

Small Construction Sites: EROSION & SEDIMENT CONTROL PLANNING

Site Planning & Scheduling

Along with all of the other planning and scheduling aspects of a construction project, pollution prevention, which includes erosion prevention and sediment control, must be taken into consideration. Like everything else there are steps that have to be taken before you can break ground, actions and coordination's that are required while in progress, and follow up activities. You really only have one opportunity to save existing vegetation and trees for example. As contrasted with the larger construction site, you probably do not have a set of "bid plans and document" or an engineer / designer that will have addressed many of the E&SC considerations for you. In some cases you may have a septic system design plan and permission to start construction. That means the planning and scheduling of these pollution prevention actions will be completely up to you – what measures to select and when to install them. That also means that you, the owner, and the building contractor, are going to have to coordinate your activities. You don't want his pile of building materials and dumpster on the construction entrance or blocking the portable toilet.

Erosion Prevention

Actions taken to prevent erosion will minimize sediment control maintenance and addition measure requirements. Minimizing the time that earth is exposed to the elements, rain and wind, is a major consideration and stabilization measures should be taken within 14 days of the desired grade being obtained. Temporary stabilization measures should be taken if earth and stockpiles are not going to be active for 14 days or longer. This can be as elementary as spreading straw, at an appropriate rate, over exposed soil which will potentially reduce erosion by as much as 95%. In some cases temporary or interim seeding is warranted, even on a small site. The use of Rolled Erosion Control Products (RECP) are also an option. When properly installed, directly on the ground with the correct amount and pattern of staples, the use of a blanket qualifies as stabilization. Careful selection of the RECP allows stabilization on varying slopes.

Permanent stabilization of a site has multiple facets, including the selection and depth of the topsoil, fertilization, and seed selection. Topsoil should either be tested by you or in some cases your supplier. The test results will determine what kind of fertilization requirements should be met. Short of this, you are guessing, in which case you can over fertilize and potentially cause nutrient pollution or under nourish and see poor stabilization results. Seed selection is equally important, so buying re-cycled seed from a wholesaler is not recommended. The application of the seed at a prescribed rate of pure live seed (PLS) based on the sun-light conditions and exposure is critical. The goal

is to obtain a well distributed growth that has roots that are going to hold the soil in place as soon as practicable. Hydro-seeding is a very popular solution with normally very good results but again, make sure the mix of seed, mulch, and fertilizer is appropriate for the site. With many landscapers and contractors having small hydro-seeders, interim and temporary hydro-seeding is also a real option.

The stabilization of steeper slopes may required extra effort. In addition to mulch, topsoil, and grass, stabilization planting may be warranted. At the end, I have reference a New Hampshire Cooperative Extension document, "Landscaping the Waters Edge" which lists native plants that are applicable for the use of slope stabilization. The spacing of a low growth shrub like a juniper which will establish deep roots is a good solution. Numerous plants that have been historically used for stabilization are now considered invasive species so selection of the plantings is critical.

Sediment Control

When the original site planning is undertaken, evaluate where the stormwater runoff is going to flow. Is it flowing in multiple directions requiring different solutions? Example – Is the front of the property contributing surface water runoff to a catch basin that is part of the municipality or community stormwater system and the back of the property directing runoff into an open space conservation area? Depending on the situation, there may be two radically different solutions. The first requires that inlet protection be provided to the catch basin. This may require multiple layers of protection with different levels of maintenance with each. A silt basket is quite effective but very maintenance intensive. A circle of silt socks around the basin may be warranted initially and a silt basket alone is appropriate as stabilization on site occurs. This is going to be a dynamic environment. The property line where runoff flows off the property is going to require perimeter protection, or layers of perimeter protection. The installation of silt fence, silt socks, erosion control mulch berms, straw wattles or fiber rolls all have their applications but each has installation requirements and limitations. Straw wattles are very common on construction sites, often installed improperly, and are not the solution for most runoff protection applications. Learn the benefits, costs, installation requirements, and maintenance requirement of each of these tools. One may be more effective for your application.

Also when the original site planning is done, the location of a Stabilized Construction Entrance (Exit) is a vital part of the decision making. This will be used by the earth work contractor, the owner, the builder, and buyer, throughout the construction process. It has to be constructed properly at the beginning and maintained throughout the process. Tracking into the roadway is an inevitable part of the process and steps must be taken to sweep the sediment from the paved surface so that it is not washed into receiving waters or downstream catch basins. Do not let the landscaper use a backpack leaf blower to do this function.

The construction process is going to cause areas of flow concentration, often in the valley between residential structures. In some cases this was designed and intended to become a swale and sometimes the grading around structures causes the situation. Where ever there is a concentration of flow, check dams are an appropriate solution to capture sediment prior to the final line of defense – the perimeter control. Check dams can be made from clean crushed stone, from silt socks, or from pre-manufactured installations. In any case, they need to be spaced so that the top of the second check dam is even with the toe of the first check dam so that pools are created slowing the runoff down to allow sedimentation. Check dams have to span the full width of the concentration because water will find the edges and ... make them wider for you. A check dam should be laid in the swale so that there is a low point toward the middle to allow the runoff to be directed. The removal and disposal of the sedimentation is critical at a point where there is always storage capacity behind the dams.

The purpose of sediment control is to prevent sediment from leaving the site and enter a water way. The effectiveness of the plan has to be continually evaluated and perhaps additional steps may have to be taken to reinforce the protections.

Inspections and Maintenance

A number of times through the three previous topics, the subject of maintenance has been discussed. Every E&SC measure has a proscribed maintenance requirement that is going to allow the measure to function effectively. On a small construction site you probably will be the sole inspector unless the municipality has a designated inspector. With the newly published Municipal Separate Stormwater Sewer (MS4) permits and requirements, the designated authorities are going to be more interested in new construction and pollution prevention.

As the sole inspector, you will need to step back from your own project and all of the other demands to objectively look at your Best Management Practices (BMPs). You will need to learn the vulnerabilities of protection measures and take a proactive approach to E&SC protections and pollution prevention. When sediment laden water hits the catch basin invert or water ways, it is too late. Sediment pollution and turbidity are two very major impairments to New Hampshire's waters and new construction if very often the cause.

Good Housekeeping / Material Management / Pollution Prevention

The overall management of a construction site to prevent pollution include many other factors. The presence and location of a portable toilet falls into this category. The portable toilet needs to be one of the first items located on the project, and located in a logical and stable location. If petrochemicals are stored on site, there needs to be secondary containment for the installation that is 110% and that is covered from the elements. A concrete / materials washout area needs to be designated so that there is

no discharge of concrete washout and that it is disposed of properly. This is often overlooked by the earthwork contractor who is not even on the site when the building contractor has concrete poured. Pollution prevention has to be a team effort.

Regulatory Process

Without being prescriptive, the laws of the State of New Hampshire prohibit the discharge of polluted stormwater into water ways. The threshold of turbidity that is allowed in runoff is not zero tolerance but might as well be. The laws are written so that although there are levels where a direct permit is required from the state, all terrain alteration construction is governed. (RSA 485-A:17 Permit by Rule) Land that is located within 250 feet of designated surface waters are also governed by the state under the Shoreland Water Quality Protection Act (RSA 483-B). Because the US EPA has directed municipalities that fall under the MS4 program to establish ordinances that require stormwater protection measures, there are new local provisions that have to be taken into consideration. Discussion of a project with the building professionals at the municipality during the planning stage is advisable.

Resources:

1. New Hampshire Stormwater Manual, Volume 3 – Erosion and Sediment Control During Construction, NHDES, December 2008
2. Stormwater Pollution Prevention for Small Construction Sites, US EPA 830-F-15-001, December 2012
3. EPA, Small Residential Lot Stormwater Pollution Prevention Plan Template, US EPA 830-K-15-001 December 2015
4. Landscaping at the Water's Edge, An Ecological Approach. A Manual for New Hampshire Landowners and Landscapers, University of New Hampshire Cooperative Extension, 2007

Respectfully provided:
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