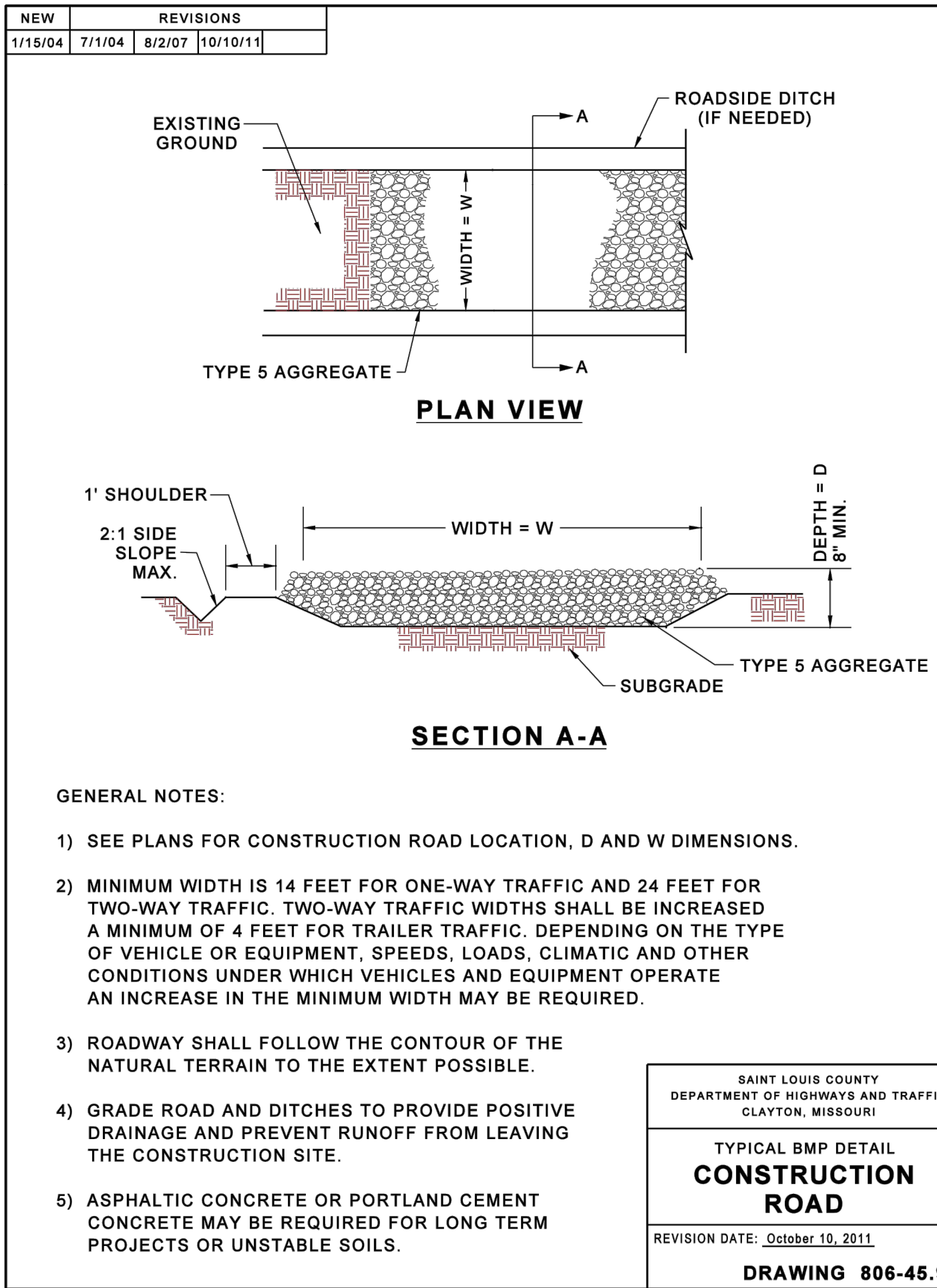
- ✓ Grade and compact area of construction road and if needed, adjacent road ditches.
- ✓ Install culvert under road if needed to maintain positive drainage.
- ✓ Place and compact roadway materials.
- ✓ Vegetate road ditches.

O&M PROCEDURES

- ✓ Remove sediment and clods of dirt from road daily.
- ✓ Remove sediment from road ditches.
- ✓ Repair settled areas.
- ✓ Replace rock if necessary to maintain clean surface.
- ✓ Remove sediment from road ditch once it is within 6" of top of road surface.

SITE CONDITIONS FOR REMOVAL - Remove when vehicles and equipment will no longer access remote areas; re-grade area and vegetate.

TYPICAL DETAIL - 806-46.02



SILT FENCE

PHYSICAL DESCRIPTION - Silt fences are used as temporary perimeter controls, appropriate to the BMP, at sites where construction activities will disturb the soil. They can also be used on the interior of the site. A silt fence consists of a length of filter fabric stretched between anchoring posts spaced at regular intervals along the site at low down slope areas. The filter fabric should be entrenched in the ground. When installed correctly and inspected frequently, silt fence can be an effective barrier to silt leaving the site in storm water runoff.

WHERE BMP IS TO BE INSTALLED - Silt fences apply to construction sites with relatively small drainage areas. They are appropriate in areas where runoff will occur as low-level flow, not exceeding 0.5 c.f.s. The drainage area for silt fences should not exceed 0.25 acre per 100-foot fence length (100 square feet per foot of fence). The slope length above the fence should not exceed 100 feet (NAHB, 1995). The fence should be designed to withstand the runoff from a 10-year peak storm event.

CONDITIONS FOR EFFECTIVE USE OF BMP - Spacing of parallel lengths of silt fence along slopes is relative to slope steepness as follows:

Type of Flow:	Sheet flow only.
Contributing Slope Length:	30 foot maximum for 3:1 slopes. 50 foot maximum for slopes between 3:1 and 10:1. 100 foot maximum for slopes under 10%.

For additional information see Section 806.70 of St. Louis County's Standard Specification for Highway Construction.

WHEN BMP IS TO BE INSTALLED - Prior to disturbance of natural vegetation and at intervals during construction of fill slopes. Install on the perimeter of the site (where storm water exits the site) prior to disturbance of natural vegetation, around material stock piles and interior to the site along slopes, at the base of slopes and at intervals during construction of slopes.

INSTALLATION / CONSTRUCTION PROCEDURES

- ✓ Drive post for fence line.
- ✓ Dig trench to required dimensions in front of posts for fabric burial.
- ✓ Attach wire mesh to posts.
- ✓ Attach fabric to posts, allowing required length below ground level to run fabric along bottom of trench
- ✓ Backfill and compact soil in trench to protect and anchor fabric.

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 stakes used to anchor the filter fabric should be wood or metal. Wooden stakes should have minimum dimensions of 2 by 2 inches if a hardwood like oak is used. Stakes from soft woods like No. 2 Southern Pine, should have minimum dimensions of 4 by 4 inches. When using steel (standard U, T, L, or C shape sections) posts in place of wooden stakes, they should weigh no less than 1.0 lb/linear foot. If metal posts are used, attachment points are needed for fastening the filter fabric with wire ties. Posts should be least 5 feet long and driven or placed at a slight upstream angle into the ground to a minimum depth of 18 inches. Depth shall be increased to a minimum of 22 inches if fence is placed on a slope of 3:1 or greater. When the post embedment depth is impossible to obtain, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.

Erect silt fence in a continuous fashion from a single roll of fabric to eliminate gaps in the fence. If a continuous roll of fabric is not available, overlap the fabric from both directions only at stakes or posts. Overlap at least 6 inches.

The Geosynthetic filter fabric and wire mesh (when applicable) shall be no less than 30 inches above ground and be stapled or wired to the upslope side of the post. Staples should be a 17-gauge wire and 1/2 inch long. Excavate a trench to bury the bottom of the fabric fence in a "U" configuration at least 6 inches below the ground surface. The trench shall be backfilled with native soil and the soil compacted over the geotextile. This helps to prevent gaps from forming near the ground surface. Gaps would make the fencing useless as a sediment barrier.

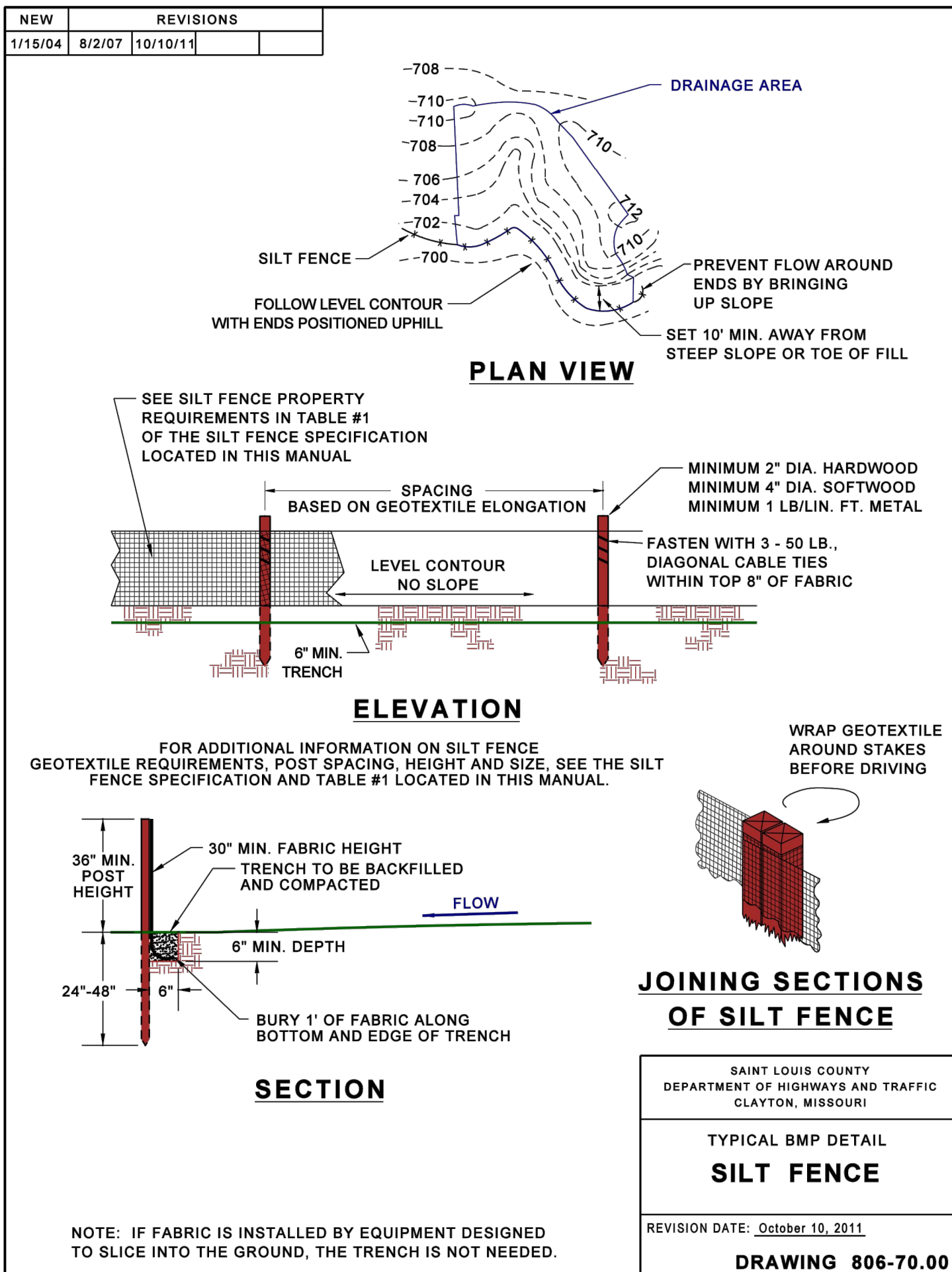
The height of the fence posts should be 38 (22-inch embedment) to 42 (18-inch embedment) inches above the original ground surface. If standard-strength fabric is used with 14-gauge steel wire with a mesh spacing of 6 inches by 6 inches (or a prefabricated polymeric mesh of equivalent strength), space the posts no more than 4 feet apart. If extra-strength fabric is used without wire mesh reinforcement, space the posts no more than 4 feet apart with woven or 6 feet apart with non-woven geosynthetic.

Alternate Construction: Install fence by slicing it into ground with specialized equipment. Install posts at reduced spacing indicated on detail.

LIMITATIONS - Do not install silt fences along areas where rocks or other hard surfaces will prevent you from uniformly anchoring the fence posts and entrenching the filter fabric. Installing fences in such an area greatly reduces their effectiveness and can create runoff channels leading offsite. Silt fences are not suitable for areas where large amounts of concentrated runoff are likely. Fence shall not be used when slope is 1:1 or greater and water flow rates exceed 2 cubic feet per minute. Open, windy areas present a maintenance challenge, too, because high winds can make the filter fabric deteriorate faster. Do not install silt fences across streams, ditches, or waterways (Smolen et al., 1988).

When the pores of the fence fabric become clogged with sediment, pools of water are likely to form on the uphill side of the fence. Setting and design of the silt fence should account for this. Take care to avoid unnecessarily diverting stormwater from these pools, causing further erosion damage.

MAINTENANCE CONSIDERATIONS - Inspect silt fences regularly and frequently, as well as after each rainfall event, to make sure that they are intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If you find gaps or tears, repair or replace the fabric immediately. Remove accumulated sediments from the fence base when the sediment reaches one-third to one-half the fence height. Remove sediment more frequently if accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event. When you remove the silt fence, remove the accumulated sediment, dress the area disturbed to give it a pleasing appearance and vegetate all bare areas as well.



DUST CONTROL

PHYSICAL DESCRIPTION - Control measures designed to reduce the transport of dust, thereby preventing pollutants from infiltrating into stormwater. Examples for construction activities include vegetative cover, wind barriers, minimization of soil disturbance, spray on adhesives, tilling, chemical treatment and water sprays.

In St. Louis County the contractor / permittee is required by Missouri State Law (10 CSR 10-6.170) and County Ordinance (812.340) to control fugitive dust blown from the construction site, land disturbance site, signal installation, etc. Dust control, including saw-cut material etc., on the construction site shall be monitored for safety purposes and to prevent nuisances. The contractor / permittee shall apply reasonable measures to control dust and particulate matter (of any size or source) due to roadway / construction traffic, grading, clearing and grubbing, building demolition, wind erosion, saw-cutting etc. from migrating off the site of origin.

WHERE BMP IS TO BE INSTALLED - Critical in areas of exposed soil.

CONDITIONS FOR EFFECTIVE USE OF BMP - A combination of the following actions should be used to help reduce the dust and air pollution at a construction site.

Minimize Concurrent Areas of Soil Disturbance - Phase work to the extent practical.

Vegetative Cover - For areas not subjected to traffic, vegetation provides the most practical method of dust control and should be established as early as possible. Temporary vegetation should also be used. See Seeding and Sodding BMP's for additional information.

Sprinkling - The site can be sprinkled with water until the surface is moist. This practice is effective for dust control on large areas, haul routes or other traffic routes, but constant repetition is required for effective control.

Tilling - Roughen the surface and bring clods to the surface. This is an emergency measure that should be used before soil blowing starts. Begin tillage on windward side of the site. Chisel plows with shanks spaced about 12 inches to 18 inches apart and spring toothed harrows are examples of equipment that may produce the desired effect. See Surface Roughening BMP for additional information.

Wind Barriers - 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.

Street Cleaning - Paved areas that have soil on them from construction sites should be cleaned continuously, at least daily, utilizing a street sweeper or bucket type end loader or scraper.

Mulching - This practice offers a fast and effective means of controlling dust when properly applied. Binders and tackifiers should be used on organic mulches. Mulching is not recommended for areas with heavy traffic. See Mulching BMP for additional information.

Note: If calcium chloride or spray-on adhesives are used for dust control, a permit may be required from the Missouri Department of Natural Resources.

WHEN BMP IS TO BE INSTALLED - Routinely, especially in advance of and during periods of dry weather.

INSTALLATION / CONSTRUCTION PROCEDURES - See conditions for effective use above.

O&M PROCEDURES - Inspect daily and renew as needed.

SITE CONDITIONS FOR REMOVAL - Maintain practices until all disturbed areas are vegetated or paved and blowing soil is no longer a concern.

TYPICAL DETAILS - Not applicable.

NON-SEDIMENT POLLUTION CONTROL

PHYSICAL DESCRIPTION - Control measures designed to prohibit chemicals, hazardous materials, solid 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 BMP's. Keeping substances like fuel, oil, asphalt, paint, solvents, fertilizer, soil additives, concrete wash water, solid 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.

WHERE BMP IS TO BE INSTALLED - 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 OF BMP

- ✓ Reduction in pollutants depends heavily on how construction personnel perform their duties. An effective management system requires training and signage to promote proper storage, handling and disposal of materials. Follow up observations of actions and inspection of storage areas by management personnel is also required.
- ✓ Plans should contain notes clearly stating requirements for addressing potential pollutants.
- ✓ Fueling areas and storage areas for hazardous materials should be protected by berms or other means of catching leaks or spills. Do not store hazardous chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and under cover in secondary containment.

WHEN BMP IS TO BE INSTALLED - Immediately following installation of construction entrance and wash station.

INSTALLATION / CONSTRUCTION PROCEDURES

- ✓ Place waste receptacles near area of work.
- ✓ Construct protective berm or other devices around fueling and hazardous materials storage areas.
- ✓ Install appropriate signage.
- ✓ Post guidelines for proper handling, storage and disposal of materials, and emergency spill cleanup on site.

O&M PROCEDURES:

- ✓ Inspect activities on regular basis.
- ✓ Inspect storage areas and control devices at least every two weeks and after every storm.
- ✓ Make necessary corrections and repairs.

SITE CONDITIONS FOR REMOVAL - Maintain practices until all construction on the site has been completed.

TYPICAL DETAILS - General pollution prevention notes attached.

POLLUTION PREVENTION PROCEDURES

DESCRIPTION - Pollution prevention includes best management practices that need to be set up at the beginning of the project. Pollution prevention practices consist of site management considerations that do not fit into the other categories of erosion or sediment controls, such as materials inventory, good housekeeping, spill prevention and clean up, solid waste management and concrete washout. Building materials and other construction site wastes must be properly managed and disposed of to reduce the risk of pollution from materials such as surplus or refuse building materials or hazardous wastes. Practices such as trash disposal, recycling, proper material handling, and spill prevention and cleanup measures can reduce the potential for storm water runoff to mobilize construction site wastes and contaminate surface or ground water.

APPROPRIATE APPLICATION OF BMP - The proper management and disposal of wastes should be practiced at every construction site to reduce contaminated storm water runoff. Use waste management practices to properly locate refuse piles, to cover materials that might be displaced by rainfall or storm water runoff, and to prevent spills and leaks from hazardous materials that were improperly stored.

Solid Wastes

- Designate a waste collection area on the site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a water body.
- Dumpsters or other collection containers should be provided as needed and ensure that containers have lids so they can be covered before periods of rain, and keep containers in a covered area whenever possible.
- Schedule waste collection to prevent the containers from overflowing.
- Clean up spills immediately. For hazardous materials, follow cleanup instructions on the package.
- During the demolition phase of construction, provide extra containers and schedule more frequent pickups.
- Collect, remove, and dispose of all construction site wastes at authorized disposal areas in accordance with state and local laws and regulations. Contact a local environmental agency to identify these disposal sites.
- Solid waste may not be buried or burned on the site.
- Good Housekeeping on a construction site is very important. Keep the site clean.

Pesticides and Fertilizers

- Follow all federal, state, and local regulations that apply to the use, handling, or disposal of pesticides and fertilizers.
- Do not handle the materials any more than necessary.
- Store pesticides and fertilizers in a dry, covered area.
- Construct berms or dikes to contain stored pesticides and fertilizers in case of spillage.
- Follow the recommended application rates and methods.
- Have equipment and absorbent materials available in storage and application areas to immediately contain and clean up any spills that occur.

Detergents - Phosphorus and nitrogen containing detergents are used in wash water for cleaning vehicles. Excesses of these nutrients can be a major source of water pollution. Use detergents only as recommended, and limit their use on the site. Do not dump wash water containing detergents into the storm drain system; direct it to a sanitary sewer or contain it so that it can be treated at a wastewater treatment plant.

1) HANDLING AND DISPOSAL OF HAZARDOUS MATERIALS

DO

- Prevent spills
- Use products up
- 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 or 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 construction debris
- Don't burn chemicals or containers
- Don't mix chemicals together
- Don't remove the original product label from the container

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 water course, 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. See additional requirements in the "Concrete Waste Management" section of this manual.

7) If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto soil, the soil shall immediately be dug up and disposed of at a licensed sanitary landfill (not a construction / demolition debris landfill). Spills on pavement shall be immediately 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 Missouri Department of Natural Resources (MoDNR) at (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) The contractor / permittee should ensure adequate training is provided to the site superintendent and all field personnel, etc. on the proper protocol for reporting and cleaning up spills.

10) Manufacturer's recommended method for spill cleanup should be clearly posted and the site personnel should be made aware of the procedures and the location of the information and clean up supplies.

11) Material and equipment necessary for spill cleanup should be kept in the material storage area on site.

12) Minimize the material inventory stored on-site (e.g., only a few days' supply).

13) Do not store hazardous chemicals, drums, or bagged / boxed materials directly on the ground. Place these items on a pallet and under cover in secondary containment.

14) Storage areas shall be kept clean and well organized.

O&M PROCEDURES - The only way to be sure that waste management practices are being followed is to be aware of worker habits and to inspect storage areas regularly. Extra management time may be required to ensure that all workers are following the proper procedures. Inspect storage and use areas and identify containers or equipment that could malfunction and cause leaks or spills. Check equipment and containers for leaks, corrosion, support or foundation failure, or other signs of deterioration, and test them for soundness. Immediately repair or replace any that are found to be defective.

TYPICAL DETAILS - Not applicable.



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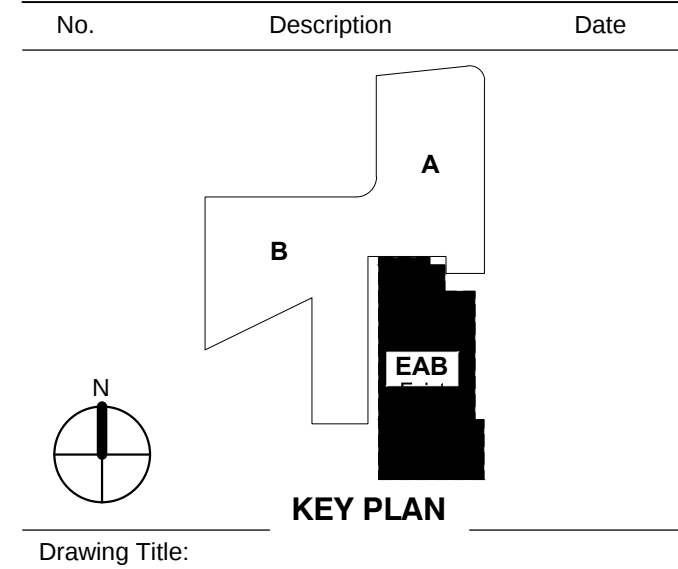
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1 ADDENDUM 1-10 5 MAY 2016
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EROSION CONTROL DETAILS

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