

TUCKER BROWN & VERMEER, LLC
ENGINEERING AND LAND SURVEYING

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MAY 17 2005

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CITY OF PONDERAY

***EROSION CONTROL and
STORM WATER MANAGEMENT PLAN***

For

***Vintage Court Medical
Ponderay, ID***

Prepared By:



May 10, 2005

ORIGINAL



102 South 2nd Avenue, Sandpoint, Idaho, 83864
(208) 263-5884

PROJECT SUMMARY

Vintage Court Medical is a proposed 10,000 sf office building to be located adjacent to Highway 200, just north of the Elks Golf Course. The 1.5 ac site is further described as: Located in a portion of Section 11, Township 57 North, Range 2 West, Boise Meridian, Bonner County, ID.

Proposed development as a result of the project will consist of 5450 sf of building footprint and 29,600 sf of paved parking area. Native soil consists of silt loam, as identified in the *Soil Survey of Bonner County Area, Idaho*. Topography of the site is gentle slopes to the south. The land cover consists of native grass and tress.

DESIGN CRITERIA

Method of Controlling a 25 yr., 24 hr. Event: Retention basins designed to store the volume difference between pre and post development conditions, based on a 24 hr., 25 yr. storm event (0.10 in/hr intensity).

New Development:

Runoff from the parking area will be directed to catch basins and piped in a 12" ads storm drain to a 4620 cf grassy retention area. The location of the retention pond has been determined based on the natural drainage patterns and storm water ponding areas of the site prior to disturbance. Water currently "ponds" at the southeast corner of the property.

EROSION and SEDIMENTATION CONTROL PLAN

Temporary Erosion and Sedimentation Control shall be done by mulching disturbed areas with hay or straw (8-10 lbs. per 100 sf) and constructing silt fence or straw bale barriers (*see Appendix, A-1*) at locations as shown on the plan (*Appendix, A-8*). Mulching shall be performed according to ISPWC specs. (*Appendix A-3*). The temporary erosion control features shall prevent storm water runoff and sediment from migrating and will reduce water velocities and lessen erosion; moreover, the barriers shall be placed perpendicular to the flow direction to achieve the aforementioned purpose. The fences or bales shall be implemented before construction begins and left in place until vegetation has re-established. Mulching shall be done after exposing bare soil.

A stabilized construction entrance shall be built at the Highway approach. The entrance shall be 100 lf and constructed per ISPWC SD-1005 specifications, attached as *Appendix A-7* of this report.

Temporary conveyance swales shall be constructed to collect runoff from the site disturbed areas during construction and direct storm water in a non-erosive manner to the retention basin. Runoff shall be free to flow to the swales from disturbed areas including, but not limited to: road subgrade and stock piles. The swales shall include straw bales placed at 50 ft. intervals. The swales shall have 3:1 side slopes and be graded at a max. 2% slope to slow water velocity and further lessen erosion.



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Permanent Erosion Control will consist of spreading a min. of 4" of topsoil over all bare soil areas and hydroseeding to establish permanent seeding. All areas where soil has been exposed shall be re-vegetated.

Rip rap shall be placed at all storm drain outlets. The rock shall be 6-8" in diameter.

OPERATION and MAINTENANCE PLAN

Any disturbed area shall be re-vegetated with grass and shrubs native to the area.

The newly seeded areas shall be inspected once per week and after moderate rain events for erosion. If erosion has occurred the eroded soils and vegetation shall be replaced.

Sediment deposits and other debris shall be removed and disposed of off-site. The outlet/inlet structures, ponds, and the drain pipes shall be inspected once per week during construction and after any moderate storm event. After construction has ceased, the system shall be checked once per month, and after moderate rain events. The pipes shall be checked and it verified that they are not plugged and are free-flowing. Any debris shall be removed and disposed of off-site.

Maintenance of the system shall be the responsibility of the Owner of the project. All permanent erosion and storm water control features must be installed per plan and functioning properly. All vegetated areas must have adequate root depth and stability. The Developer is responsible for all costs associated with O & M during this period.

It is the responsibility of the Owner/Developer to follow the EPA Baseline Construction General Permit Checklist. The "Operator" of the development, whether being the Contractor or Owner, shall obtain an EPA-NOI permit prior to construction.

CONSTRUCTION and RE-VEGETATION SCHEDULE

06/13/05	Pre construction meeting at the site between the Engineer, Contractor, Owner, and City Representative (at the City's discretion).
06/14/05	Install straw bale barriers as designated on the plan.
06/14/05	Construct the stabilized construction approach.
06/15/05	Construct retention basin for retaining storm water and re-vegetate. Provide mulching on all bare slopes.
06/16/05	Construct temporary conveyance swales, install erosion control devices and mulch as indicated.
06/20/05	Begin sub grade preparation and utility installation.
06/27/05	Finish utilities and begin road base and building construction.
08/01/05	Final all construction.



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08/02/05 Spread top soil over all ditches and other bare areas, hydroseed all areas where disturbed.
09/02/05 Remove temporary erosion control features.

Construction Schedule Notes:

1. The temporary erosion control (straw bale barrier or silt fences) shall be removed only after construction has permanently ceased. In addition, the re-vegetated areas must have sufficient root depth.
2. An operation and maintenance schedule shall be implemented as outlined in the operation and maintenance plan. Newly seeded areas shall be inspected weekly until it is certain that adequate root depth has formed.
3. The construction schedule is subject to change by the contractor or developer. This is only an outline of sequential events.

CALCULATION SUMMARY

Return period = 25 years
Rational method used for all hydraulics calculations unless otherwise noted. Open channel hydraulics analyzed by using Manning's Equation.

Pre-Development Conditions (Total Site)

Total Undeveloped Area = 1.5 ac
Composite Runoff Coefficient = 0.25 (pasture & woodland)
Time of Concentration = 20 min.
Rainfall Intensity = 1.5 in/hr (ITD - IDF Curves)
Pre-Development Peak Flow = 0.56 cfs

Post-Development Conditions (Total Site)

Total Area = 1.5 ac
Bldg. Footprint Area = 5450 sf
Parking Area = 29,600 sf
Green Space = 30,300 sf
Total Impervious Area = 35,000 sf
Composite Runoff Coefficient = 0.6
Time of Concentration = 10 min.
Rainfall Intensity = 2 in/hr (ITD - IDF Curves)
Post-Development Peak Flow = 1.8 cfs



Grassy Retention Area Required

Area Serving = 35,000 sf of developed area

Storage Needed to Retain the Increase in a 25 yr., 24 hr. Event = 4500 cf *<=governs*
((0.8 ac x 0.10 in/hr x 0.9) - (0.8 ac x 0.10 in/hr x 0.25))

Storage Needed to Retain the 1st 1/2" of Runoff = 1460 cf

Retention Volume Provided

Top Dimensions = 90' x 28'

Bed Dimensions = 72' x 10'

Total Depth = 36"

Effective Volume = 4620 cf



Appendix A

Plan.....A-1

Straw Bale Erosion Control.....A-2

Silt Fence Erosion Control.....A-3

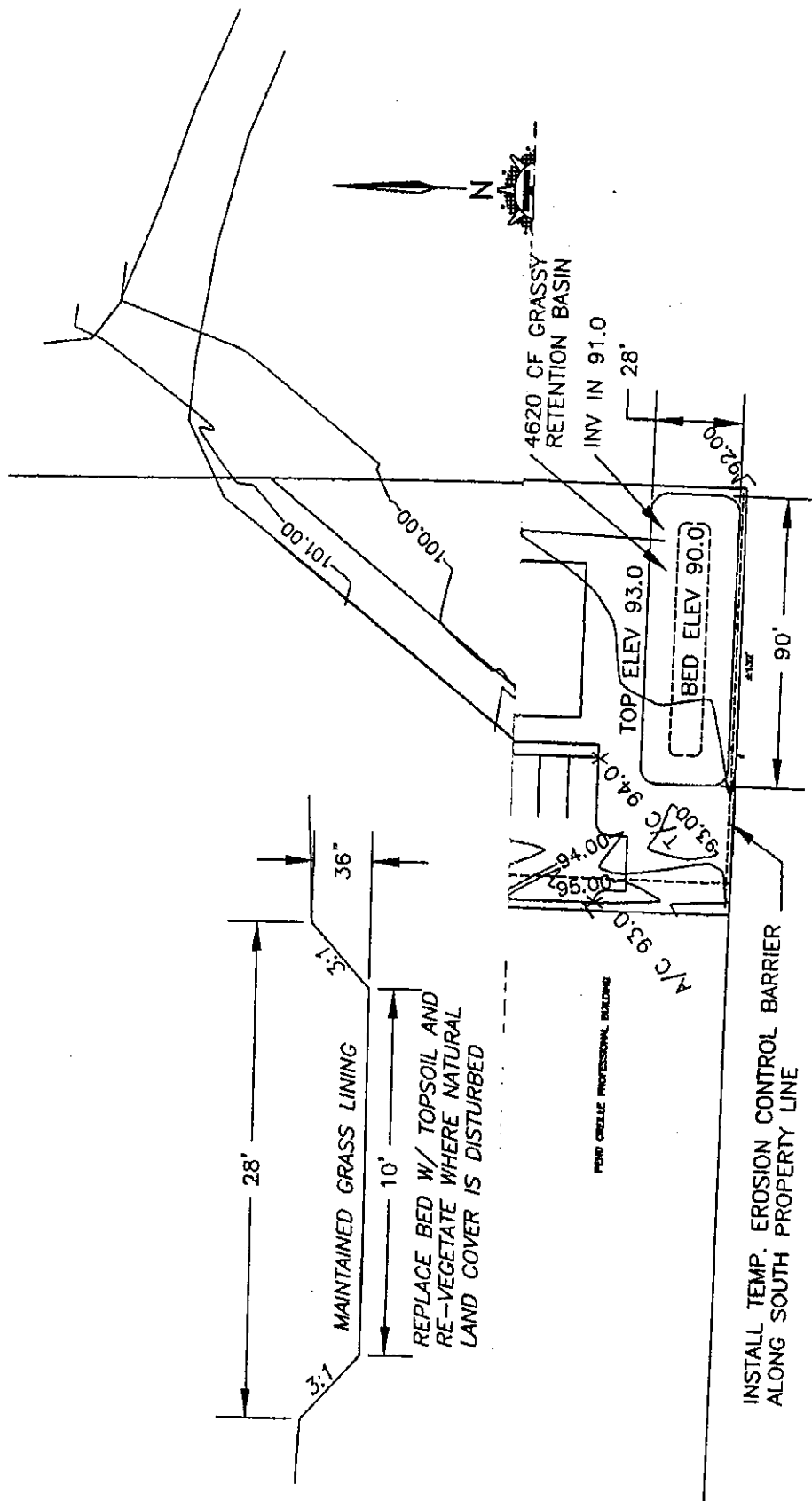
Mulching Specifications.....A-4

Construction Entrance.....A-7

Seeding Specs.....A-8



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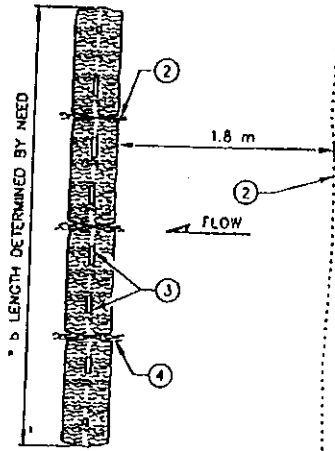


T&V
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VINTAGE COURT MEDICAL
 LOCATED IN A PORTION OF SEC. 11, TOWNSHIP 57 NORTH,
 RANGE 2 WEST, BONNER COUNTY, ID.

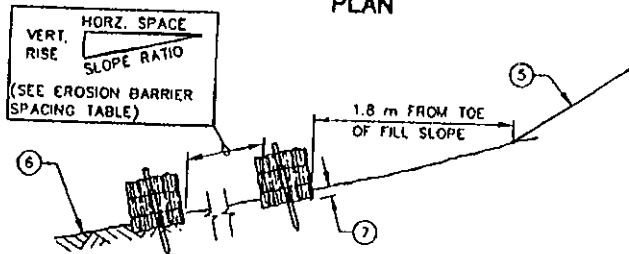
MAY 5, 2005

SHEET 1 OF 1

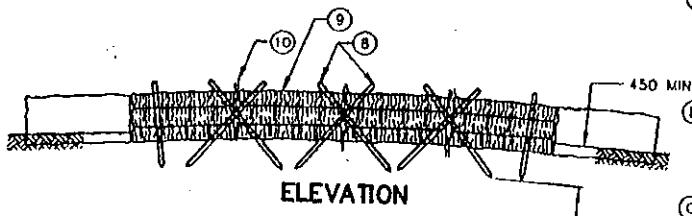


* b BALES TO BE PLACED PARALLEL TO TOE OF SLOPE OR ALONG SLOPE CONTOUR

PLAN



SIDE ELEVATION



ELEVATION

STRAW BALE BARRIER

EROSION BARRIER SPACING TABLE	
SLOPE RATIO	SPACING DIST. (MAX.)
2:1	14 m
3:1	17 m
4:1	23 m
6:1	34 m
10:1	67 m
20:1	152 m

LEGEND

- ① PLACE BALES END TO END.
- ② TOE OF SLOPE
- ③ TWO STAKES PER BALE MIN. 50 mm X mm 50 mm X 1 m.
- ④ TAMP LOOSE STRAW INTO JOINTS
- ⑤ FILL SLOPE.
- ⑥ UNDISTURBED SLOPE.
- ⑦ PLACE BALES APPROXIMATELY 150 mm INTO THE GROUND.
- ⑧ DRIVE STAKE THROUGH EACH BALE AT BUTTED ENDS (REFER TO NOTE A).
- ⑨ STRAW BALES.
- ⑩ TAMP LOOSE STRAW IN SPACES

NOTES:

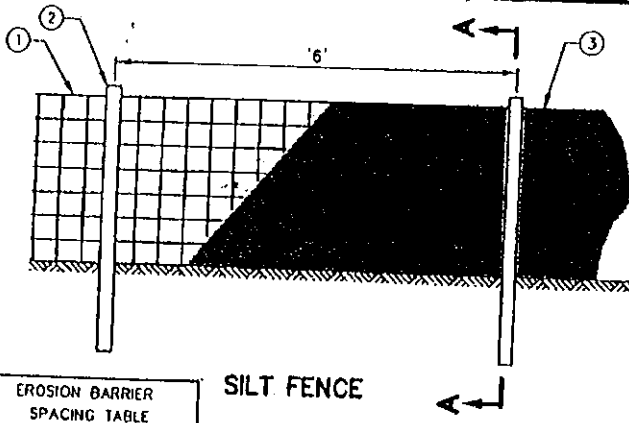
- A PLACE EROSION BARRIERS TO FOLLOW ALONG THE SLOPE CONTOUR. PLACE BALES WITH STRINGS ON SIDES TO PROLONG THE LIFE OF THE BARRIER. METAL POSTS MAY BE USED IN PLACE OF WOOD STAKES IN AREAS WHERE STAKES ARE UNSTABLE OR UNABLE TO BE DRIVEN.
- B THE NEED OF TEMPORARY EROSION CONTROL DEVICES TO BE DETERMINED BY SITE DESIGN. USE THE APPROPRIATE TABLES TO DETERMINE THE FREQUENCY OF CHECK DAMS AND EROSION BARRIERS.
- C NOT TO SCALE.

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE INDICATED.

IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION

TEMPORARY STRAW BALE BARRIER

STANDARD DRAWING NO. SD-1003M



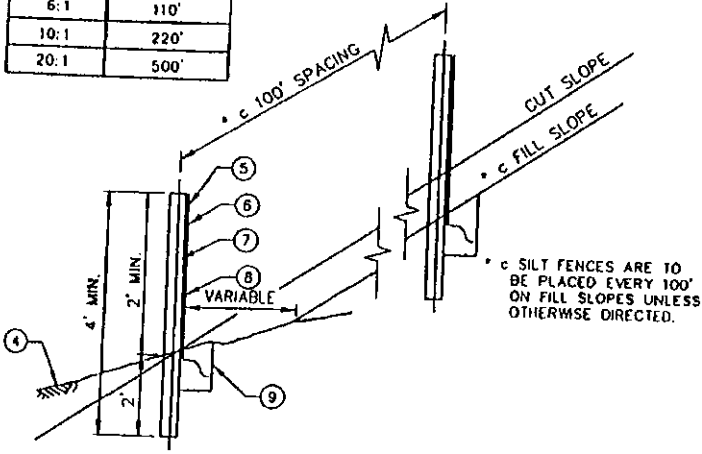
SILT FENCE LAP TABLE

WIRE MESH LAP - FASTEN A DOUBLE LAP WIRE MESH OVER A MINIMUM OF (2) LINE POSTS.
FABRIC - WRAP THE (2) FABRIC ENDS AROUND A MINIMUM OF (3) SIDES OF THE APPROPRIATE POST AND BETWEEN (1) SIDE OF THE ADJACENT NESTED POST. THEN FASTEN THE (2) WIRE MESH ENDS AND FABRIC OVER THE FABRIC ENDS AND BOTH NESTED POSTS AS SHOWN ON THE DETAIL (WIRE MESH MUST BE SEVERED).
TERMINAL POST - WRAP THE FABRIC END COMPLETELY AROUND THE POST. THEN FASTEN THE FABRIC WIRE MESH OVER THE FABRIC END AND POST.
MODIFICATIONS - EXTEND AND JOIN SILT FENCES WITH NESTED TERMINAL POSTS SIMILAR TO THE FABRIC LAP.

EROSION BARRIER SPACING TABLE

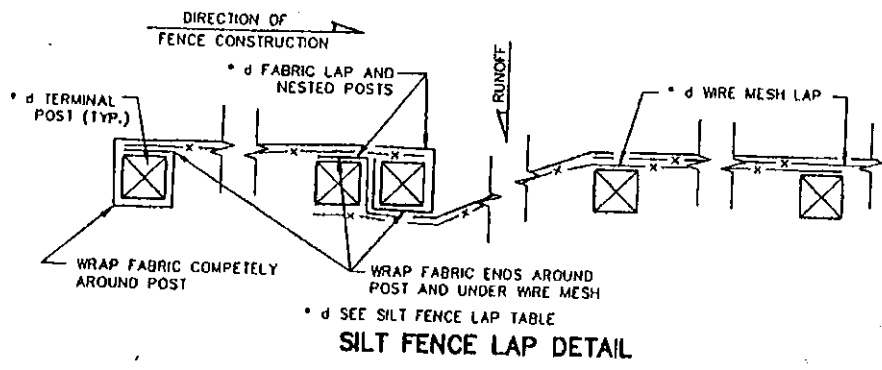
SLOPE RATIO	SPACING DIST. (MAX.)
2:1	45'
3:1	55'
4:1	75'
6:1	110'
10:1	220'
20:1	500'

SILT FENCE



SECTION A-A

- ### LEGEND
- (1) WIRE FENCE, MIN. 14 GA.
 - (2) WOOD OR METAL POST.
 - (3) SILT FENCE FILTER FABRIC.
 - (4) UNDISTURBED SLOPE BEYOND LAST SILT FENCE ON FILL SLOPE.
 - (5) SECURE TOP EDGE OF FILTER FABRIC TO TOP OF FENCE.
 - (6) SILT FENCE FILTER FABRIC.
 - (7) POST.
 - (8) WIRE FENCE.
 - (9) BURY TRAILING EDGE OF FILTER FABRIC IN TRENCH A MINIMUM OF 6".
- ### NOTES:
- (A) PLACE EROSION BARRIERS TO FOLLOW ALONG THE SLOPE CONTOUR. METAL POSTS MAY BE USED IN PLACE OF WOOD STAKES IN AREAS WHERE STAKES ARE UNSTABLE OR UNABLE TO BE DRIVEN.
 - (B) SILT FENCES TO ALLOW RUNOFF TO PASS THROUGH (NOT AROUND) THE FENCE.
 - (C) GROUND SILT FENCES WITH WIRE MESH ACCORDING TO MESH FENCES ON I10 STANDARD DRAWING F-2-A (STANDARD BARBED, WOVEN, MESH, COMBINATION WIRE FENCES, AND FENCING DETAILS).
 - (D) THE NEED OF TEMPORARY EROSION CONTROL DEVICES TO BE DETERMINED BY SITE DESIGN. USE THE APPROPRIATE TABLES TO DETERMINE THE FREQUENCY OF CHECK DAMS AND EROSION BARRIERS.
 - (E) NOT TO SCALE.



IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION

TEMPORARY SILT FENCE BARRIER

STANDARD DRAWING NO. SD-1004

3.3 MULCHING

A. Refer to Table 1 for a summary of installation requirements.

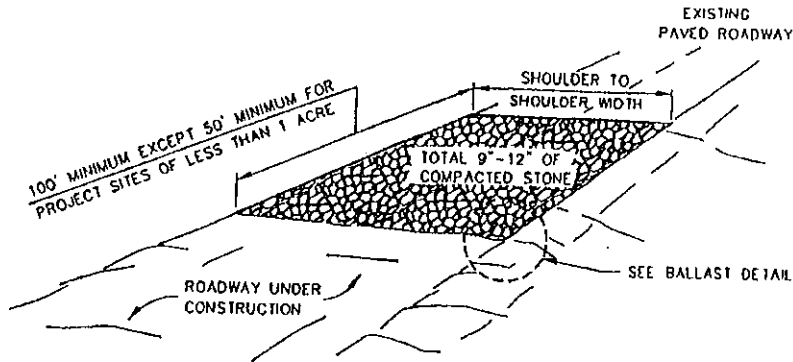
Table 1 – Mulching Installation Requirements

GUIDE TO MULCHING APPLICATION				
Mulch Material	Application Rate		Depth and Coverage	Remarks
	(per 100 m ²)	(per 100 ft ²)		
Gravel, or crushed stone	8 cubic meters (or more to ensure 90% coverage at 2.3 metric tons/100 m ²).	1 cubic yard (or more to ensure 90% coverage at 0.25 tons per 100 ft)	70 to 75 mm (2 3/4 to 3 inches) uniform covering.	Can be hydraulically seeded, fertilized, and mulched for revegetation if the gravel or stone contains adequate fine material or if topsoil is mixed with the rock mulch.
Hay or straw	40 to 50 kg (2 to 3 bales).	8 to 10 lbs.	50 to 75 mm (2 to 3 inches) to form a uniform mat thru which 20 to 40% of the original ground surface can be seen.	Subject to blowing unless kept moist, punched, or tacked down.
Wood fiber cellulose	10 to 15 kg or per manufacturers specification.	2 to 3 lbs.	13 to 19 mm (1/2 to 3/4 inches) minimum depth.	If used on critical areas, double the normal application rate. Apply with hydromulch. No tie-down required.
Wood chips	40 to 60 kg	8 to 12 lbs.	70 to 80 mm (2 3/4 to 3 1/4 inches) uniform depth	If use with seeding, increase fertilizer rates 25 to 50 % with wood chip mulch on revegetation sites.
Washed dairy waste (manure)	20 to 25 kg dry weight in water slurry (280 L/100 m ²)	4 to 5 lbs. dry weight in water slurry (7 gal/100 ft ²)	25 to 50 mm (1 to 2 inches) uniform depth	Only with pre-approval of the Idaho DEQ.
Compost	to 8 m ³ (3,000 kg/ha)	26 ft ³ (2,700 lb./ac)	50 to 75 mm (2 to 3 inches) uniform depth	

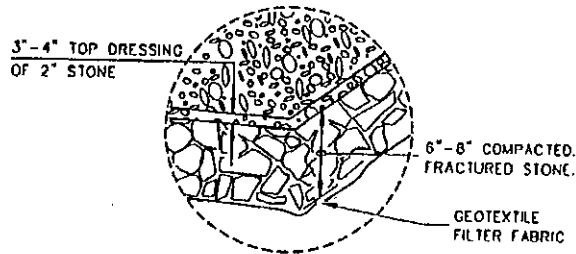
1. **Stone and gravel:** After the gravel or stone is applied, construction traffic may move over it. Remulch areas which become compacted or depressed to the same level as the remaining area to prevent flows from the site from becoming channelized into these depressions. Upon completion of activities on the site, the gravel or stone mulch may be left in place during revegetation operations. When used for driveways or dirt roads, a filter blanket must be placed under the gravel.
 2. **Straw:** Apply mulch to form a loose layer when applied over a loose soil surface. Stabilize mulch from wind drifting and water damage by covering it with a netting, such as jute, by punching it into the soil with a spade or roller, or by spraying it with a tacking agent. Straw mulch must cover the entire seeded area or exposed slope. The mulch must extend into existing vegetation or stabilized areas on all sides to prevent wind or water damage, which may start at the edges of the mulched area. The straw fibers must be applied to form a uniform cover of loose straw through which approximately 20% to 40% of the original ground surface can be seen. No large clumps of unscattered straw must exist after application. On small slopes, straw mulch must be applied by hand broadcasting to a uniform depth of 50 to 75 mm (2 to 3 inches). On larger slopes, straw can be blown onto the slope to achieve a uniform cover of 50 to 75 mm (2 to 3 inches).
 3. **Wood chips:** Applications must not exceed the specified thickness. When using wood chips to mulch revegetation projects, the specified application of fertilizer must be increased approximately 25% to replenish soil nutrients lost due to breakdown of wood chips.
 4. **Washed dairy waste:** Apply with a hydroseeder at 2.8 t/ha (1.2 tons per acre) in a water slurry 28 m³/ha (400 cubic feet per acre).
- B. **Timing of mulch application and seeding:** Temporary seeding can take place prior to or concurrent with mulching. Install other surface runoff control measures prior to seeding and mulching. If seeding is prior to mulching, apply mulches seeded areas immediately after seeding. Do not apply mulches when free surface water is present. The choice of materials for mulching must accommodate the type of soil to be protected, site conditions, and season.

C. Straw mulch stabilization techniques.

1. Hand punching: Use only on small sites, sites with rock and stone on the surface, sites with slopes which are steeper than 3:1, or sites which have been wattled. Take care not to damage wattling or planted vegetation. Use a spade or shovel to punch the straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 100 mm (4 inches) into the slope. The bunches of straw to resemble the tufts of a toothbrush.
 2. Roller punching: Use on large, gently sloping sites without significant outcroppings of rock and stone. Do not use on wattled or planted sites. Use a roller equipped with straight studs not less than 150 mm (6 inches) long, from 100 to 150 mm (4 to 6 inches) wide, and approximately 19 mm (3/4 inches) thick to accomplish the desired effect. Studs to stand approximately 200 mm (8 inches) apart and must be staggered. All corners must be rounded to prevent withdrawing the straw from the soil. Vegetative planting may be conducted following roller punching.
 3. Crimper punching: Use specially designed straw-crimping rollers consisting of serrated disk blades, set 100 to 200 mm (4 to 8 inches) apart, which force straw mulch into the soil. Crimping to be done in two directions with the final pass conducted across the slope rather than up and down it.
 4. Tacking agents: Use on any type of site. Apply 2.0 m³/ha (1 cubic yard per acre) of the tacking agent or its equivalent over the straw mulch. Agents which are neutral or nearly neutral in color and of demonstrated effectiveness in the soils and climate of the area in question are acceptable.
 5. Matting: Use on large, steep areas which cannot be punched with a roller. Apply jute or wood excelsior on plastic netting over unpunched straw.
- D. Maintenance: Inspect all mulched areas periodically and after runoff-producing storm events. Repair damaged areas of the mulch immediately. Reseed or replant such areas, if necessary, before replacing the mulch cover.
- E. Removal: Straw mulch and other organic products do not have to be removed when the vegetation becomes established. Remove other mulches, such as chemical/synthetic mulches 30 days after final stabilization of the site.



STABILIZED CONSTRUCTION ENTRANCE



BALLAST DETAIL

NOTES:

- (A) THE STABILIZED CONSTRUCTION ENTRANCE MAY REQUIRE PERIODIC TOP DRESSING OF 2" STONE, AS CONDITIONS DEMAND.
- (B) THE STABILIZED CONSTRUCTION ENTRANCE LOCATED ON A DETOUR ROADWAY TO MEET THE MINIMUM PUBLIC ROAD RADII AND WIDTH REQUIREMENTS.
- (C) MINOR MODIFICATIONS TO THESE INSTALLATIONS MAY BE NECESSARY TO ACCOMMODATE FIELD CONDITIONS.
- (D) NOT TO SCALE.

IDAHO STANDARDS
FOR PUBLIC WORKS
CONSTRUCTION

**TEMPORARY STABILIZATION OF
CONSTRUCTION ENTRANCE**

STANDARD DRAWING
NO. **SD-1005**

RE-SEEDING GUIDELINES

PERMITTEE WILL:

Maintain structural integrity of the State's highway right of way.

No undercutting of present highway fill and ballast sections.

No construction of unprotected cuts (bare soil cuts) for access from the highway.

Not grade, excavate, or perform ground disturbing activities during rainy periods. Permittee will, as much as possible, avoid these activities during the spring and fall rainy seasons. If work must be done during rainy seasons, the permittee will install check dams in drainage channels and/or provide a sediment retention basin to avoid discharging sediment containing runoff into the drainage system, or any wetlands, or water bodies (streams, rivers, lakes and ponds).

Reseed, fertilize, and mulch all areas of disturbed ground. Seeding will be accomplished using one of the following seed mixtures:

<u>Seed Mix 1</u>	<u>Lb/Acre</u>	<u>Seed Mix 2</u>	<u>Lb/Acre</u>
Canada Bluegrass	5	Kentucky Bluegrass	5
Red Fescue	12	Smooth Bromegrass	12
Durar Hard Fescue	12	Red Fescue	12
White Dutch Clover	<u>2</u>	White Dutch Clover	<u>2</u>
	31		31

<u>Seed Mix 3</u>	<u>Lb/Acre</u>
Canada Bluegrass	5
Sheep Fescue	12
Red Fescue	12
White Dutch Clover	<u>2</u>
	31

Seed is available at most farm and garden stores or feed stores in north Idaho or Spokane, WA.

Fertilizer shall be a general purpose or multi-use fertilizer with a Nitrogen (N), Phosphorous (P), Potassium (K), ratio of 1:1:1. This is usually shown on the fertilizer information label as 12-12-12 or 16-16-16. The minimum percentage that will be allowed is the 12-12-12%. Greater percentages will be allowed up 20%. These types of fertilizers are also available at most farm and garden stores or feed stores.

Mulch can be made from grass, wheat, or oat straw, wood fibers (not bark), or rock (2 ½ inch to ¾ inch, fractured or crushed). Mulch should be spread out to provide even coverage over the seed and fertilizer to protect them and the soil from erosion while the seed is germinating and growing (rock mulch does not need to be more than one to two inches in depth).