Table 7 – Soil Covers[1]

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Rolled Erosion Control Products (RECPs)					
Mulch control nets	A net that is applied over a loose wood or straw mulch to secure it in place. If natural biodegradable fibers are used, it can be a permanent installation.	Nets made of natural fibers or synthetic materials.	Netting is installed above an area that has been covered with loose mulch. The netting is stapled in place.	✓ Secure mulch from blowing or flowing away. ✓ Allows the use of locally derived mulches. ✓ Allows vegetation to grow through the netting and helps to lock in new vegetation.	× Synthetic materials may degrade into microplastic trash. × Synthetic materials may cause entrapment of animals. × Not suitable for slopes greater than 5:1.
Open weave textiles	A woven or processed mesh that is made of natural or synthetic yarns such as jute or coir (coconut fibers). If natural, biodegradable yarns are used, it can be a permanent installation.	Mesh made of natural or synthetic yarns. They come in different strengths and can be classified as short-term or long-term.	Rolled mesh is applied either directly to prepared soils or onto seeded mulch or compost. The mesh is stapled in place.	✓ Secures mulch from blowing or flowing away. ✓ Good for stabilization of moderate (3:1) to steep (1:1) slopes when used in conjunction with other erosion controls, such as hydraulic mulch or a compost blanket. ✓ Allows vegetation to grow through the netting and helps to lock in new vegetation.	× Synthetic materials may degrade into microplastic trash. × Synthetic materials may cause entrapment of animals.

[1] Adapted from the Erosion Control Technology Council erosion toolbox. For additional information about erosion control products and specifications, go to https://www.ectc.org/erosion-toolbox, the State of Washington Department of Ecology 2019 Stormwater Management Manual for Western Washington https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm, and Profile ® Products resources for erosion control professionals https://www.profileevs.com/products/hydraulic-erosion-control.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Erosion control blankets	A blanket comprised of natural or synthetic materials that is stitched together with natural or synthetic thread or is chemically bonded together. If natural biodegradable materials are used for the blanket construction, it can be a permanent installation.	There are many different variations and durabilities. Common materials used in the blankets include coir, excelsior (soft wood shavings), straw, cotton, or polypropylene. Some have netting and others are chemically or physically pressed together.	Blankets are applied either directly to prepared soils or onto seeded mulch or compost. More durable blankets may also be placed in drainage swales or other concentrated flow locations. The blanket is stapled in place.	✓ The blanket contains the "mulch" material. ✓ Good for stabilization of moderate (3:1) to steep (1:1) slopes. ✓ Relatively quick to install. Ideal for smaller areas of soil disturbance or specific slopes.	× Synthetic materials may degrade into microplastic trash. × Synthetic materials may cause entrapment of animals. × Not suitable for uneven surfaces.
Plastic sheeting	Rolled plastic sheeting for temporary cover of areas of soil disturbance or stockpiles.	Black or clear polyethylene sheeting, with a thickness of 6 to 20 mil.	Plastic sheeting is appropriate for temporary short-term covering of erodible surfaces. It is applied directly onto the soil and weighted down with gravel bags or sandbags.	✓ Relatively quick to install. ✓ Impermeable and will keep underlying soil relatively dry. Particularly useful for protecting water-saturated slopes or for keeping work areas dry. ✓ Can be removed quickly, saved, and reinstalled for the next rain event.	× Plastic will photodegrade and turn into trash and microplastics. × Plastic increases the velocity of runoff and can cause downgradient erosion. × Prone to being disturbed by wind. × The plastic sheeting may not be recyclable and will add to landfill waste. This may cause problems for LEED[2] projects.

[2] Leadership in Energy and Environmental Design, U.S. Green Building Council, https://www.usgbc.org/leed.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Geotextiles	Geotextiles are typically synthetic materials used to temporarily or permanently strengthen or protect erodible surfaces.	Geotextiles are manufactured of synthetic materials including polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass, and other materials. They can be woven or non-woven fabrics. They come in a variety of thicknesses and durabilities.	They are often installed as a separator between exposed soil and riprap in sediment traps, post-construction storm water measures, and stone-lined storm water conveyances.	✓ Durable and long-lasting. ✓ Permeable. ✓ Helps to strengthen slopes or conveyances.	× Synthetic material will photodegrade over time and turn into solid waste and microplastics. × Relatively expensive.
Turf reinforcement mats	A three-dimensional matrix-like product composed of non-degradable synthetic materials placed permanently over erodible surfaces for slope stabilization, scour prevention, or vegetation support.	Manufactured of synthetic fibers, filaments, nets, wire mesh, and/or other durable materials.	Installed for long term protection of steep slopes, highly erodible surfaces, and conveyances of concentrated flow.	✓ Durable and long-lasting. ✓ Permeable. ✓ Allows vegetation to grow through it. ✓ Helps to strengthen slopes or conveyances.	× Relatively expensive. × Relatively difficult to install.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Hydraulic (Spray Applied) Erosion Control Products (HECPs)					
Blown straw with a tackifier	Dry straw is either hand or machine scattered and then sprayed with a liquid tackifier.	There are a variety of types of straw and tackifiers. Ideally, a dry straw free of undesirable seed should be used. A tackifier containing plant-based glues is usually preferred.	Straw should be applied in a soil covering layer that is ideally 2 to 3 inches thick (approximately 2–3 tons/acre). It is best to have varied straw lengths or to include wood or paper cellulose (fiber) mulch to help the tackifier join the pieces together. Requires 48 to 72 hours of dry weather for curing.	✓ Usually this is the most cost effective and durable soil cover, many times lasting up to two seasons. ✓ Straw obtained from feed stores will often contain wheat or oat seed, which will germinate for added erosion control.	× Should not be used on slopes greater than 2:1. × Blowing straw can cause excessive dust. × Straw can contain undesirable seed. × Straw may need to be removed for subsequent phases of work.
Cellulose mulch	Cellulose (typically from wood) is mixed with a liquid tackifier and sprayed onto areas of soil disturbance. Cellulose is a polymer that can crystallize to form very strong fibers.	Fiber is typically cellulose derived from wood, paper, or cotton. A plant-based glue/tackifier should be used.	It can be applied to gently sloped areas (less than 4:1) for very short-term protection. Requires 48 to 72 hours of dry weather for curing. This product is best used in conjunction with blown straw.	✓ Economical ✓ Two-dimensional structure allows it to not interfere with compaction or other surface preparations.	× The two-dimensional structure causes it to lie flat on the ground and, therefore, does not hold moisture well and does not provide as much protection from raindrop erosion. × When the cellulose mulch dries, at times and for various reasons, it can form a paper mâché-like layer which is hard for seedlings to penetrate.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Soil binders/polymers	Although these materials are not a true soil cover, when applied to bare soil, they bind soil particles together making the soil less erodible. Chemical binders are particularly useful with soils having high clay and silt content.	Binders can be all-natural, plant-based adhesives, cementitious materials like quicklime, resin emulsions, or polymers. A very common polymer used for soil stabilization is polyacrylamide (PAM), which is an anionic polymer.	Application will be based on the type of soil binder selected. Generally, soil binders are applied directly to bare soil. PAM is often included with a cellulose mulch or other HECPs.	✓ Helps to make soils less erodible. ✓ Can be quickly applied directly to bare soil and, in the case of PAM, requires little curing time. ✓ Can be used in conjunction with other HECPs for improved erosion control.	✗ Depending on the product selected, it can result in the introduction of other pollutants in storm water runoff (e.g., high pH from quicklime, excess polymer, etc.)
Bonded fiber matrix (BFM)	A wood or straw mulch with a tackifier that is mixed and sprayed onto areas of soil disturbance.	Manufacturers will utilize a variety of fibers and tackifiers to create their own blend of BFM. Additives can include fertilizers, mycorrhizal fungi, organic compost, PAM, and seed.	BFMs are ideal for moderate to steep slopes (less than 2:1) on which it should be applied at 4,000 lbs./acre. On flatter surfaces, it can be applied at 2,500 lbs./acre. The soil should be dry and no rain forecasted for 48 hours.	✓ The three-dimensional structure provided by the wood or straw media allows for greater interlocking of fibers and provides more water retention and a better environment for seed germination. ✓ Soil protection for 12 months or less.	✗ Requires dry soil for application and a 48-hour or longer period of dry conditions for curing.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Flexible growth media (FGM)	A wood or straw mulch with a combination of tackifiers and polymers that provide both chemical and mechanical bonding.	Manufacturers will utilize a variety of fibers and tackifiers to create their own blend of FGM. Additives can include fertilizers, mycorrhizal fungi, organic compost, PAM, and seed.	FGMs are ideal for moderate to steep slopes (less than 2:1) on which it should be applied at 4,000 lbs./acre. On flatter surfaces, it can be applied at 2,500 lbs./acre. The soil should be dry and no rain forecasted for 48 hours.	✓ Can be applied when soil is damp or rain is expected within 24 hours. ✓ The three-dimensional structure with the blend of tackifiers and polymers allows for a flexible environment that facilitates seed germination. ✓ Soil protection for 12 to 18 months.	× Tends to be the most expensive of the HECPs.
Mulches & Compost					
Straw	A bed of straw placed on the soil.	There are different types of straw. Some are certified weed-free. Others, like oat straw obtained from feed stores, will often contain seed that will germinate and enhance erosion control.	Hand applied at 2”–3” thick, which should equate to approximately 2–3 bales/1,000 ft^2 or 2–3 tons/acre; or equipment applied straw with a tackifier. A typical bale is 80 pounds x 50 bales = 2 tons which when machine applied to one acre will provide an approximate 1” thick cover. Thickness and number of bales needed will depend on the type of straw utilized.	✓ Hand application for small areas or equipment applied (blown) to large flat areas can be very economical. ✓ Durable.	× Should not be used on slopes greater than 2:1. × Straw can contain undesirable seed. × Straw may need to be removed for subsequent phases of work. × Can result in excessive tannin or lignin in storm water runoff.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Wood	A bed of wood mulch placed on the soil.	Wood mulch comes in a variety of types and coarseness. It can be from chipped green waste or from specific types of wood such as redwood or cedar trees.	Applied at 2” thick, which should equate to approximately 270 cubic yards/acre. Can be applied by a blower truck.	✓ May be used as a permanent measure notably when derived from on-site or locally sourced chipped native vegetation that will contain, attract, or support restorative conditions (i.e., viable seeds, roots, etc.) by design. ✓ May be used around container plants during the landscaping phase when derived from “sterile” sources (i.e., void of viable plant parts). ✓ Some wood mulches, such as redwood or cedar, may help reduce pH. ✓ At times can be economically obtained.	× Should not be used on slopes greater than 2:1. × Depending upon the source, it can contain undesirable seed or trash. × Wood mulch may need to be removed for subsequent phases of work. × Can result in excessive tannin or lignin in storm water runoff. × May not be allowed as a ground cover by local fire prevention regulations.
Pine duff	A bed of natural pine duff placed on the soil. Pine duff is partly decaying organic matter that includes pine needles, leaves, bark, decaying wood matter, seeds, pine cones, and fungi.	It is usually locally derived and sourced. It will differ from one location to another as the ecosystems change.	Applied at 2”-3” thick. Usually, pine duff is scraped off the project at the beginning and stockpiled for later use.	✓ Natural ground cover endemic to that location. ✓ May remain in place as a permanent stabilization measure or used with landscaping. ✓ Contains nutrients, fungi, and a seed bank needed for a healthy ecosystem. ✓ Economical to obtain.	× Should not be used on slopes greater than 2:1. × Depending upon the source, it can contain undesirable seed or trash. × May not be allowed as a ground cover by local fire prevention regulations. × Can result in excessive tannin or lignin in storm water runoff.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Compost	A bed of composted material that is applied on bare soil as a soil cover and to provide a growing media.	There are a variety of compost feedstocks and coarseness of the compost product.	When used as a soil cover, utilizing a 2- to 3-inch layer of a mix of fine (3/8” to 1/2”) screened material and course (2”–3”) screened materials will provide optimal water retention and protection from raindrop erosion. Can be applied by a blower truck.	✓ Not only provides an effective soil cover, but also retention of storm water and filtering of the storm water that does run off. ✓ May remain in place as a permanent stabilization measure or be used with landscaping. ✓ Provides a growing media on soils that are infertile. ✓ Utilizes recycled materials and can help with meeting LEED green building certification requirements.	× Should not be used on slopes greater than 2:1. × Depending upon the source, it can contain trash.
Other					
Crushed rock	Covering bare soil with a layer of crushed aggregate.	Will vary based on local supply. Typically, 3/4” to 2” rock free of fine material (larger than a #200 mesh sieve).	It should be a 2” thick layer on soil. In areas of high traffic, it may be best to place a permeable geotextile below the rock layer. When installed on low to moderate slopes, having a roughened soil surface and keying in the base will help prevent sloughing of the rock. Rock should have jagged edges, not rounded.	✓ Provides durable and permanent stabilization. ✓ Ideal for areas where vegetation is undesirable, such as road shoulders, or for fire prevention. ✓ Ideal for areas that will have vehicle and equipment traffic.	× Expensive and labor intensive. × Can be unsightly. × Can cause increased runoff. × Can contain fines that can cause turbidity increases or have pH altering minerals present. × Aggregate may become “contaminated” with sediment and not be useful as a base layer for paving.

Cover Type	Description	Variations	Application	Advantages	Disadvantages
Paving	Covering soil with a permanent asphalt-concrete (AC) pavement.	This will vary with the engineering design for a particular development or project. It can consist of asphalt, concrete, pavers, or other durable structural pavements.	Typically, contractors do not want to install exterior pavement until the end of the project to avoid having it scuffed up or damaged during construction. However, especially with asphalt, paving can be installed in multiple lifts. Installing a first lift of asphalt in a parking lot can provide a stabilized work environment during the rainy season.	✓ Planned site improvements can double as erosion control measures. ✓ Pavement provides a stabilized work area and can allow work to continue during the rainy season. ✓ Pavement is relatively easy to clean and can help with spill control.	× Can be damaged during ongoing construction activities. × Can cause short-term issues with elevated pH or oil & grease. × An additional lift will cost more because of additional mobilization of paving crews (but may be offset by the savings on temporary erosion control measures).
Sod/landscaping	Covering soil with grass or other vegetation as part of permanent landscaping.	There are multiple variations of sod, seed, and ground-covering plants that may be incorporated into the landscaping design.	Use landscaping design to provide permanent vegetation of erosion control. The design should include not only ground-covering vegetation but also trees and shrubs to act as rain interceptors and to lock in soils.	✓ Effective long-term soil cover. ✓ Uptake and filtering of storm water reducing runoff and improving water quality. ✓ Soil stabilization with roots. ✓ Trees and shrubs provide a rain canopy to lessen effects of raindrop erosion.	× Requires maintenance and upkeep. × May require supplemental irrigation. × Will have an establishment period when erosion control is less because of immature plants.