Section 5
Implementing Visual Mitigation BMPs

The implementation of BMPs is a collaborative and adaptive process. **A preconstruction meeting should be arranged in advance of implementing the visual mitigation program, and periodic progress monitoring should be scheduled.** Construction inspection and adaptive management during the implementation process will be necessary to achieve the visual mitigation objectives.

Because this section is designed for use with the forms and tables in Section 4, the text in several sections may be repetitive. It is designed to help the reader locate required information quickly and easily by matching the titles in Section 4 to the headings in this section.

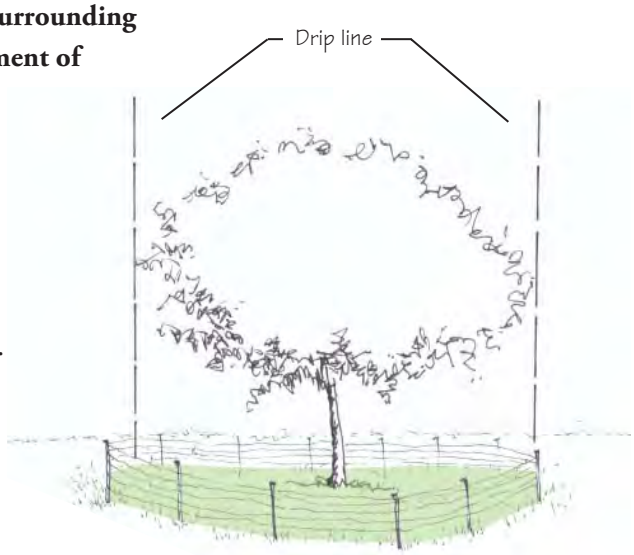
BMP: Preservation of vegetation

In the typical construction process much of the surrounding vegetation is destroyed. This may happen in a variety of ways, including direct removal, root disturbance, root compaction, diversion of a water source, etc.

The preservation of the surrounding existing vegetation is very valuable—an expense-free way to help the disturbed area blend with the surrounding environment, provide a solid vegetative base for reestablishment of disturbed growth, and in some cases, serve as a screen for the disturbed area.

Care should also be taken during construction to prevent disturbance within the drip line of vegetation that is to be preserved as part of visual mitigation. The root structure beneath the drip line is considered the most critical for survival.

The water source for vegetation should be maintained during construction as well as after construction is complete. Keep in mind that the water source may not be visible; it may be beneath the surface or provided by an intermittent stream or drainage flow.



Fencing at drip line

BMP: Naturalized cut-and-fill slopes, berms, and contour manipulation

To achieve an effective and successful visual mitigation solution, a properly constructed ground plane is very important. Conventional slope excavation and fill typically create an abrupt change between the unmodified and the modified landscape. Generally, a very visible line of disturbance is created between the point where the excavation or fill begins and the point where it ends. The modified slope is typically a constant grade (usually between 1.5:1 and 2:1) for its entire area, making it highly detectible in most natural settings because it does not emulate the undulations and varied slopes of the surrounding landscape. In addition, the steepness of the modified slopes makes revegetation more difficult, and the slope surface often remains exposed, creating a visible contrast even in the most sparsely vegetated environment.

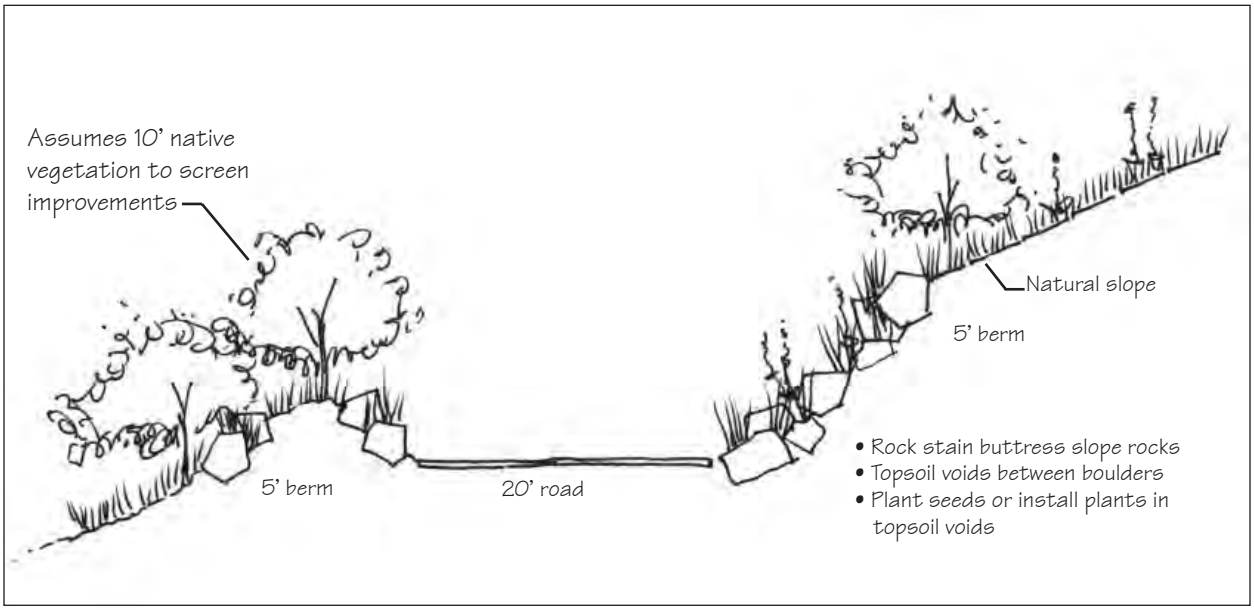
Cut-and-fill slopes shall be graded back to match the natural grade, with contouring and undulations to emulate the surrounding terrain. In some instances, retention of some slope may be needed so that the rest of the slope meets grade.

Mini-benching seeded with native species; note how vegetation thrives where water collects along the benches.

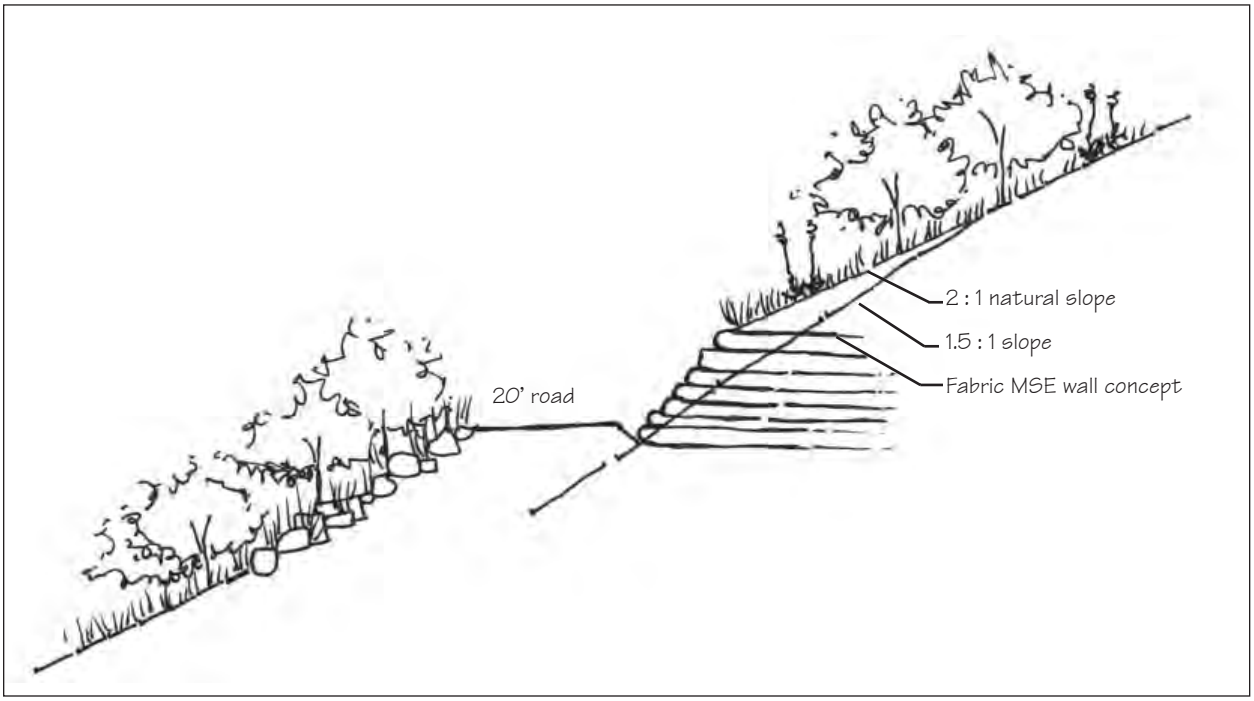
Mini-bench construction

- Minimum slopes shall be 2:1. Mini-benches shall not exceed 12 inches in vertical dimension, or shall be surfaced with rock ranging in size from one to three feet in diameter or more. Geotextile erosion control fabric may also be used.
- While grading, collection pools shall be integrated into the landscape to collect stormwater runoff and shall have a natural appearance.
- Lithic mulch (see page 66) containing large material generated during construction and reclamation, including boulders two feet or greater in diameter, and trunks and branches left from feathering the outer edge of the clearing, shall be strategically placed to create microclimates, encouraging successful plant growth. The material shall be placed so that it appears to be naturally deposited.
- Topsoil from stockpiles (see page 64) shall be spread on top of finished grade, between the lithic mulch elements, taking care to maintain the undulation and contouring of the finished grade.
- Soil surface shall then be roughened with pitting or gouging, to increase water retention and seed germination.
- Stormwater BMPs should be employed when berming and contouring to avoid increasing sedimentation into major drainages.
- Contouring can be applied to berms as well as to any cut or fill slopes. Contouring undulates the modified surface to mimic the surrounding contours found in the native landscape. The gentle undulations also interrupt the surface, reducing the reflectivity and therefore the visual perceptibility of the regraded surface. Also, by rounding the edges of the cut or fill back into the natural grade, the harsh edge line is lost.

Cut-and-fill concepts. The following illustrations demonstrate seven different concepts for access road and well pad cut-and-fill techniques. These are concepts only, and require review by a geotechnical engineer prior to construction.



Concept 1



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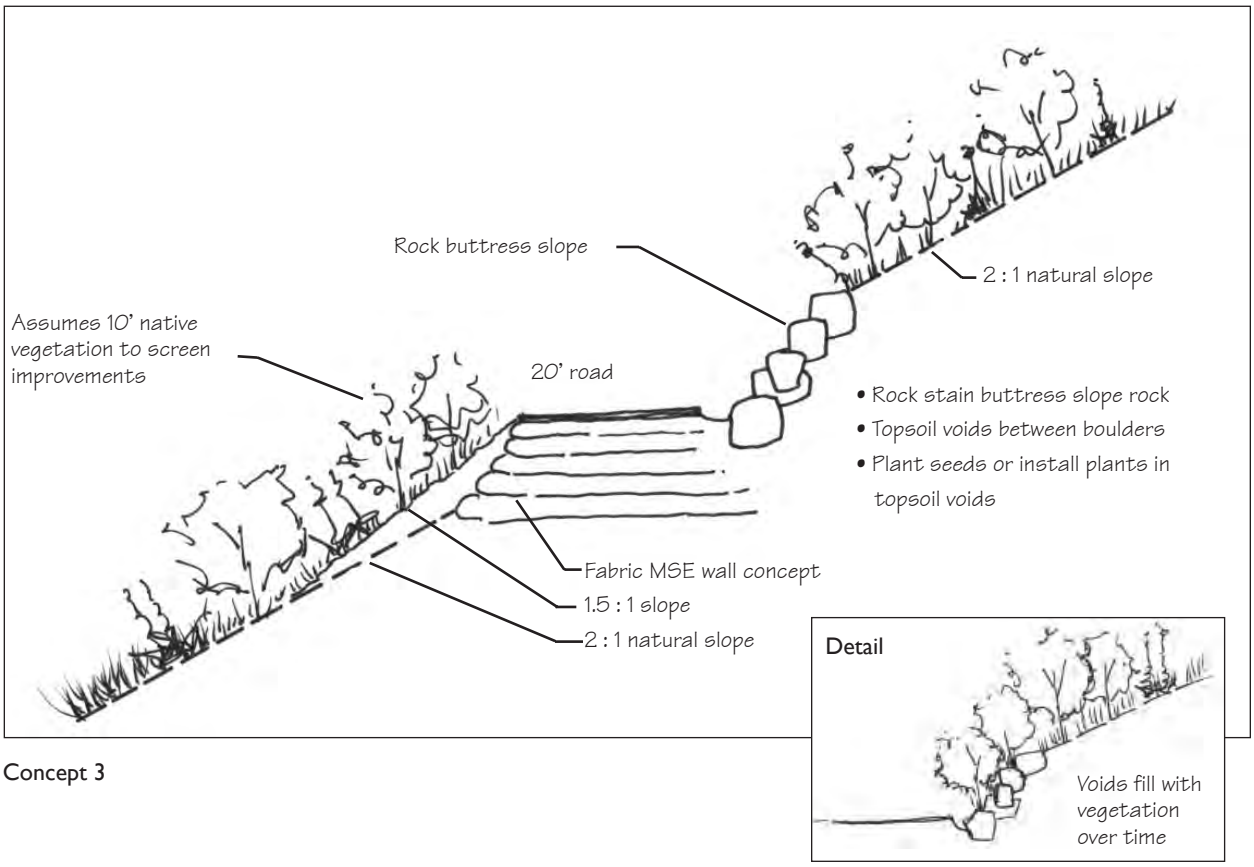

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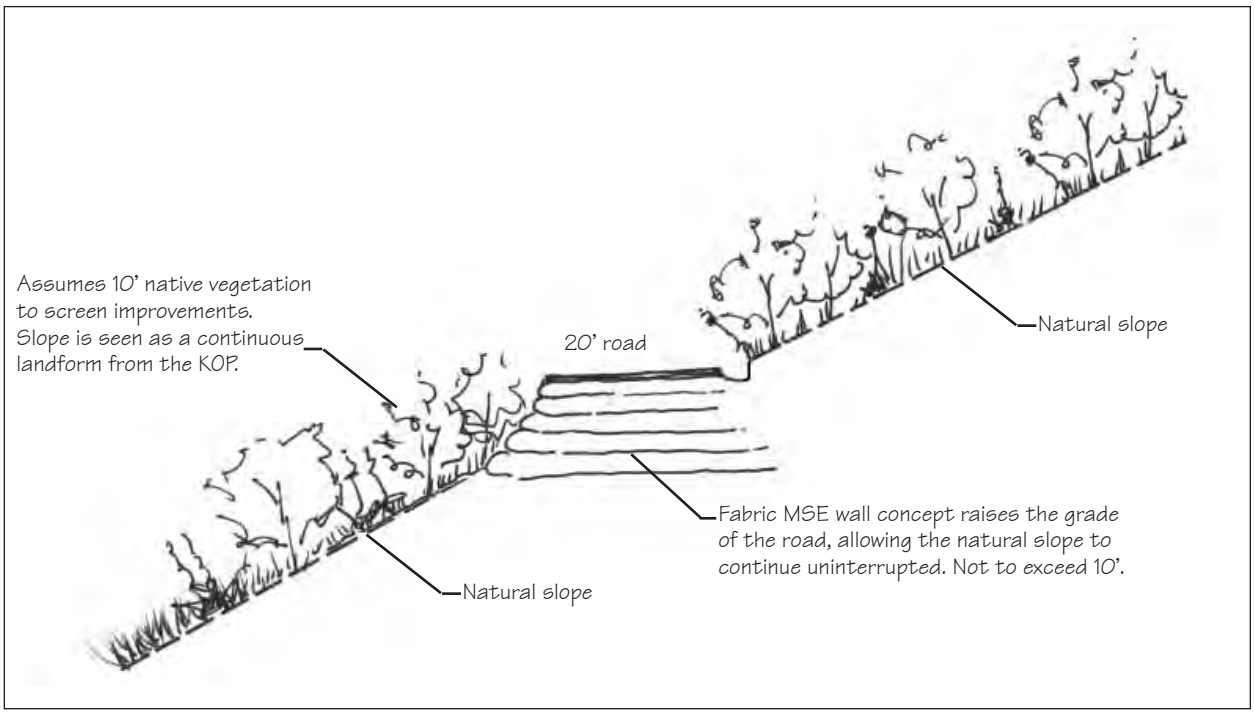
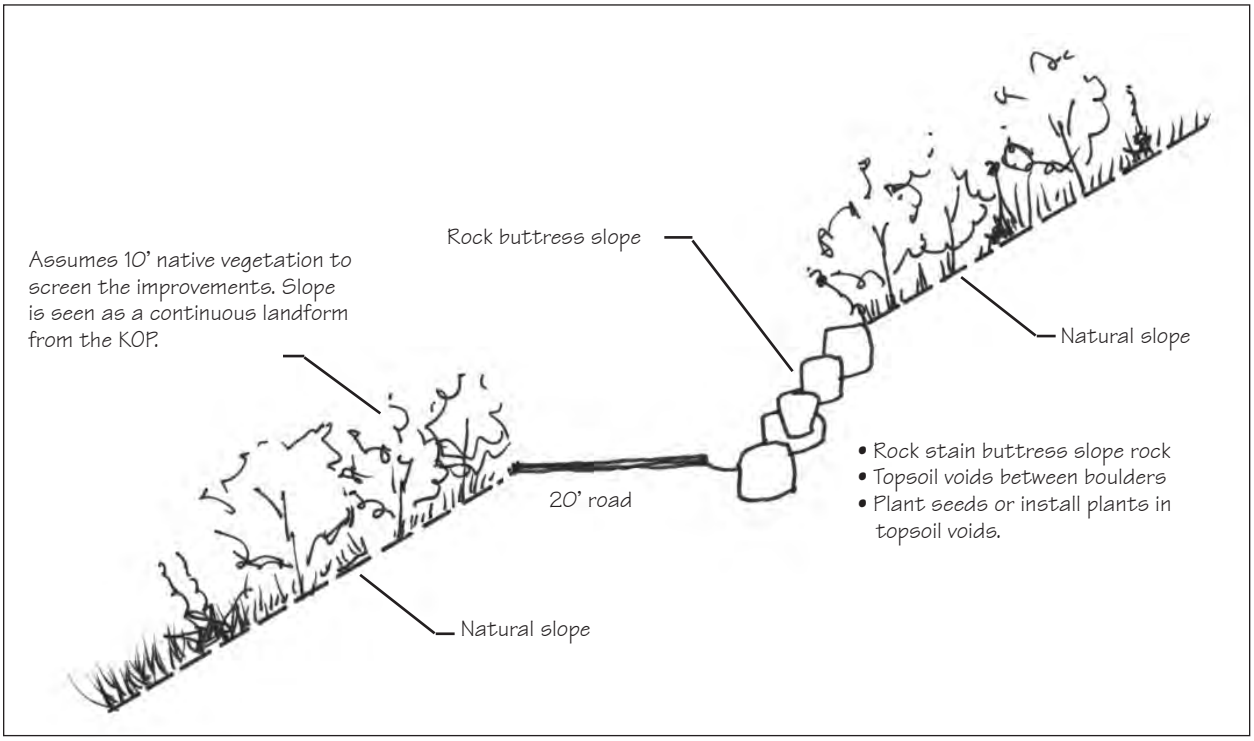


Concept 4



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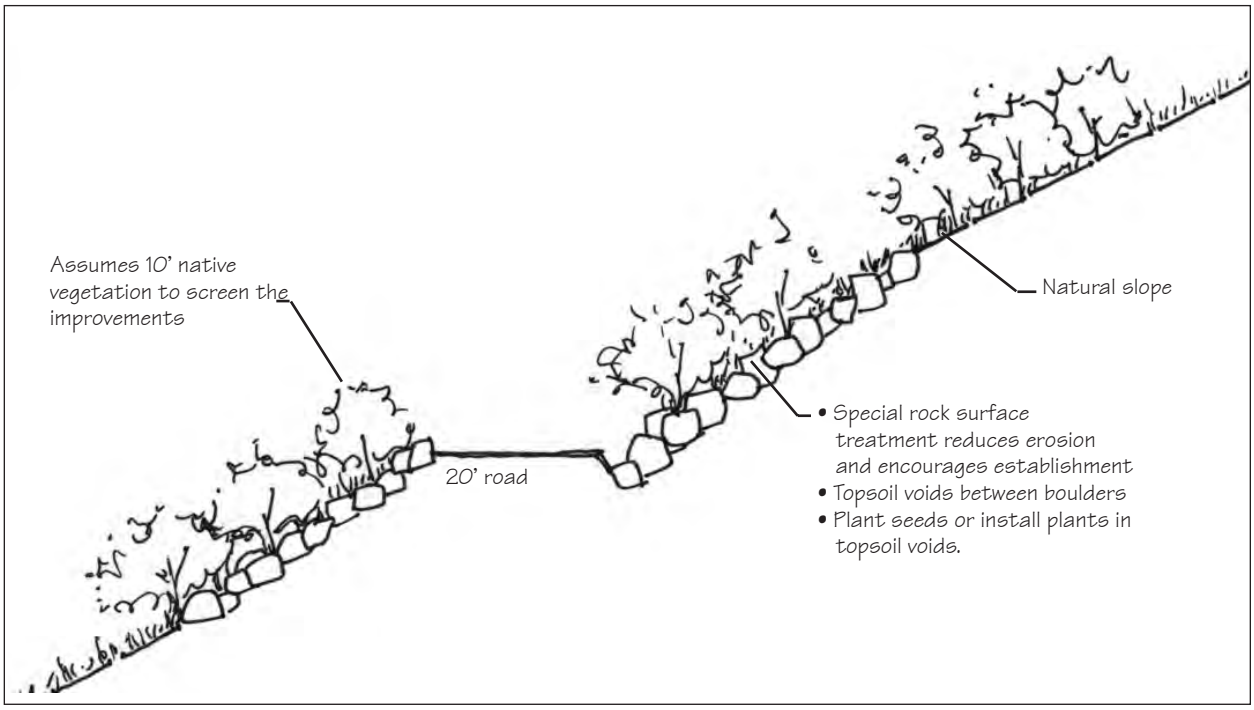
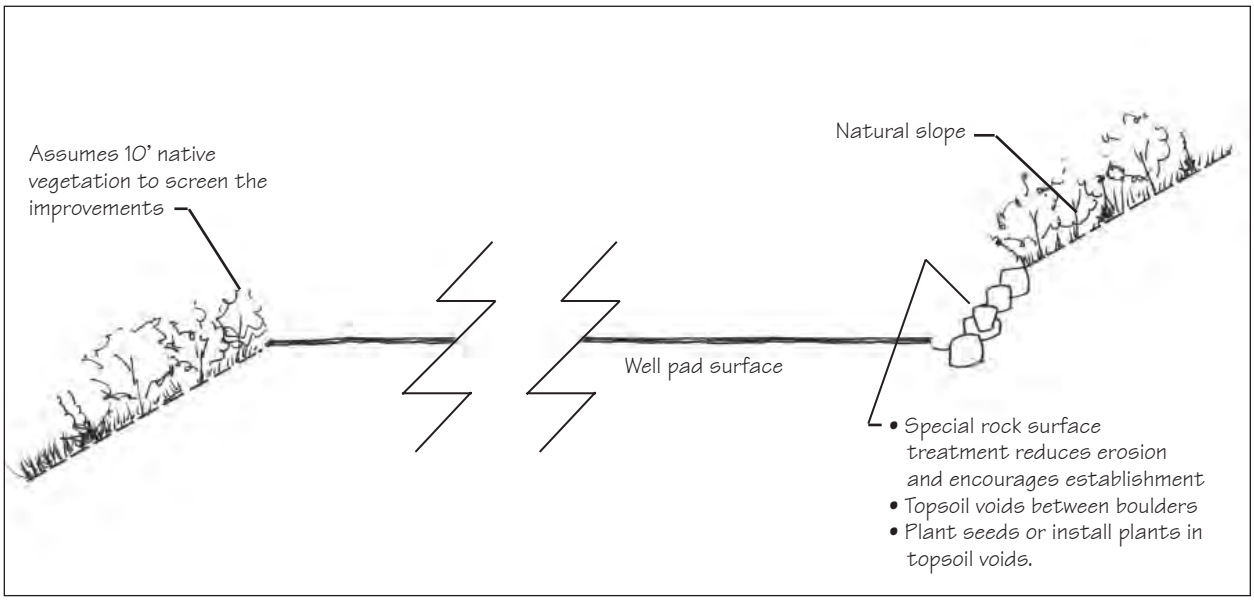


Concept 6



Concept 6

BMP: Thinning and feathering of existing vegetation

New well pads and access roads create large areas devoid of vegetation. To reduce the hard line between new construction and existing vegetation, thinning and feathering will be used to mimic the natural meadow/clearing forms found in the surrounding landscape.

Feathering of the outside edge of the tree removal zone will be accomplished by removing, on the average, every other tree for the first 10 feet back into the remaining stand, and then every third tree between 10 and 20 feet back into the remaining stand. Hand tools will be used for most of this work. Material from felled trees will be stockpiled for dispersing over seeded areas, creating microclimates and habitats, encouraging vegetation growth, and providing small species cover.

Tree root structure should be left in the ground with approximately a six-inch stump to reduce erosion.

BMP: Naturalized Vegetation

Revegetating with native species planted in the patterns and environments where they are naturally found will aid in visual mitigation success. The revegetation of disturbed areas allows the modified landscape to blend with the surrounding natural landscape. Woody native vegetation can be planted in organic clusters, mimicking its natural occurrence. Reseeding and the preservation and reuse of existing topsoil also encourages native vegetation growth. Following is a listing of vegetation species found in those parts of La Plata County where oil and gas development is occurring.

Pinyon/juniper zones

- *Amelanchier alnifolia* – Serviceberry
- *Artemisia tridentata tridentata* – Big sage
- *Cercocapus Montanus* – Mountain Mahogany
- *Chrysothamnus nauseosus* – Rubber rabbitbrush
- *Juniperus osteopserma* – single seed juniper
- *Juniperus scopulorum* – Rocky Mountain juniper
- *Pinus edulis* – Pinyon pine
- *Prunus virginiana* – Chokecherry
- *Quercus gambellii* – Gambel oak
- *Rhus trilobata* – Three-leaf sumac

Ponderosa pine areas

- *Amelanchier alnifolia* – Serviceberry
- *Chrysothamnus nauseosus* – Rubber rabbitbrush
- *Juniperus communis* – Common juniper
- *Pinus Ponderosa* – Ponderosa Pine
- *Populus tremuloides* – Aspen
- *Prunus virginiana* – Chokecherry
- *Quercus gambellii* – Gambel oak
- *Rhus trilobata* – Three-leaf sumac
- *Ribes cereum* – Squaw currant

Riparian / high water table areas

- *Cornus sericea* – Redtwig dogwood
- *Lonicera involucrata* – Bearberry honeysuckle
- *Picea pungens* – Blue spruce
- *Pinus ponderosa* – Ponderosa Pine
- *Populus angustifolia* – Narrowleaf cottonwood
- *Populus tremuloides* – Aspen
- *Salix species* – Willow

Sagebrush flats

- *Artemisia arbuscula* – Low sage
- *Artemisia tridentate tridentata* – Big sage
- *Artemisia tridentate vaseyana* – Mountain big sagebrush
- *Atriplex canescens* – Four-wing saltbush
- *Atriplex confertifolia* – Shadscale
- *Chrysothamnus nauseosus* – Rubber rabbitbrush
- *Chrysothamnus viscidiflorus* – Yellow rabbitbrush

Shrublands

- *Amelanchier alnifolia* – Serviceberry
- *Atriplex canescens* – Four-wing saltbush
- *Cercocapus Montanus* – Mountain Mahogany
- *Chrysothamnus nauseosus* – Rubber rabbitbrush
- *Chrysothamnus viscidiflorus* – Yellow rabbitbrush
- *Juniperus osteopserma* – single seed juniper
- *Juniperus scopulorum* – Rocky Mountain juniper
- *Pinus edulis* – Pinyon pine
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- *Quercus gambellii* – Gambel oak
- *Rhus trilobata* – Three-leaf sumac

Growth rates are a result of environmental influences such as precipitation, sun exposure, nutrient availability, growing medium, etc. Undesirable conditions will have a dramatic effect on growth rate. The average growth rates shown below assume relatively constant conditions.

- Grasses and Forbes — 2-3 years to maturation
- Shrubs — 5-10 years to substantial growth
- Pinyon — 1-3 years to establish, then about 4 inches/year
- Juniper — 1-5 years to establish, 15-20 years to noticeable development
- Ponderosa Pine — 5 years to establish, then about 12 inches/year
- Spruce — 3 years to establish, then about 12 inches/year

Vegetating with native species

Topsoil handling. Before construction begins on an access road or well pad, the topsoil shall be scraped and stockpiled for use in the revegetation process. Prior to any excavation and the stripping of topsoil, surface vegetation will be Hydro-axed, shredded, and left on the soil surface to be integrated with the topsoil as it is stripped. Stripping of topsoil will be monitored to strip the entire O (organic top layer containing native seed, dropped needles and leaves, etc.) and A1 horizons of the native soil. Topsoil stripping will be limited to the top six inches, unless an on-site topsoil survey indicates a more appropriate depth (deeper or shallower).

Do not screen rocks out of topsoil.

Stripped topsoil will be stockpiled in shallow piles to preserve topsoil quality.

- 3-foot pile is ideal for preserving the organic life in the soil
- 4-foot pile is acceptable
- 5-foot pile or greater will need an additional 3-foot pile to be spread as an inoculant over the larger pile, once that has been spread.

If the construction sequence permits, access road construction shall be synchronized in order that topsoil stripped from one location can be directly transported and placed on a roadway area with a finished grade that is ready for topsoil placement.

Topsoil stripping and topsoil placement will be carefully synchronized so that the stripping from one location may be directly transported and placed on an area that is finish-graded and ready for topsoil placement. This strategy minimizes the need to stockpile topsoil, maintains higher quality, reduces overall handling and transport time, and minimizes volume loss through erosion.

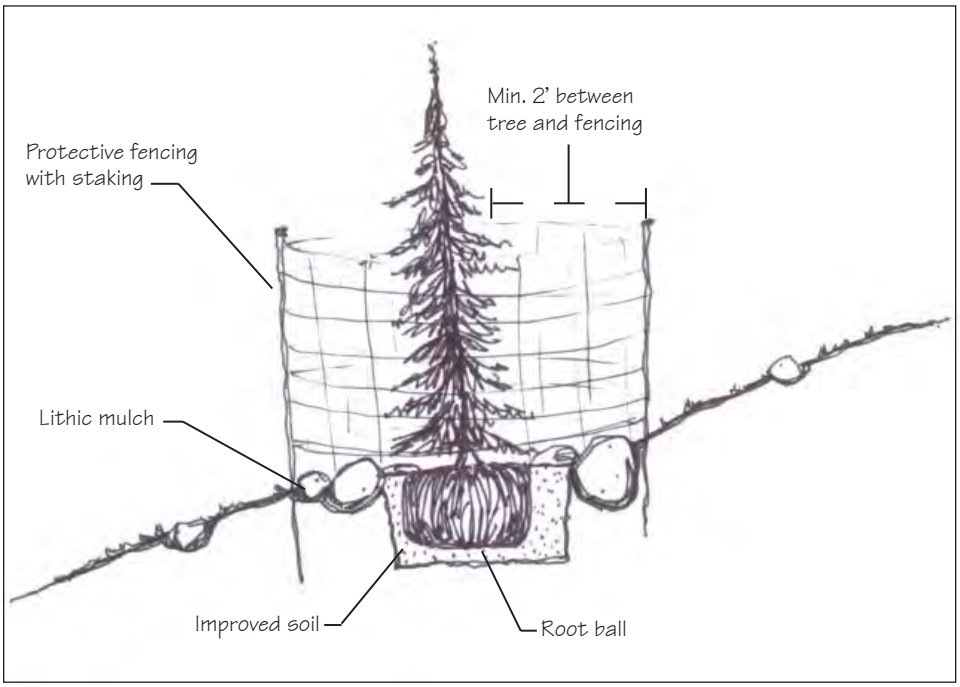
Careful handling of topsoil will facilitate the reestablishment of indigenous vegetation, which will also facilitate color, texture, line, and form compatibility with the surrounding unmodified landscape. Care will be exercised to transport topsoil from a stripping area to a receiving area that is similar in aspect, slope, and vegetation to promote maximum success.

Topsoil placement must also consider the character of the soil surface texture. Care will be exercised to strip to a depth that does not contaminate the topsoil with deeper soil horizons that could alter the texture or character of the topsoil. Maintaining soil texture character will allow for more successful revegetation in the long term and visual compatibility for both the short and long term.

For areas where trees are to be removed, but not excavated, filled or recontoured, the seed mix will be broadcast and incorporated into the soil prior to removing trees with a Hydro-ax or an approved equivalent.

Seeding of excavated, filled, or recontoured areas will take place after the access road or pad is constructed, completed-in-place, and properly prepared to receive revegetation treatments. Seeding will take place during the appropriate seeding season.

Planting shrubs and trees. Proper soil preparation and appropriately sized planting holes are critical to revegetation success.



Planting detail for trees and shrubs

Planting holes should be dug twice the size of the root ball. Backfill soils are to be amended with compost at a rate of 2:1 and inoculated with micorrhyzae from topsoil stockpiles.

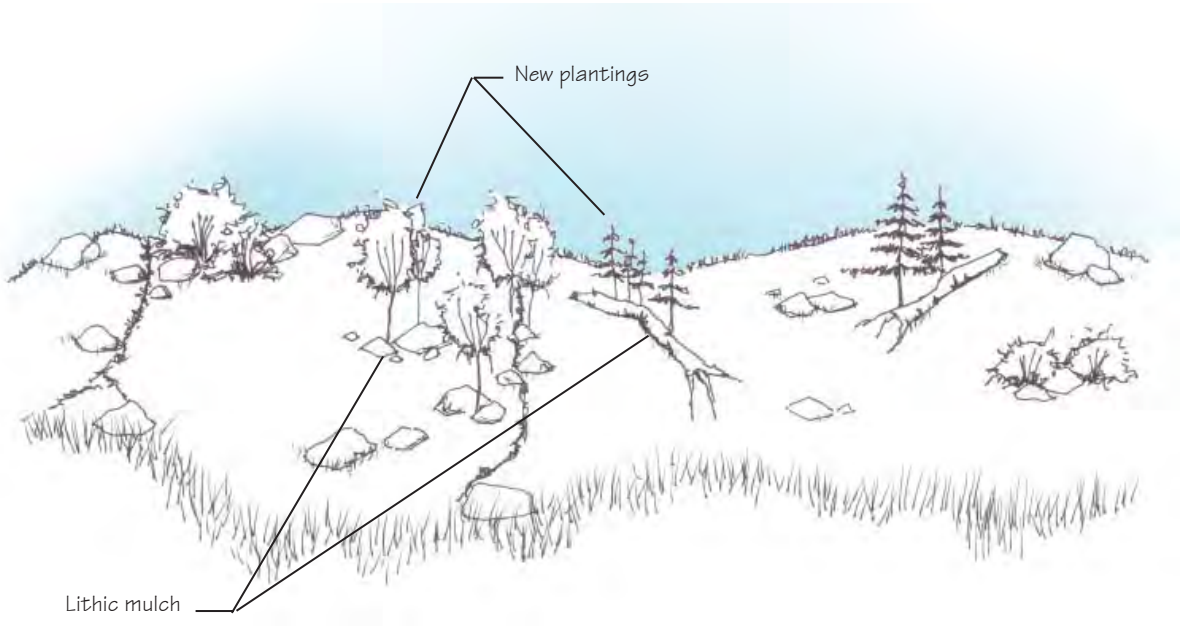
Additive products, such as Driwater,® mixed into the soil around new vegetation can also provide supplemental water to be released over time, keeping the new vegetation hydrated. Fencing will help to minimize livestock and wildlife impact until new vegetation is established.

BMP: Lithic Mulch

Stone or other large, impermeable, natural materials should be used to direct water runoff and reduce the effects of erosion on slopes, in areas where such materials would naturally be found.

Placement of materials should emulate natural occurrence and tree-fall patterns in the surrounding landscape, and should be planned to direct moisture onto new vegetation or seeded areas. Stone should be placed downhill from new plantings to help form a catch basin for rain and snowmelt.

Large lithic materials, such as boulders, and large trunks from trees removed during construction should be saved until final grading is complete and then set into the slopes in a random pattern.



BMP: Manipulation of Color and Texture

The application of color and texture should be used in concert with other visual mitigation BMPs. Where there is room between the viewer and the facilities to construct additional naturalized BMPs, a pattern should be used that lends itself to the texture of both the new naturalized landscape and the existing landscape.

If there is insuffcient room for naturalized BMPs between the viewer and the facilities, then a single color application should be used. Due to the close proximity of the facilities to the viewer, a single color a few shades darker than the dominant colors of the landscape will be less visually apparent

Color and texture selection

The human eye is attracted to lighter, warmer and brighter, more dominant colors of the landscape. **Darker and duller colors tend to recede and do not attract the same attention.** The Bureau of Land Management (BLM) has developed the Standard Environmental Colors and Supplemental Colors as a reference tool. The charts provide proven examples of successful color choices for landscapes in the western environment. Original color chip samples can be obtained from the BLM.

Acknowledging that landscapes change as the season changes, color and texture decisions should be made based upon those seasons in which the greatest amount of viewing will take place and/or those colors that are dominant for the greatest period during the calendar year.

Due to the ever-changing and developing surrounding environment, color choice and texture should be reevaluated when new treatment applications are required.

To be effective, color and texture selection should be made in the field, not from digital representations or printouts. Color(s) should be selected first, following these steps:

- Select the most visually sensitive location from which the facility will be viewed. This is the key observation point.
- Using the BLM color charts, select the paint colors that appear to be most appropriate.
- Create test color samples by applying the selected paint to individual pieces of plywood or similar material at least 24”x48” in size.
- Place the samples in the landscape in the approximate location of the facility to be visually mitigated.
- Standing at the key observation point, select the color samples that are most prominent in the landscape and eliminate them as options for mitigation.

If the facility is located in the near ground, select the least prominent color for application. Using a color one to two shades darker than the surrounding landscape will be most effective, and will also help reduce the effect of fading over time.

Standard Environmental and Supplemental Color samples are tested in the landscape.

If the facility is located in the middle or far ground, a texture pattern using a minimum of two of the least prominent colors will provide better visual mitigation than a single color. It may be a simple two-tone application, or a more sophisticated, computer-generated pattern.

Dual-texture (DualTex®) patterns are the leading technology in camouflage development. These copyrighted digital patterns are generated mathematically to mimic the patterns that appear in the natural landscape. The overall pattern combines two different scales: the micro-pattern and the macro-pattern. For more information about DualTex® and the sample patterns shown below, please see Section 7, References.

Dual-Texture 4est™

Dual-texture Arizonapat™

Dual-texture Zig Zag Arizona™

Use these steps to select a pattern:

- The color that is least visible in the landscape should be used as the base for the pattern. Select two to three of the remaining colors for use in generating different texture options. A private contractor will likely be required to generate these patterns.
- Apply the test pattern(s) to a sheet of plywood, and place it in the landscape in the approximate location of the facility.
- View and photograph the samples from the key observation point at different times of day to see which is least visible under different angles and levels of natural light.

Color and texture application techniques

While matte paint is preferred because it absorbs light instead of reflecting it, gloss enamel may be the more practical, long-term choice. Surfaces painted with gloss enamel will tend to lose at least some of their shine with exposure to the elements.

Patterns may be applied by freehand painting, painting in masked layers, or by installing adhesive-backed, preprinted vinyl. If the pattern is comprised of more than two colors, a vinyl applique is likely to be most cost-effective; the number of colors is unlimited and does not affect the cost. For more information about adhesive-backed vinyl, please see Section 7, References.

BMP: Bare ground treatment

Color treatments are recommended for the following hard surfaces, especially when the identified viewing area is above the elevation of the facility or access road. These surfaces are typically a light color that contrasts with the immediate surroundings:

- gravel roads
- graveled production pads
- surface rock used to roughen the ground surface for revegetation
- bedrock excavations

Two products that are commercially available include Eonite and Permeon. They are used specifically for the purpose of coloring concrete or rock surfaces to tone down the glare and contrast.

Regular maintenance and monitoring will help to ensure the success of most BMPs, particularly those that involve vegetation and color application.

Facility replacement

As new technology becomes available, permanent facilities should be replaced whenever feasible. Low-profile equipment with a lower visual impact is preferable to traditional installations.

Vegetation

A maintenance program should be established for all vegetated areas, whether seeded or planted with native species. The following items will be monitored on a regular basis:

- Protective fencing around revegetated areas is in good condition until the new vegetation is established.
- Removal of weeds and other undesirable species occurs before they become established.
- Irrigation, including catch basins and lithic mulch, are in good condition and functioning as intended.
- Additive products such as Driwater® are mixed into the soil around new vegetation to provide supplemental irrigation until new vegetation is firmly established (up to two years).
- Dead trees and other vegetation are removed and replaced by the operator as soon as feasible. Planting strategy is re-evaluated if necessary to ensure that vegetation has a reliable source of irrigation.

Color-treated surfaces

- Monitor paint and adhesive-backed vinyl for fading, cracking, peeling, etc. While some level of deterioration is anticipated and acceptable, severe damage warrants repair or replacement.
- Monitor bare-ground treatment and re-apply stain as required to minimize contrast with the surrounding landscape.