Minnesota Department of Transportation
Best Management Practices (BMP) for
Concrete Washout
May 2009, v5

The NPDES permit requires that concrete washout be managed on all construction projects. This document is Mn/DOT's interpretation of MPCA's guidance on concrete washout dated February 2009, and describes recommended best management practices for concrete washout. As improvements in technology occur for managing liquid and solid concrete washout materials, the department will amend this guidance document.

Mn/DOT Guidance: The NPDES construction permit requires concrete washout management (Part IV.F.4) on every project that uses concrete and concrete products, with SWPPP amendments (Part III.A.5 & Part III.A.7) as necessary to prevent the discharge of concrete liquids and uncured solids from making contact with soils unless in defined containment Best Management Practices (Part V.C & MS4 Permit).

- Accidental Discharge. If concrete washout makes accidental contact with soils or discharges to waters of the state, state law requires notifying (Minn R 7045.0468 Subp 6) the State duty Officer and immediately stop further discharge, remove discharge materials and restore the site to the pre-disturbance condition.
- Designated Area. The NPDES permit requires that designated concrete washout areas be posted with a sign or spray painted in a conspicuous manner, and inspected as often as necessary to function without discharge. Unless shown, the concrete washout location must be amended in the SWPPP.
- Special Location Restriction. Washout BMP must be sited more than 200 feet from a DNR public or permit listed Special Water unless robust, redundant best practice protection measures are installed and amended into the SWPPP.
- The Department reserves the right to indicate in the plans and final details where or where not concrete washout may occur.

The following options are recommended as best management practices for handling concrete truck, pump, mixer, chute, hand tools, concrete testing equipment and wheel barrow washout:

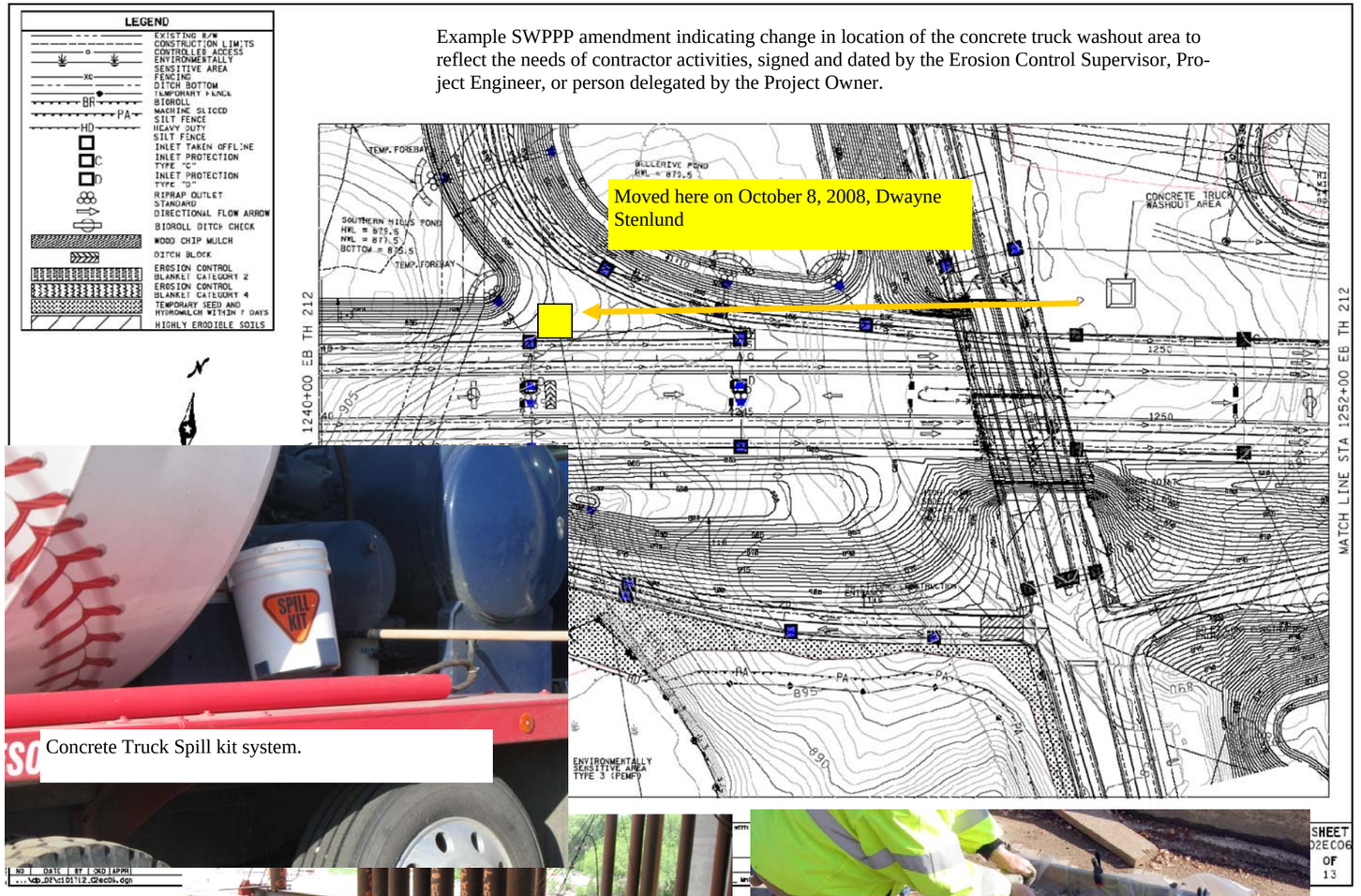
Option A: Lined Trap
Option B: Berm Trap
Option C: Dumpster
Option D: Chute Washout Systems
Option E: Concrete Truck & Pumper
Option F: Small Volume Systems

Spill Response Program: The contractor must have on hand the following items capable of capturing, containing or treating accidental discharge of concrete materials on ground and surface waters:
1. dry washed sand or wood slash mulch that can be used to temporarily solidify liquid concrete washout fluids to facilitate emergency pickup, and
2. Citric acid, dry ice or CO2 compressed gas cylinder (CO2 Sparging) to pH neutralize overflowing traps, berms, dumpsters or other emergency cementitious discharge due to weather or under-capacity trap containment conditions.

1. Prevent nuisance conditions as defined in Minn. R. 7050.0210, subp. 2
2. Compliance to the NPDES Construction and Minnesota State Disposal System (SDS) Permit of the Federal Clean Water Act, as amended, (33 U.S.C. 1251 et seq.), 40 CFR 122, 123, and 124, as amended, et seq.; Minn. Stat. chs. 115 and 116, as amended, Minn. R. chs. 7001 and 7090
3. Protection of ground and surface waters as defined in Minn. Stat. § 115.01, subd. 22
4. Beneficial reuse as defined in Minn. R. 7035.2860, subp. 4, item I

Photos shown throughout this guidance document does not constitute endorsement of any manufacturer by the Department.

Prepared by Dwayne Stenlund, CPESC #2052. Office of Environmental Services. 612-810-9409



Example SWPPP amendment indicating change in location of the concrete truck washout area to reflect the needs of contractor activities, signed and dated by the Erosion Control Supervisor, Project Engineer, or person delegated by the Project Owner.

Concrete Truck Spill kit system.

Excess and slump test solids placed on plastic until hardened. Contractor may consider installing wire or rebar hook for later pickup removal to crusher or recycling stockpile.

Discharge prevention pallet lined with disposable plastic for testing of concrete and washout of tools by Inspectors. Pallet may be made to accommodate skidsteer forks for quick pickup and discharge to defined washout trap areas until liquid evaporates and solids harden.

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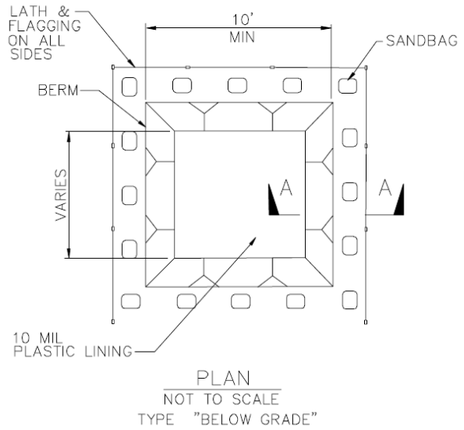
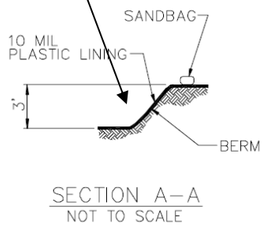
Option A: Lined Trap System.

A Lined Trap system is excavated in an area with storm water overflow protection and can consist of either a (1) plastic sheeting for all soil types that infiltrate or (2) constructed clay liner or other suitable zero infiltrating soil (Hydraulic Soil Group D). The goal is to retain the liquids until evaporation, CO2 neutralization/settling or pump extraction. A maximum of 0.5 cu yd of cured material can be buried in trap area.



PLAN
NOT TO SCALE
TYPE "BELOW GRADE"

Slope less than maximum angle of repose for soil type, typically less than 1:2.



SECTION A–A
NOT TO SCALE

Plastic Liner with posted sign or spray painted notice for washout.

Areas with Clay soil that allow storage until evaporation of liquids

Conc Washout sign

Option A, Type 2. Compacted clay or Hydraulic Soils Group D Liner for low infiltration soils. Size of excavated and compacted trap must be commensurate with washout requirements for daily construction activities. Maintenance must be sufficient to prevent overflows due to excess washout, trackout and storm water. The contractor may washout concrete slurries behind poured walls as long as there is no connection to the soil below nor drain-tiled, and 100 percent of material remains contained until evaporation or extraction. No concrete washout may occur if dewatering is or may be required to complete the fill of abutment or footing.

Spray Paint 'Conc Washout' on inside poured wall containment area

Option A, Type 1. Plastic liner for sandy soil, well head protections area, and critical soil shear area with side slope wall failure above MPCA/DNR Listed Special, or Impaired Waters. Trap size must be appropriate to expected washout volumes and allow suitable time for evaporation, or sufficient capacity for pump extraction. Sides of plastic liner can be held in place with any suitable material including sand, sand bags, rock, metal, wood logs, etc. The Type 1 Traps must be routinely maintained, and replaced as necessary to perform.

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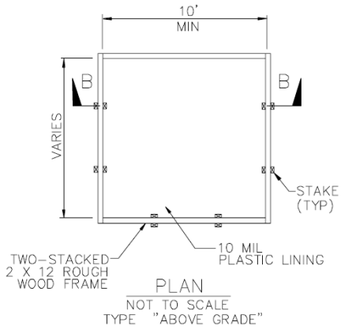
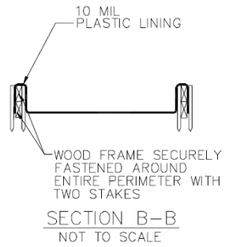
Option B: Berm Trap System.

A Berm Trap System may consist of raised walls constructed from wood or wood slash (3882 Type 5 Mulch Material), straw bales, Compost Filter Logs, sand bags, soil, lined concrete barriers, or any suitable strength materials to contain concrete washout liquids and solids until evaporation, curing, or extraction and final removal. No material can be left in place once operations are completed for that area.



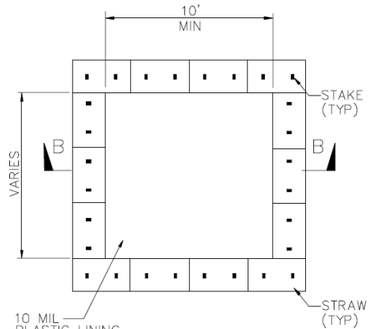
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



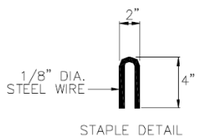
SECTION B-B
NOT TO SCALE

NOTES

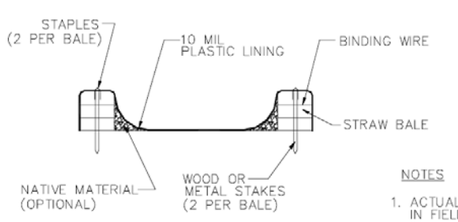
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



SECTION B-B
NOT TO SCALE

NOTES

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High cohesive, low infiltration soil berm


Concrete washout tote


Superduty washout berm


Sealed or plastic lined wood washout box

Slash mulch filter ring on low infiltration soils


Mixing sand berm with plastic liner


2x10 plastic and geotextile box, with 2x4 cleats for front loader pickup and movement


Granular berm and plastic liner

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Option C: Dumpster System.

A dumpster washout system is any commercial or retro-fitted leak-proof dumpster capable of holding liquid and solid concrete washout materials until final treatment and disposal. There are commercial companies available to manage and treat all liquid wastes and recycle all solids. Prevent comingling of other solid wastes with concrete washout materials.

Various concrete liquid and solid dumpster systems sized to store all materials until liquid evaporates or vacuum removed and treated by commercial operators.

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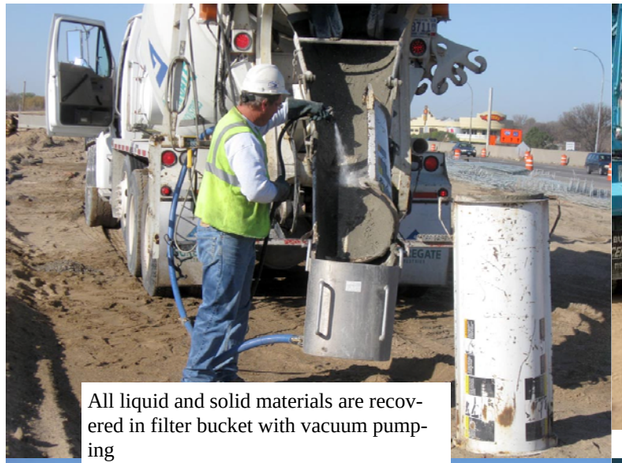
Option D: Chute Washout System

Two commercial types known include (1) a portable truck mounted pump recovery system, and (2) portable truck mounted pull behind wash tank. A locally manufactured system includes a portable truck mounted plastic trough and reinforced insulated wash box with sealed transport lid.

All devices appear capable of containing all concrete liquids and solids, or possess the ability to separate the liquids from the aggregate.

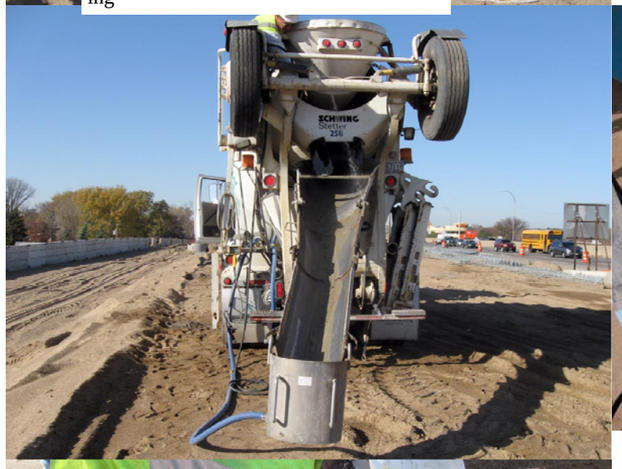
At the request of the ready mix operator, the clean washed aggregate may be left in suitable grade areas as determined by the Project Engineer or may be reused as concrete aggregate once processed to comply with Mn/DOT Specifications. At this time, all similar chute washout systems appear equal in ultimate performance goal of leaving no trace of concrete washout residues. Due to the nature of the liquid waste recovery system, there are no restrictions on where the operator may washout the chutes, tools, test equipment, and any portion of the truck that directly drains into to the filter apparatus. **A washout sign is not required for chute washout systems.** Mn/DOT concrete inspectors are allowed to deposit tool wash water into the filter bucket system at the discretion of the concrete producer. The contractor is advised not to wash-off truck parts and equipment that does not flow back into the chute system unless performed in designated equipment wash-off areas indicated in the SWPPP or SWPPP amendments.



All liquid and solid materials are recovered in filter bucket with vacuum pumping

Chute funnel installed onto chute section, prior to lowering chute funnel port to tank opening.

Chute Washout System, mounted on metal carriage.



Wash tank with slotted filter bucket installed in tank port.

Plastic wash trough mounted with rebar hooks to chute, capable of containing rinse wash water and

Final rinsing of aggregate.

Gravity Drain tube for decanting liquid waste from tank into drum, secured during wash tank filling.

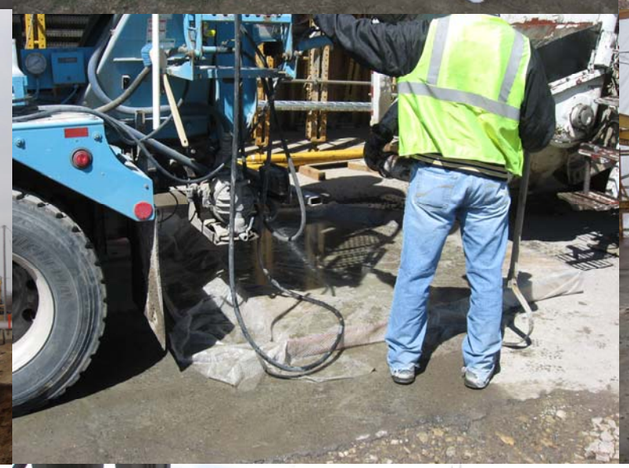
Approximately 3 rinse cycles are necessary to adequately clean truck chute, tools, and funnel.

Option E: Concrete Truck & Pumper

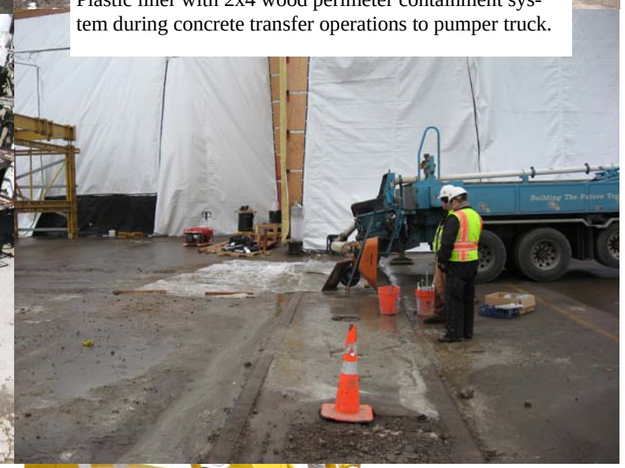
Certain operations involving pumper trucks that require priming and end flush cleaning will require special consideration of washout management. Empty concrete truck tank discharge is the process of total containment during high volume preparation and final cleaning of boom pipes and hoses. Final hopper and pump motor cleaning can use Options A through C, front loader bucket, or other Project Engineer accepted plan, and as amended in the SWPPP. Depending on concrete pumper location (ie. well head protection area, sand soils, etc.), concrete perimeter control using super duty barrier and liner, sand, sand bags and plastic or plywood liners may be required to prevent discharge to ground and surface waters during pump hopper loading. If liquid or solid material spills to the soil surface, remove at a frequency to prevent loss to ground or surface waters of the state, and clean by removal of contaminated soil areas to trap areas amended to the SWPPP.

Priming or washing out of pumper truck into empty concrete truck for total containment of washout slurry.

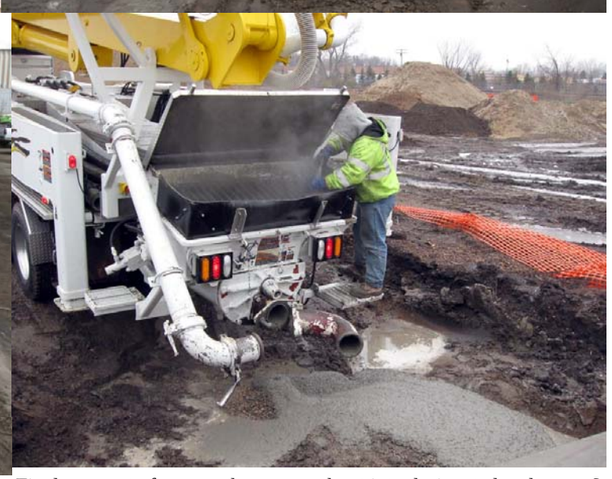
Pumper grout slurry discharge form box



Plastic liner with 2x4 wood perimeter containment system during concrete transfer operations to pumper truck.



Concrete Slurry Perimeter control using super duty barrier, aggregate filter toe, and slash mulch filter berms of pumper loading area



Final remnant of pumper hopper washout into designated and signed washout trap.

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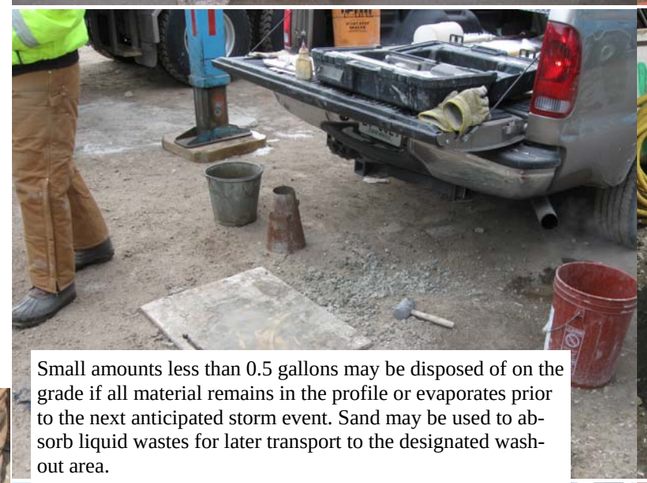
Option F: Small Volume

Concrete shaping, forming, and inspection operations involving concrete test equipment, tools, and other small items including trowels, forms, wheelbarrows, boots, and gloves that require washout and/or cleaning will require special consideration of washout management. All items must be cleaned or washed in a manner consistent with the requirements described in this guidance document such that liquids and solids from the cleaning operations do not enter ground or surface waters of the state. This can be accomplished by washing items by any method described in this guidance document, or other Project Engineer accepted plan, and as amended in the SWPPP. Less than 0.5 gallons of liquid wash waste may be disposed on the grade. If wash liquid or solid material spills to the soil surface, remove at a frequency to prevent loss to ground or surface waters of the state, and clean by removal of contaminated soil areas to concrete washout trap areas and as amended to the SWPPP.

Slump and concrete test equipment waste temporarily stored on plastic sheet until contractor removes at the end of each day.

Small quantity concrete wash water into bermed plastic lined trap

Traditional designated washout areas can be used for rinse water until evaporation.

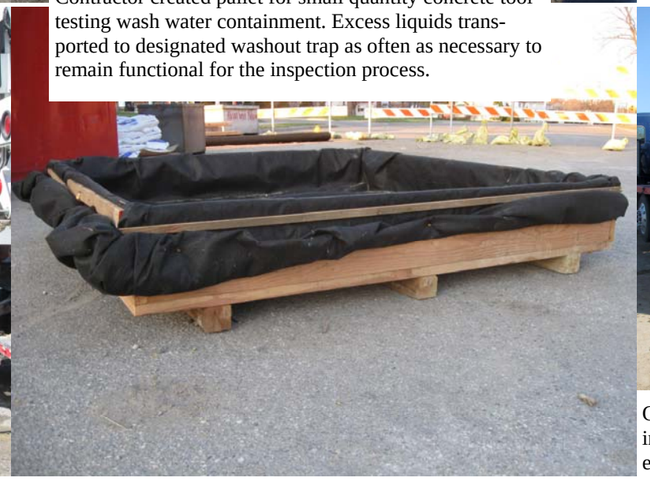


Small amounts less than 0.5 gallons may be disposed of on the grade if all material remains in the profile or evaporates prior to the next anticipated storm event. Sand may be used to absorb liquid wastes for later transport to the designated washout area.

Contractor created pallet for small quantity concrete tool testing wash water containment. Excess liquids transported to designated washout trap as often as necessary to remain functional for the inspection process.

Small quantity wash water placed on grade where equipment washoff has been designated in the SWPPP, in areas to receive permanent pavements.

Temporary rinse buckets used during testing operations, with liquids transported back into the ready mix truck to batch plant



Concrete bucket washout and solids management placed in contractor developed containment box, maintained each day of ready mix operations.