City of Westlake

Engineering Department

Construction Site Erosion & Siltation Control Guidebook

INSPECTIONS / COMPLIANCE

The City of Westlake is aware that contractors have a difficult job in completing projects and want to assist them in their work. Our staff of inspectors, the Director of Engineering and our Storm Water Discharge Coordinator are here to assist the contractors on the Storm Water Pollution Prevention Plan (SWPPP) in the approved drawings for your project.

We ask for your cooperation by notifying us of needed inspections on your site 24 hours in advance. Please conform to your SWPPP by installing the BMPs per the details and maintaining them properly. If private inspections of the BMPs are required in your contract, add the city engineering department as a recipient of the reports.

SWPPP inspections by the city will be done regularly and you will receive verbal and written notification of the inspection results in a timely manner. **You are expected to make changes / repairs to conform to your SWPPP upon notification**. Failure to do so could result in suspension of work on the project, fines per city codified ordinance, or both.

The city is highly motivated to be ecologically friendly by maintaining our waterways as free of construction pollution as practical. We would like to have you as a partner in these efforts.

EROSION & SILTATION PROTECTION

Soil erosion is the removal of soil by water, wind, ice and gravity. The most common cause of erosion is caused by raindrops. Raindrops strike the soil at a speed of approximately 25-30 ft/sec. and break soil particles off exposed soil. The runoff caused from the rain event carries the detached soil particles and any pollutants they have absorbed downhill into storm sewers or waterways.

Siltation is the process of the eroded soil causing damage to downstream sewers and waterways by depositing the soil or causing a chemical change to the waters.

This manual is meant to briefly describe the most common methods of controlling erosion and siltation on construction sites within the City of Westlake.

The Federal EPA under the **National Pollution Discharge Elimination System laws requires that all construction sites of one acre or larger submit a NPDES permit for storm water damage**. Under Phase II EPA regulations of the NPDES permit, the City of Westlake is responsible for insuring compliance erosion & siltation controls on construction sites within our borders.

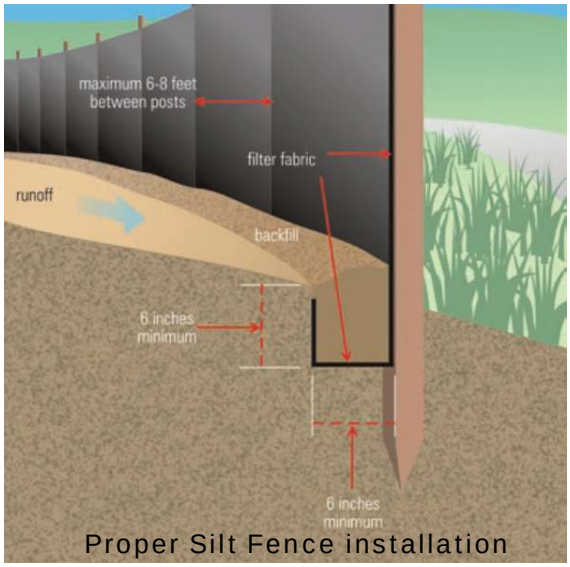
The project designer is required to submit a construction site erosion and siltation control plan for the project. The plan must include (but is not limited to); a list of best management practices (BMPs) of control methods used on the site along with a plan view of their location and a detail showing their proper installation, any appropriate sequencing of construction activities and the needed BMPs for that phase of work, a plan for permanent E&S control and any required notes regarding maintenance and installation of the various BMPs.

Inspections of the site erosion and siltation controls are required weekly and within 24 hours of any rain event larger than 1/2” on all sites. The contractor must resolve any deficiencies immediately or face stoppage of work and/or financial penalties.

This manual is intended to be a guide for contractors on the most common types of erosion and siltation BMPs used. Designers and contractors are encouraged to use other approved BMPs if they are more effective. Discuss any issues with site BMPs with your Engineering inspector or the city’s Storm Water Discharge Coordinator.

SILT FENCING

Silt fences are the most common erosion and siltation method used in Ohio. They work by ponding a shallow amount of surface water along their upstream side to allow the silt to settle out of the water. They are NOT meant to filter the water. If silt fences are used in the wrong place or not properly installed and maintained, they are useless.



Proper Silt Fence installation

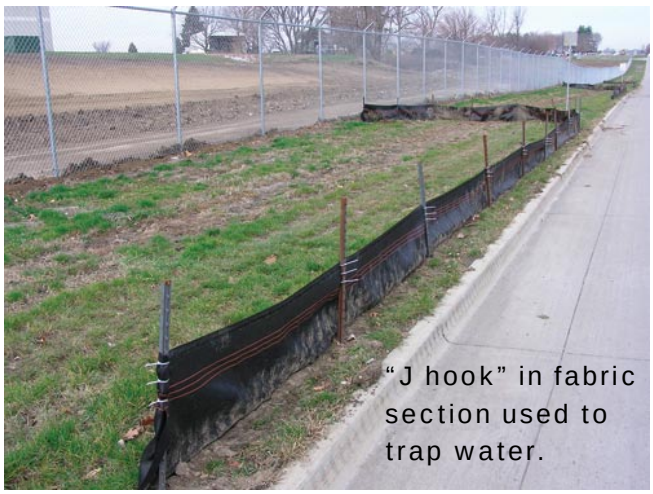

Fabric not tucked into soil

Fences need to have the bottom ends of the fabric <u>completely</u> tucked into compacted soil to work. Any gap below the fabric makes the fence worthless. Fences may be installed by digging a shallow trench for the fabric to be placed in or may be installed by "slitting" the fabric into the soil. In either case the soil above the fabric must be compacted.

If water can pass below, around, through or over the fence it becomes worthless. Fabric may be properly placed in shorter lengths with "J hooks" on the end(s) of the fence to trap water.
If multiple lengths of fencing are needed, the last stakes of abutting sections need to be wrapped 180° around each other before staking in the soil.


Poorly & properly installed fences .

Silt fencing needs to be placed along a consistent elevation or grade line to allow water to pond behind the fence. With the water ponded behind the fence the particles suspended in the water will settle out. Fences can handle the runoff from a rain but are not meant to hold a steady flow of water. If a fence becomes clogged with silt build-up it is better to build another fence below it than to remove the soil.


"J hook" in fabric section used to trap water.

INLET PROTECTION

Manufactured filter bag over flat grated inlet

Stormwater inlet protection traps sediment from a construction site before it can enter the storm sewer systems on and off-site or to downstream waterways.

Proper installation and maintenance of the inlet protections will keep the sewers clean and prevent expensive cleaning of down-stream utilities by the contractor.

Yard drains or inlets in grassed areas are often protected with a wooden framework supporting wire mesh and filter fabric around the outside of the structure to pond and filter water prior to entering the inlet. The placement of sod around the inlet or excavation of a shallow, flat-bottomed depression with filtering stone / fabric around the structure also helps filter and settle silt before it can flow into the grate. Manufactured inlet protections can also be used and work by filtering water flowing to the basin.

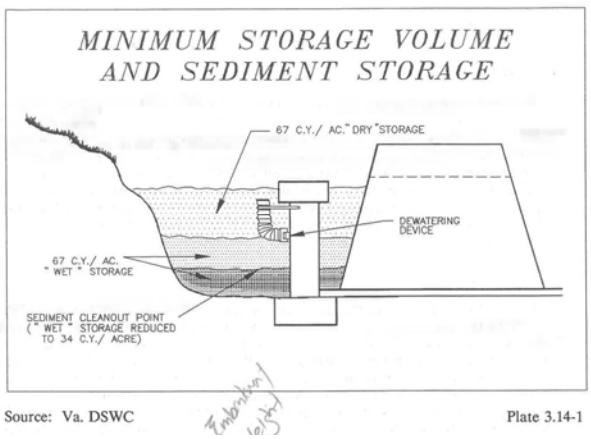
Protecting basins in paved areas can be done with manufactured filters or by wrapping or surrounding the castings with filter fabric or sand bags. Ponding of water occur with either method to allow sediments to fall out of the still water sitting around the inlet. The silt left on the pavement will require cleanup after any rain and the fabric will require frequent replacement / cleaning. Care is needed to prevent the fabric / filter or its collected silt from falling into the basin. **The contractor must also make sure that the BMP is not intentionally moved or broken to allow ponded water to drain past the protection.**

In all cases, inlet protections must be checked / maintained on a weekly basis and within 24 hours of any rainfall over 1/2". It is also best to establish growth of permanent groundcover ASAP so that the inlet protections on site can be removed.

BASINS & SETTLING PONDS

Settling ponds are frequent construction site stormwater pollution prevention tools that are usually **turned into water quality basins after the job is complete**. The ponds are designed to hold a calculated volume of storm-water runoff from all or part of the site for a period of time allowing sediments in the water to settle to the bottom of the pond.

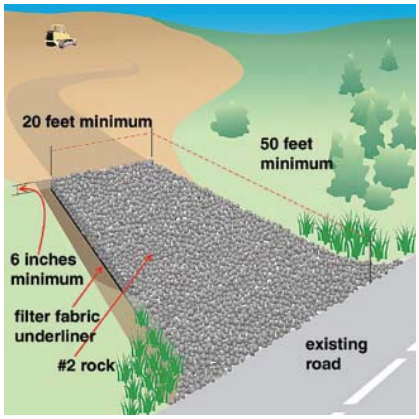
The settling pond and its carefully designed outlet structure need to be completed before stormwater flow from the site is directed to it. Often the basin's permanent outlet structure is modified to work for the construction phase of the project.



The outlet structures are usually designed to restrict flows through very small open-ings. By limiting the flow through the small opening water is ponded in the basin long enough to allow suspended soil to fall out of the water and settle. While effective for treating large portions of a site the structures **require careful construction and maintenance to properly function**.

Follow maintenance and sequencing instructions for the settling basin during the construction phase of the project. If the basin is to be converted to a water quality basin additional work is usually required. Contractors will likely need to remove the temporary outlet structure, dredge silt, excavate forebays and micropools and construct dikes in the basin.

VEHICLE MAINTENANCE



Normally we think about rain runoff causing erosion and siltation problems on construction sites but construction vehicles and activity can also cause a lot of damage to sewers and streams off site. **Tires from trucks and equipment leaving the site can carry off mud**. Toxins and chemicals from fuel, vehicle leaks or concrete slurry washoffs can do significant chemical damage to wildlife habitats.

The installation and keeping up a good construction access drive will be a significant cost savings to the contractor. The City of Westlake requires a no-mud policy on our streets. Any mud tracked off site will need to be cleaned immediately. If the contractor does not clean the mud, a street sweeper will be called and the contractor will pay for the service from his mud bond.

Stabilized construction entrances allow dirt to be removed from tire treads and collected as trucks leave construction sites

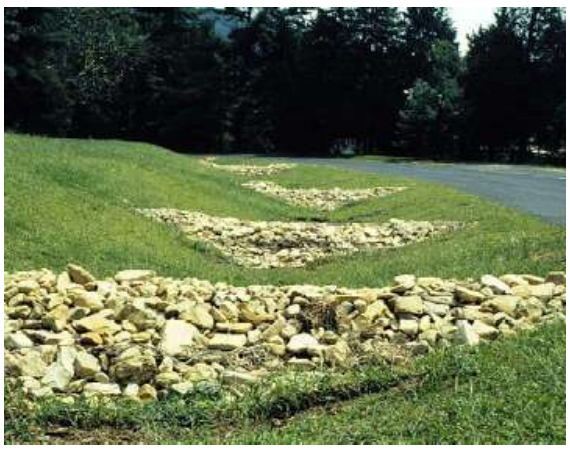
The slurry from masonry products and equipment as well as wash water from concrete trucks contain toxic metals and are highly caustic and corrosive and can kill plants and aquatic life downstream. Concrete washout stations should be placed on a site where they can be easily accessed and maintained The stations or bags need to collect the slurry and the washoff water without them ending up in storm sewers and ditches.

Fuels, oils and asphalt paving products all contain petroleum byproducts which are highly poisonous to life in downstream waterways. Leaks from vehicles need to be cleaned up and **fuel tanks need to be stored in properly sized secondary containment tanks**.

GRASS CHANNELS & CHECK DAMS

Grass-lined channels are an effective method to convey stormwater runoff on a site and are often converted to a post-construction BMP following construction. Grass channels work by providing a stable, vegetated path for stormwater to flow from one area to another without picking up additional soil. The runoff is also treated by the filtering of the grass and the absorption of water into soil below. The channels are inexpensive and easy to maintain but need to be installed and have vegetation established before they can be used.

Channels can be further enhanced by using check dams. The check dams are intended to slow the speed of the runoff flow along the channel by damming small amounts of water behind the dams. The slowed runoff helps allow some of the suspended particles in the water to settle out and prevent downstream siltation. Dams may be constructed of large aggregates or of soil. Maintenance will be periodically required to remove collected silt behind the check dams.



SEQUENCING / VEGETATION

Following a well planned sequencing of operations for a construction project will dramatically reduce the cost and effort of keeping your site compliant. By keeping the time an area of the project is disturbed to a minimum, the cost of maintaining the erosion and siltation controls for the site are kept lower. Restoration of any disturbed areas needs to be done after construction activities are completed and at a time when vegetation can grow and establish.

Erosion and siltation controls need to be maintained in all disturbed areas from the start of work in an area until permanent vegetation growth is established. By organizing the work on site to minimize disturbed areas open at a given time, a contractor can reduce the costs of maintaining his BMPs.

Hydroseeding a disturbed area

A well vegetated right-of-way. E & S BMPs are completed for the contractor.

Once work is completed in an area it is just as important for a contractor to establish the growth of vegetation. Do the job right with the proper topsoil, fertilizer, mulch, plantings / seed and watering. Once growth is established on site the erosion and siltation controls can be removed saving money otherwise needed for maintenance and / or bonding.

Your site is subject to inspection for proper erosion and siltation controls.

Failure to properly install and maintain them will result in a violation.

The EPA requires that violations be reported and tracked until corrected.

1.) Upon discovery, the inspector will notify the contractor of the problems with the erosion & siltation controls on site. A written copy of his report will be sent to the site contractor's address. The contractor is expected to correct any problems immediately (if the equipment or material is on site) or no later than the next work day.

2.) A second written warning will be sent to the site contractor if repairs are not made in a timely manner.

3.) If, after one week from the second written warning, the contractor has not corrected the problems on site, the Director of Engineering may issue a Stop Work Order. All construction activities on site are required to be stopped. The city reserves the right to contract an outside contractor and place a lien on the construction project for the cost of the needed work. Additional penalties of a fourth degree misdemeanor as provided in Section 501.99 of the General Offenses Code may also be applied.

City of Westlake

Engineering Department

Contact Information

Engineering Office

(440) 617-4145
Fax – (440) 617-4189

Inspector - _____

Mayor: Dennis M. Clough

Director of Engineering: Robert P. Kelly, P.E.

Contractor's Erosion & Siltation Licensing Approval Quiz

Please circle the correct answer

1) Contractors are required to submit a NPDES permit for all construction sites of more than 1 acre.

True False

2) In order to work, silt fencing needs to be *completely* tucked into the soil.

True False

3) During a heavy rain it is OK to remove or cut inlet protection over an inlet to allow the ponded water in the area to drain.

True False

4) Settling ponds are often converted into water quality basins once the construction project is over.

True False

5) Maintenance of a settling pond outlet structure is important.

True False

6) Construction access drives help keep mud off city streets.

True False

7) Construction site fuel tanks do not need special storage.

True False

8) Grass channels can be used during construction to move runoff before grass growth is established in them.

True False

9) Once construction in an area of the site is completed the growth of vegetation should be established.

True False

10) Upon notification of a problem with the site erosion & siltation controls, a contractor can take 2 weeks to make the correction.

True False