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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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Internal
C/007/019
Centennial

July 11, 2003

TO: Centennial Mine File C/007/019

THRU: Pam Grubaugh-Littig, Permit Supervisor pgl

Mark Mesch, Program Administrator MRM

Priscilla Burton PB

Greg Galecki GG

Karl Housekeeper

FROM: Louis A. Amodt LAA

RE: Subsidence Opening Near Mine Office

In consultation with Mike Glasson of Andalex Resources and contractor (VCM Construction) the subsidence feature located just above the mine office parking lot will be completed as follows:

1. Gravel backfill material will be trucked from the county gravel pit to the edge of the existing mine office parking lot.

2. The berm below the topsoil pile will be breached to allow backhoe access (30 feet).

3. Approximately 100 cubic yards of the topsoil pile will be graded to allow access by the backhoe.

4. Approximately 270 feet of temporary access road will be installed up the slope.

5. The upper undisturbed drainage ditch above the topsoil pile will be disturbed to allow access to the subsidence feature (75 feet).

6. The backhoe will transport the backfill material (gravel) to the subsidence.

7. Approximately 91 cubic yards of backfill material will be placed in the subsidence feature.

8. The drainage and berms will be restored upon completion of the backfilling. Mirafi 500X or 600X will be placed under the reconstructed drainage ditch (spec attached).

9. The topsoil pile will be graded to a pre-disturbance configuration and "fluffed up" with the backhoe.

10. All disturbed areas will be revegetated upon completion of the work using the seed list supplied by Andelex Resources (attached).

laa
Attachments
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Recommended Seed Mix for Steep Slope Areas
Andalex Resources, Inc.

SPECIES	# PLS/Acre
Grasses :	
Agropyron smithii	
Western Wheatgrass	3.0
Agropyron spicatum	
Bluebunch Wheatgrass	2.0
Agropyron trachycaulum	
Slender Wheatgrass	2.0
Bromus marginatus	
Mountain Brome	3.0
Oryzopsis hymenoides	
Indian ricegrass	2.0
Poa sandbergii (secunda)	
Sandberg bluegrass	0.25
Forbs:	
Artemisia ludoviciana	
Louisiana sagebrush	0.1
Hedysarum borealis	
Northern sweetvetch	1.0
Linum lewisii	
Lewis flax	1.0
Melilotus officinalis	
Yellow sweetclover	0.5
Penstemon strictus	
'Bandera' Rocky Mtn. penstemon	0.25
Shrubs:	
Amelanchier alnifolia	
Serviceberry	1.0
Artemisia tridentara vaseyana	
Mountain big sagebrush	0.2
Cercocarpus ledifolius	
Curlleaf mountain mahogany	1.0
Cercopcarpus montanus	
True mountain mahogany	1.0
Chrysothamnus nauseosus albicaulis	
Whitestem rubber rabbitbrush	1.0
Purshia tridentata	
Bitterbrush	3.0
Symphoricarpos oreophilus	
Mountain snowberry	1.0
Total	23.3

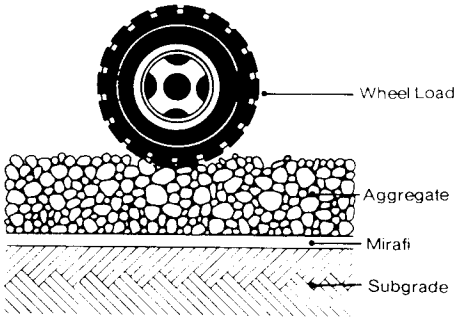
Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.
12-10-86

MIRAFI®
500X, 600X
Ground Stabilization Fabrics

Construction on weak, wet or frost susceptible soils can cause needlessly expensive delays and added material costs. These types of soil cause rapid deterioration of paved structures like parking lots, roads and streets and also can lead to severe rutting of unpaved structures. Mirafi stabilization fabrics help solve these soil-related construction and maintenance problems and hold down costs in three ways:

- Unpaved roads and areas, when designed with Mirafi, require 30 - 45% less aggregate.
- Construction schedules are more easily followed because work can continue during most types of weather.
- Mirafi fabrics protect the aggregate base against subgrade intrusion thus significantly reducing costly maintenance.

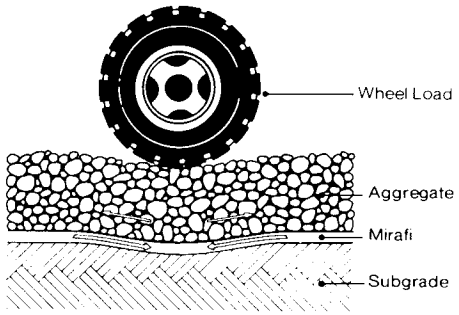
These benefits result from fabric functions of separation, confinement and load distribution as shown below:



Subgrade/Aggregate **SEPARATION**
(Using Mirafi fabric)

Separation

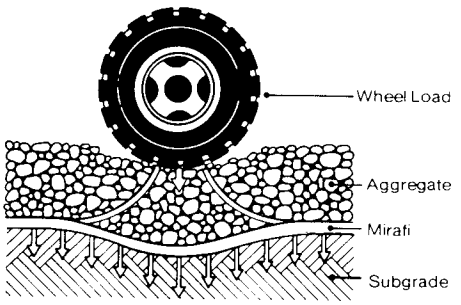
Mirafi fabrics with excellent puncture and tear resistant properties act as a separation barrier between fine grain soils and load-distributing aggregate fill material. As a separator, it eliminates the loss of costly aggregate material into the subgrade and prevents the upward pumping of silt and other contaminating soil fines into the aggregate.



Aggregate **CONFINEMENT**
(Using Mirafi fabric)

Confinement

Mirafi fabrics provide a high friction surface between the subgrade and the aggregate layer that helps to keep the aggregate in place. This confining action maintains the thickness and hence the intended load-bearing capacity of the aggregate.



Subgrade **LOAD DISTRIBUTION**
(Using Mirafi fabric)

Load Distribution

When placed between the subgrade and the aggregate layer Mirafi fabric, with its high tensile strength and modulus, acts to reduce localized stress by redistributing traffic loads over a wider area of subgrade.

In ground stabilization uses, Mirafi stabilization fabrics excel in performance because of its woven construction. Mirafi fabric offers excellent resistance to installation abuse with burst, tear and puncture resistance values found in far heavier, more expensive fabric products. More importantly, the inherent high modulus, or low stretch, of woven Mirafi stabilization fabrics means less rutting in the system from repetitive wheel loads. This feature is particularly important in permanent roads, parking lots and other structures where resistance to rutting is a necessity. While many types of construction fabrics have been used for ground stabilization, field experience and research prove that Mirafi offers a combination of performance, ease of handling and cost effectiveness that is unequalled in the industry.

Fabric Properties

Fabric Property 500X	Unit	Test Method	Typical Values[1]
Resistance to Installation Damage			
Grab Tensile Strength	lb	ASTM D-1682-64	200
Grab Tensile Elongation	%	ASTM D-1682-64	30 (max)
Burst Strength	psi	ASTM D-3786-80a[2]	400
Trapezoid Tear Strength	lb	ASTM D-1117-80	115
Puncture Resistance	lb	ASTM D-3787-80[3]	85

Fabric Property 600X	Unit	Test Method	Typical Values[1]
Resistance to Installation Damage			
Grab Tensile Strength	lb	ASTM D-1682-64	300
Grab Tensile Elongation	%	ASTM D-1682-64	35 (max)
Burst Strength	psi	ASTM D-3786-80a[2]	>600
Trapezoid Tear Strength	lb	ASTM D-1117-80	120
Puncture Resistance	lb	ASTM D-3787-80[3]	130

[1]The values listed are average values. Contact the Mirafi Technical Department for minimum certifiable values.

[2]Diaphragm Bursting Tester.

[3]Tension Testing Machine with ring clamp; steel ball replaced with a 5/16-inch diameter solid steel cylinder (with hemispherical tip) centered within the ring clamp.

MIRAFI® INC

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