

City of Albuquerque Construction Site Manual 2018



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Construction Site Inspection Standards

This Construction Site Inspection Manual is meant to set standards for BMPs, maintenance and corrective actions. It will reference the Construction General Permit. The primary objective of this manual is to provide a process for installation design, details and inspection criteria for Best Management Practices (BMP's) in accordance with good engineering practices.

Effective Site Management should be considered prior to beginning a project.

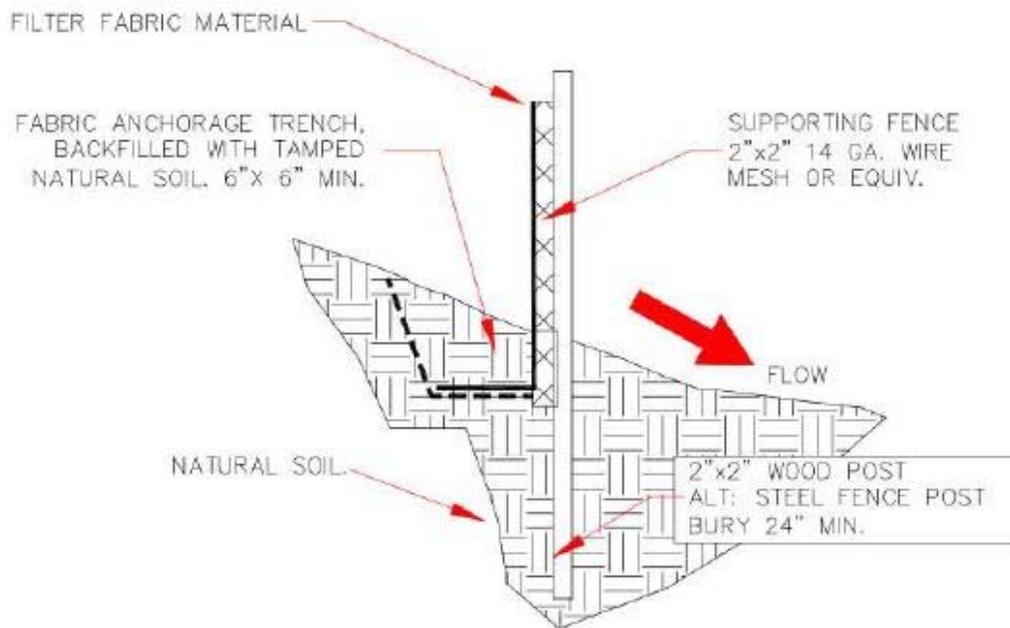
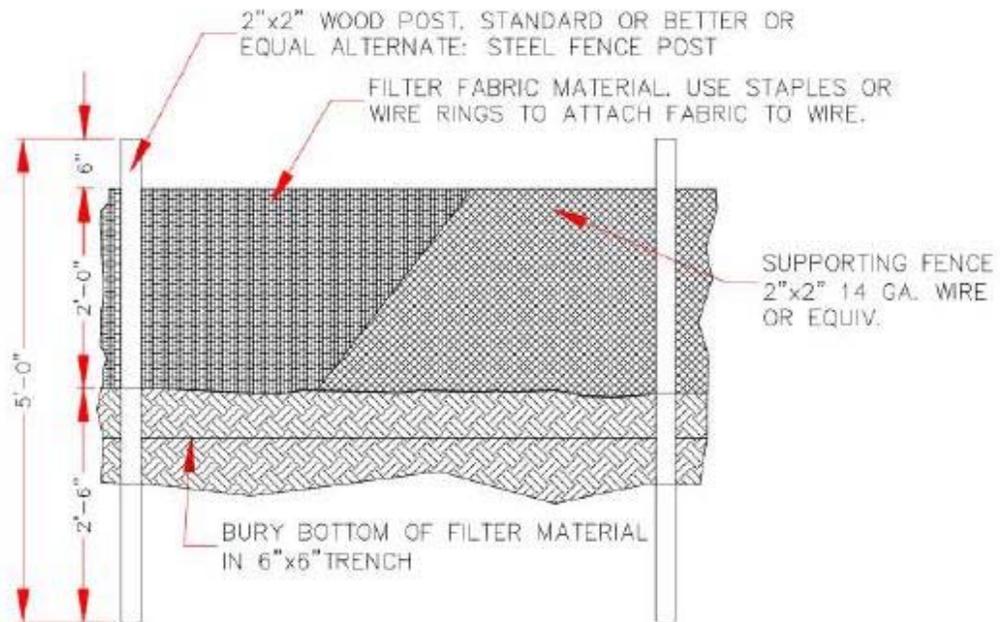
- Clear only what is required for immediate construction activity.
- Mass clearing and grading should be avoided.
- Avoid disturbing sensitive areas such as steep or unstable slopes, surface waters or existing drainage channels.
- Re-stabilize disturbed areas as soon as possible after construction is completed.
- Make sure all workers understand the major provisions of the erosion and sediment control plan.

Sediment BMPs:

The most common sediment BMPs are: silt fence and mulch/filter sock. A sediment BMP is to trap sediment, but let stormwater pass through. Straws wattles are primarily an erosion control BMP, but may be effective for inlet protection in a sump condition as they do not allow water to pass through. The water has to go over the wattle.

Silt fence:

Silt fence is to be installed per the following detail shown on the following page.



Wire mesh is not required, but it is recommended as it will help prevent tearing due to increased wind speed.

Silt fence is to be buried approximately 6 inches. The soil backfill is to be compacted. Poles are to be 2" X 2" wood or metal "T" or "U" posts. Pole spacing is not to exceed 10 feet between poles in straight-run sheet flow areas. Where the silt fence goes around a corner and if there is a low corner at the site the poles should be spaced approximately 6 feet apart or closer.

If concentrated flow may drain towards the silt fence, then the velocity should be slowed down prior to contacting the fence. Straw wattles, mulch socks, cobbles or a berm can be used to minimize the velocity.

Poles are to be buried approximately 2 feet deep. A deep bury is important to support soil, water and wind loads.

1. Fence is to be installed on the down-slope area of the site or wherever the disturbed grade on-site is higher than the existing grade/top of curb of the adjacent property/street. Silt fence can also be installed along streams, channels, and perimeters of projects.
2. Silt fence is required to be buried. Pull up on the silt fence. It should not move more than ½ inch. It should not lift out of the soil.
3. Silt Fence is not created for use in high velocity situations where flow is heavily concentrated such as a channel.



Gap between silt fence and the ground. Sometimes placing a mulch sock in this location is the easiest way to mitigate this condition.



Silt fence is not buried.

4. There should be no tears or holes in the bottom ½ of the silt fence.



Silt fence torn below half the height.

5. The grade shall not be higher than halfway up the silt fence and the silt fence shall not be bulging regardless of sediment height against the silt fence.



Silt fence is too full. Dirt is to be removed from behind the fence.



Silt fence is too full. Dirt is to be removed from behind the fence.

6. There shall be no gaps in the silt fence. The silt fence is to be continuous.



Silt fence is not continuous.



Gap in silt fence. Silt fence should have been extended to the block wall. This corner is a drainage outfall for the site.

7. If silt fence is run across an impervious surface (e.g. concrete or asphalt) an additional BMP is to be laid at the bottom of the silt fence to seal the bottom of the fence with the impervious surface.



Silt fence installed across an impervious surface.

8. Check the stability of the poles by applying a light (5 to 10 pounds) force to them. The pole should not move at all.



Silt fence installed with $\frac{3}{4}$ " x $\frac{3}{4}$ " poles that are not strong and these poles were not adequately buried.



Typical result when silt fence is installed with small (3/4" x 3/4") poles spaced too far apart.



Silt fence installation with numerous issues: not buried, poles are not strong enough, fence is not taught and it is not buried. Reinstallation of this silt fence or installation of another sediment BMP is required.

Mulch Socks/Filter Socks:

Mulch socks and filter socks are the same thing. In general, they are sock material filled with wood chips. They can also be filled with gravel, in which they are called rock socks.

1. The sock is to be set in the ground and sometimes staked so that it will not move when the stormwater drains into it. Socks on grades steeper than 2.0% are to be staked.
2. Sediment shall not be higher than halfway up the sock.
3. Debris shall not be higher than the top of the sock.
4. Flow shall not go under or around a sock.



Flow undercutting beneath the filter sock. Sock was not staked down.



Flow under rock sock at joint. If it was turned uphill and overlapped the silt fence, it may not have leaked.

The following photos show acceptable examples of installing this type of BMP.



Mulch sock installed around a gravel pile in the street.



Mulch sock installed in front of a pipe that drains out of a pond.



Mulch socks installed to catch sediment draining downhill behind the curb and to reduce the velocity of the water. This area should have been stabilized.



Filter socks installed on a slope to prevent erosion. This area should have been stabilized.



Mulch sock installed at bottom of silt fence to “seal” on an impervious surface.

Vehicle Tracking Control:

Vehicle tracking control is a BMP installed to prevent sediment from being tracked offsite/into the street. Most Operators use an aggregate pad (track-out pad) with geotextile fabric below it to prevent the aggregate from being pushed into the dirt. Geotextile fabric is generally placed 6-12 inches below the top of track-out-pad and with aggregate 3-6 inches in diameter.



Aggregate track-out pad. Note construction fence to prevent bypass.

Metal grate types of this BMP are also effective at removing sediment. They are used in conjunction with an aggregate track-out pad.

1. The grate should cause the vehicle to bounce. Usually these are used in conjunction with an aggregate track-out pad.
2. The grate should not be full of dirt.
3. The grate shall prevent track-out.



Metal grate type of Vehicle tracking control BMP with aggregate.

For aggregate track-out pads:

1. The majority of the aggregate should be visible. The track-out pad is to prevent track-out,



Track-out pad requires maintenance. Not enough aggregate is available for track-out control. Replenish or replace aggregate as it becomes clogged with sediment.

2. There should be no bypass. Bypass is evident if there are tire tracks outside of the aggregate.



Vehicle bypassing track-out pad.

3. Track-out pad shall be long enough to prevent track-out.



Track-out pad is too short. In addition, fine material was tracking-out onto the street.

4. There shall not be a dirt area between the aggregate and the roadway/curb.

5. The track-out pad shall prevent track-out. If track-out exists, the following adjustments are to be made: increase the length of the aggregate and/or change the size of the aggregate. It may help to: drive forward on the track-out pad, back-up, then exit the site. This method increases the effective length of the track-out pad
6. If the site is very muddy and vehicles are causing heavy track-out, then vehicles are to not leave and return repetitively until site conditions improve.
7. Track-out is rated as: none, minor, medium and heavy. There may be a minor amount of track-out even if documented as “none”. All other ratings require removal of the sediment.
8. Track-out is not to be washed into roadway or surrounding inlets/storm drains.



This amount of track-out was rated as minor.



This amount of track-out was rated as medium. Medium track-out will be thicker and be further from the site than minor track-out.



This amount of track-out was rated as heavy. Heavy track-out is thicker, covers most of the roadway and extends further from the site than medium track-out.

The Operator of a site with heavy track-out will receive a Violation Letter. Street should be swept regularly to mitigate excessive track out.



Example of a muddy site, wherein, vehicles shall not be entering the roadway except to leave the job site for the day. The contractor at this project shut down receiving dirt trucks for the day.

Using a paved surface for Vehicle Tracking Control:

1. In some instances, there is a long paved surface to drive on prior to leaving the site. This can be used for track-out as long as it is preventing track-out and it is not downhill to the Public roadway.
2. In general, length of the paved surface should be at least 100 feet long to prevent track-out.
3. The paved surface is to be swept on a regular basis

How much sediment is allowed in a street?

Very little sediment is allowed in a City street, where, when exposed to stormwater can be transported into the City's drainage system.



Too much sediment in the street.



Another photo of too much sediment in the street.



Single family residential project with too much sediment in the street. The drain to the street is shown in the top of the picture.



If this was the only sediment in the street, it would be acceptable. This does not mean the sediment BMP on the lot is acceptable.

Inlet protection allows the Operator to have more sediment in the street than if there is no inlet protection. The amount allowed is the amount that would not plug the inlet protection in one storm event.

Dirt shall not be taken from the site and placed into the street without a sediment BMP. If there is equal opportunity to place it on a non-impervious surface, this is preferred to placing the dirt in the street with a sediment BMP.



Dirt placed in street when digging around pull boxes.

Dirt Ramps:

Dirt ramps shall not be constructed in a street/gutter where stormwater can transport the material in to the City's drainage system.



Dirt ramp used for access to the site.

If access is required the following methods are acceptable:

1. The preferred method is to cut the curb, so a ramp is not required. If the curb cut is in the same location as the future entrance/exit, this minimizes the amount of work to be done.
2. Place cold-mix asphalt in the gutter. Asphalt is not to extend past the gutter into the paved portion of the roadway.



Cold-mix asphalt ramp used for accessing the site.

3. Lay lumber parallel to the curb. This method is not to be used on high speed (35MPH and greater) roads due to a car may drive into it.



Lumber laid parallel to the curb to create a ramp to access the site.

4. Some contractors have built ramps from lumber that are triangular- shaped.



Ramps constructed of plywood to create a ramp for accessing the site.

Note: Any injury or property damage to a motorist, cyclist or pedestrian due to the installation of a ramp is the responsibility of the contractor/property owner.

Inlet Protection:

The proper inlet protection shall be used and maintained to prevent sediment and wastes from entering the City's drainage system and shall minimize the risk of flooding. The type of inlet protection utilized shall depend on the inlet type, slope and volume of flow.

Inlet protection should be used not only for inlets/storm drains within the construction site/disturbed area but also any inlets/storm drains outside the project area that may receive stormwater discharges from the construction site/disturbed area.

In residential subdivisions where there are inlets internal to the construction site, the style of inlet protection should change as the site is developed. This is due to initially there is less drainage and more exposed dirt, then as streets and houses are constructed, there is more drainage and less exposed dirt.

When the site is mostly dirt (no houses) a more restrictive style of inlet protection shall be used that protects the throat and the grate. As more houses are built and there is less exposed dirt, a

less-restrictive style shall be used that catches sediment in the gutter but does not cover the throat or the grate of the inlet.

1. Straw wattles are only to be used if the inlet is located in a low-spot (sump) and the water can go over the straw wattle and not bypass the inlet.
2. For inlets that are flush with the grade (e.g. Type "D" or area drain) the inlet shall be covered with a mat-type of BMP that is tied to the grate of the inlet.
3. For inlets with a throat opening and a grate, the inlet shall be protected with a BMP that covers the throat and the grate.
4. Rock bags or mulch socks can be placed in the gutter upstream of the inlet when the site meets the criteria to use a less-restrictive style of inlet protection as discussed above.
5. Inlet protection constructed of silt fence surrounding the inlet may be used when the inlet is surrounded by dirt so that the stakes can be pounded in.

Inspection Criteria:

1. The inlet protection shall be able to let water drain through.
2. For mat-type inlets, at least 50% of the mat area must not be covered with sediment and debris.
3. For throat type of inlet protection, the sediment shall not be higher than halfway up the mulch sock.
4. For a one-piece style of BMP, at least 50% of the area must not be covered with sediment and debris.



One-piece inlet protection BMP for an inlet with a grate and a throat.



Cocoa mat grate cover with mulch sock covering the throat. It is working, but the Operator was informed it required maintenance due to the amount of sediment on the mat and upstream of the BMP.



Rock bags used for inlet protection. Photo was taken during a rain event.



Cocoa mat used for grate and throat.



Inlet protection requires maintenance since sediment is to the top of one rock bag and the bags no longer form a "T".



Open storm drains are considered an inlet and require protection. This also includes storm drains that are not actively being worked on.



Mulch sock used for inlet protection.



Silt fence style of inlet protection. This Operator also used large aggregate to reduce the velocity of the flow.



Another application of using silt fence for inlet protection.



Filter sock is to be replaced since sock is torn.



Filter sock is protecting the grate, but not the throat of the inlet. Basically it is not working.



Inlet protection requires maintenance since grate is more than half-full of sediment.

Berms

Earthen berms can be used to direct or to pond stormwater. If a berm is constructed it is to be compacted. If a berm is not compacted, it will get blown-out and contribute additional sediment into the drainage system. Adequate compaction should be able to be obtained by driving earth-moving equipment on the berm.

Inspection criteria:

The berm should be compacted such that the inspector does not sink into it when walking on it. Uncompacted berms shall not be built.



Uncompacted berm got “Blown-out” during a storm.

Arroyo and Channel Construction:

When working in or adjacent to an arroyo or concrete channel, loose soil shall not be stockpiled or left in the low-flow area of the arroyo or channel. A berm or a similar BMP is to be constructed to divert flow into a low-flow area.

If there are active storm drains in the work zone, an energy dissipator is to be constructed at the pipe outfall to slow the velocity of the stormwater to less than 3 ft/sec at the end of the dissipator. A plunge pool constructed of large aggregate is the most common form of energy dissipation.

If there is an arroyo or channel draining into the work zone, an energy dissipator is to be constructed upstream of the confluence to slow the velocity of the stormwater to less than 3 ft/sec at the end of the dissipator. A plunge pool constructed of large aggregate is the most common form of energy dissipation. There are equations that can be used for sizing the energy dissipator and the aggregate. They are based upon methods provided by the USBR and FHWA.



Energy dissipation (plunge pool) for slowing the velocity of water entering the arroyo under construction. This one could have used more aggregate, but it was still functional.



Energy dissipator for large storm drains

Rasping Styrofoam:

A common construction activity is to place Styrofoam on the exterior of a building prior to applying stucco. The Styrofoam is rasped to level it out and to roughen the surface prior to applying stucco. The rasping process creates lots of small pieces of Styrofoam which are easily transported by wind.

Two BMPs help contain the small pieces of Styrofoam. One is to hang sheathing/plastic on the exterior of the building to help minimize transport of the Styrofoam. The other BMP is to vacuum it after it hits the ground/surface.



Rasped Styrofoam on the ground.

Inspection criteria:

Rasped material is to be removed during the rasping and not it is not allowed to accumulate. 95% of the rasped material is to be removed from the ground/surface by vacuuming.

Rasped Styrofoam is not to leave the site or enter stormwater conveyances of any kind. If the rasped material is leaving the site by wind, the process should be stopped until the wind subsides.



Plastic sheathing used to contain Styrofoam during rasping.

Painting/Spray Painting:

If items are to be painted outside the building, a tarp or similar is to be used to prevent paint from falling on a surface where it can be transported by stormwater. “Mix paint indoors, or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain or watercourse.

Dispose of any paint thinners, residue and sludge(s), that cannot be recycled, as hazardous waste. For water-based paint, clean brushes to the extent practical, and rinse to a drain leading to a sanitary sewer where permitted, or into a concrete washout pit. For oil-based paints, clean brushes to the extent practical and filter and reuse thinners and solvents.” (Caltrans 2003)



A tarp or similar shall be used under the item to be painted.

Oiling Forms:

When oiling forms, the process is to be performed inside the building or over a tarp or similar to prevent oil from falling on a surface where it can be transported by stormwater.

General BMP for coatings:

When applying a coating of material this operation is to be performed indoors or over a tarp or similar. The only liquid to contact the ground is clean water.

Wash-out

Designated washout areas should be provided for any concrete, stucco, mortar or paint operations. Washout areas should be designated with signage and located as far away as possible from waters of the U.S., storm water inlets, or conveyances. "Wash-out should be directed to leak-proof containers or leak proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation. (CGP, 2017)."

If the stucco/concrete/mortar is firm when it contacts the soil it is not considered wash-out. This is because it is not wet enough to infiltrate into the soil and then be carried away by stormwater. Examples of where this may occur is applying stucco to a building or mortaring joints when constructing a CMU wall.

A centralized wash-out may be effective for concrete trucks. Examples include a lined-pit or roll-off container. Inspect the roll-off container to see if it is leaking. Some have had a long life and leak. A leaking wash-out facility is not acceptable.

All wash-out material is to be inside the pit or roll-off. Missing the pit or roll-off container is the same as not using it.



Lined-pit wash-out.



Roll-off style of wash-out facility. This container also has ramps so the pump can also be discharged into the roll-off.



These roll-off wash-out containers were lowered for easier access.



This wash-out lined pit is too full and is no longer effective.



This wash-out pit is clearly full and requires replacement.

It has been noted on numerous inspections that a centralized wash-out is ineffective for stucco, mortar and paint wash-outs as it is generally too far for the contractor to walk to use the BMP. A local wash-out should be used for these operations. The best BMP for stucco, mortar, paint and grout is for the Operator to have a program in place, including education.



Localized wash-out boxes.



Same area as shown in the photo above prior to installation of localized wash-out boxes and training contractors to use it.

If a wash-out occurs at the site, the Operator is expected to remove it the same day. The wash-out material as well as the wetted soil are to be removed and disposed of appropriately.

Mortar and Stucco mixing.

It is possible to mix stucco or mortar without the wet material contacting the ground, but it takes great care and is rarely observed. If wet stucco or mortar contact the ground near due to mixing, this is considered wash-out.

Mortar towers shall have a liner beneath them to prevent the wet mortar from contacting the soil.



Mortar towers with plastic beneath as a BMP.

Construction Debris and litter

Construction debris is material that is a byproduct of the construction process. Examples include sheetrock and lumber.

Litter (domestic waste) is material that is discarded as the owner of the material did not wish to dispose of the material properly. Examples include: water bottles, soda cans and burrito wrappers. This may be due to a convenient trash receptacle was not provided. In general, a worker will not walk more than 50 feet to dispose of litter properly. Therefore, trash receptacles shall be placed in convenient locations around the construction site. Training may also be required. An example for the single family residential home building is a trash receptacle between each house or at each house.

Some consideration of the Operator's process for handling construction debris may be granted, but no consideration is granted for litter.

Construction and domestic waste are to be placed in a leak-proof container and not exposed to stormwater by means of a tarp of secondary containment may be used.



Tarp partially covering waste container. In case of precipitation, the tarp can be pulled over the entire.

Street Work

Most development projects involve construction in the street or construction of a street. Streets in Albuquerque are designed to be a conveyance of stormwater. In addition they also convey nuisance waters and contractor induced water (fire hydrant testing, etc...). Therefore, a storm is not necessary for drainage to be present in the gutter/street.

Transverse (90 degrees to direction of travel) Street Cuts

It is common to have to cut the street to construct a water or sewer line. The BMP to use for Transverse street cuts is to place the excavated soil on the uphill side of the street cut. If the street is flat (no uphill) a filter sock or similar shall be placed at the toe of the dirt pile, if rain is imminent or water from another source is present.

Longitudinal (in the direction of travel) Street cuts

The project may require a longitudinal street cut. Since most City streets have a cross-slope, the drainage will be towards the gutter pan. A filter sock or rock bag shall be placed in the gutter pan to catch any sediment that may leave the work area.

Constructing a portion of a street.

It is common that the development project will have to construct half a street section along the frontage of the project. The same BMP(s) used for Longitudinal Street Cuts shall be used. (cc)

Cutting Curbs

It is common to have to cut the curb. The cutting machine uses water, so drainage is present. The byproduct of cutting curbs is similar to wash-out and is treated as such. It is to be placed in a wash-out container. (cc)



Wash-out from curb-cutting operation.

Open storm drain pipes during storm drain construction- protect when not actively working on them(cc)

Future Material and Acknowledgements

At the time of publication of this manual, it was known that it is not complete and apparent that it would require updates at regular intervals. Rather than waiting, it seemed prudent to publish the document to help Operators with compliance at their construction sites.

An update will most likely occur on an annual basis.

Two topics that will be included in the update(s) are stabilization and covering of building material.

If you have any questions/comments on the material in this document, please contact Curtis Cherne in Stormwater Quality at 924-3420, ccherne@cabq.gov.

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